

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
PUBLIC WORKS AND TRANSPORT INSTITUTE (PTI)
MINISTRY OF PUBLIC WORKS AND TRANSPORT

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC

**THE PROJECT FOR
URBAN DEVELOPMENT MASTER
PLAN STUDY
IN VIENTIANE CAPITAL**

**FINAL REPORT
< SUMMARY >**

MARCH 2011

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NIPPON KOEI CO., LTD.
INTERNATIONAL DEVELOPMENT CENTER OF JAPAN
PACET CORP.
ORIENTAL CONSULTANTS CO., LTD.

| |
|--------|
| EID |
| JR |
| 11-052 |

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
PUBLIC WORKS AND TRANSPORT INSTITUTE (PTI)
MINISTRY OF PUBLIC WORKS AND TRANSPORT

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC

**THE PROJECT FOR
URBAN DEVELOPMENT MASTER
PLAN STUDY
IN VIENTIANE CAPITAL**

**FINAL REPORT
< SUMMARY >**

MARCH 2011

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NIPPON KOEI CO., LTD.
INTERNATIONAL DEVELOPMENT CENTER OF JAPAN
PACET CORP.
ORIENTAL CONSULTANTS CO., LTD.

The exchange rate used in the report is

JNY 86.19 = USD 1

JNY 0.010 = LAK 1

(average in 2010)



Source: JST

The Project for
Urban Development Master Plan Study in Vientiane Capital
Final Report
<Summary>

Location Map

TABLE OF CONTENTS

| | |
|---|----|
| Chapter 1: Introduction | 1 |
| 1.1 Background of the Study | 1 |
| 1.2 Objectives of the Study..... | 1 |
| 1.3 Study Area | 1 |
| 1.4 Implementation Arrangement | 2 |
| 1.5 Work Progress..... | 2 |
| 1.6 Formulation Methodology | 3 |
| Chapter 2: Current Conditions and Regulatory Framework..... | 5 |
| 2.1 Current Environmental Conditions..... | 5 |
| 2.2 Current Socioeconomic Conditions..... | 6 |
| 2.3 Legal and Regulatory Framework | 9 |
| 2.4 Urban Planning..... | 10 |
| 2.5 Urban Landscape | 12 |
| 2.6 Present Land Use..... | 13 |
| 2.7 Current Conditions of Infrastructure | 17 |
| 2.8 Relevant Development Project | 24 |
| Chapter 3: Development Visions and a Structure Plan for Vientiane Capital | 25 |
| 3.1 Development Visions..... | 25 |
| 3.2 Socioeconomic Framework | 28 |
| 3.3 Promotion of Urban Economy..... | 29 |
| 3.4 A Structure Plan for Vientiane Capital | 30 |
| Chapter 4: A Master Plan for Urban Planning Area | 43 |
| 4.1 Land Use Plan..... | 43 |
| 4.2 A Basic Strategy for Urban Development | 55 |
| 4.3 A Basic Strategy for Urban Landscape..... | 57 |
| 4.4 A Basic Strategy for Infrastructure Development | 58 |

| | |
|---|----|
| Chapter 5: Urban Development Management Program | 72 |
| 5.1 General Principles for Urban Development Management Program..... | 72 |
| 5.2 Sub-program for Urban Development Management | 73 |
| 5.3 Urban Development Management Governance of Lao PDR | 80 |
| 5.4 Organization Strategy | 81 |
| 5.5 Legal Framework Strategy | 83 |
| 5.6 Human Resource Development Strategy..... | 85 |
| 5.7 Capacity Development Plan | 87 |
| 5.8 Priority Programs..... | 89 |
| Chapter 6: Conclusions and Recommendations | 95 |

List of Tables

| | <u>Page</u> |
|---|-------------|
| Table 1.1: Outline of the S/Cs..... | 3 |
| Table 1.2: Outline of the SHMs | 3 |
| Table 1.3: Outline of the WGM..... | 4 |
| Table 2.1: Population and Annual Average Growth Rate in Census Years | 6 |
| Table 2.2: Change of Population Density by Districts..... | 6 |
| Table 2.3: No. of Factories in Vientiane Capital in 2008..... | 7 |
| Table 2.4: No. of Foreign Factories in Vientiane Capital in 2008..... | 8 |
| Table 2.5: No. of Hotels and Guesthouses in Vientiane Capital in 2007, 2008 and 2009..... | 8 |
| Table 2.6: Land Use Changes | 15 |
| Table 2.7: Population Distribution Pattern (2005)..... | 16 |
| Table 2.8: Water Demand Projection in Vientiane Capital..... | 18 |
| Table 2.9: Main Relevant Development Projects in Vientiane Capital..... | 24 |
| Table 3.1: Comparison of Alternatives | 30 |
| Table 3.2: Evaluation of Alternatives..... | 32 |
| Table 3.3: Multi-core Urban Structure..... | 32 |
| Table 3.4: Population Distribution..... | 33 |
| Table 3.5: Six (6) Planning Zones..... | 36 |
| Table 3.6: Infrastructure Development Policy in the Historic Conservation Zone | 37 |
| Table 3.7: Infrastructure Development Policy in the Inner Urban Zone..... | 38 |
| Table 3.8: Infrastructure Development Policy in the Outer Urban Zone | 39 |
| Table 3.9: Infrastructure Development Policy in the Sub-center Zone..... | 41 |
| Table 3.10: Infrastructure Development Policy in the Urban Cluster Zone..... | 42 |
| Table 4.1: Zoning Concept of Land Use Plan..... | 44 |
| Table 4.2: Area by Land Use Category | 46 |
| Table 4.3: Development Concept of KM21 | 47 |
| Table 4.4: Development Concept of Thanaleang..... | 48 |
| Table 4.5: Development Concept of Dongdock..... | 49 |
| Table 4.6: Development Concept of Naxaithong..... | 50 |
| Table 4.7: Development Concept of Railway Town | 51 |
| Table 4.8: Summary of Recommended Revision in Coverage Ration, Height of Building and Plot Ratio | 55 |
| Table 4.9: Basic Relocation Policy for Governmental and Educational Facilities..... | 57 |
| Table 4.10: Proposed Road Functional Road Classification | 58 |
| Table 4.11: Water Service Ration..... | 61 |
| Table 4.12: Water Quality Target | 63 |
| Table 4.13: Estimation of Wastewater Generation in Core Urban Area..... | 63 |
| Table 4.14: Proposed Wastewater Treatment Facility to Future Land Use | 63 |
| Table 4.15: Strategy in Drainage system and Action Plan | 65 |
| Table 4.16: Estimation of Annual Solid Waste Disposal..... | 67 |
| Table 4.17: Summary of Basic Strategy..... | 68 |
| Table 4.18: Administrative Obligation and Green Spaces Coverage Ratio | 69 |

| | |
|--|----|
| Table 4.19: Service Distance to Use of District Park and Pocket Park | 69 |
| Table 4.20: The Area Estimation of Public Parks for 2030..... | 70 |
| Table 5.1: List of Sub-programs and Projects..... | 77 |
| Table 5.2: Proposed Main Function of Each Organization on Urban Planning | 81 |
| Table 5.3: Proposed Duty of VUDAA..... | 82 |
| Table 5.4: Proposed Land Use Zone for amendment of Law on Urban Plan..... | 83 |
| Table 5.5: Amendment of Articles in Decree on VUDAA..... | 83 |
| Table 5.6: Confirmation Items and Contents of Building Confirmation..... | 84 |
| Table 5.7: General Information of Human Resources of Major Organizations | 85 |
| Table 5.8: Professional Field of Personnel of PTI | 86 |
| Table 5.9: Formation Flow of Capacity Development Plan..... | 87 |

List of Figures

| | |
|--|--------------------|
| | <u>Page</u> |
| Figure 1.1: Study Area | 2 |
| Figure 1.2: Flow of the Discussion..... | 4 |
| Figure 2.1: Geography and Hydrology | 5 |
| Figure 2.2: GDP Growth Rate and Contribution of Industries..... | 7 |
| Figure 2.3: Location and Function of Urban Centers in Vientiane Capital..... | 10 |
| Figure 2.4: Present Urban Planning Area and Land Use Zoning | 11 |
| Figure 2.5: Location Map of Registered National Historical and Cultural Heritage | 12 |
| Figure 2.6: Current Spatial Structure of Vientiane Capital | 13 |
| Figure 2.7: Land use 1995 | 14 |
| Figure 2.8: Land use 2005 | 14 |
| Figure 2.9: Urban Expansion of Central Area | 15 |
| Figure 2.10: Number of Registered Vehicles in Lao PDR | 17 |
| Figure 2.11: Existing Carriageway Width..... | 17 |
| Figure 2.12: Existing Water Supply System in Vientiane Capital..... | 19 |
| Figure 2.13: Existing Drainage System in Urban Vientiane Capital..... | 21 |
| Figure 2.14: Annual Volume of Solid Waste Disposal of KM32 Landfill Site | 22 |
| Figure 2.15: Park Area per Person in Comparison with Cities around the World..... | 23 |
| Figure 2.16: Locations of Public Parks, Open Spaces and Greenery in Urban Areas of Vientiane Capital | 23 |
| Figure 2.17: Main Relevant Development Projects in Vientiane Capital | 24 |
| Figure 3.1: Development Visions for Vientiane Capital | 25 |
| Figure 3.2: Location of Vientiane Capital in the GMS economic corridors | 26 |
| Figure 3.3: Framework of Development Visions and a Master Plan | 27 |
| Figure 3.4: Change of Total Population, Urban Population and Rural Population | 28 |
| Figure 3.5: Population Projection of Vientiane Capital in Different 3 Scenarios | 28 |
| Figure 3.6: GRDP Growth from 2010 to 2030 | 29 |
| Figure 3.7: Concept of Multi-core Structure..... | 31 |

| | |
|--|----|
| Figure 3.8: Concept of Concentrate Structure | 31 |
| Figure 3.9: Multi-core Structure Plan (Vientiane Capital)..... | 34 |
| Figure 3.10: Multi-core Structure Plan (Core Urban Area) | 34 |
| Figure 3.11: Urban Planning Area | 35 |
| Figure 3.12: Planning Zones in Vientiane Capital | 35 |
| Figure 3.13: Planning Zones (Core Urban Area) | 36 |
| Figure 4.1: Urbanization Simulation for 2030 | 43 |
| Figure 4.2: Existing Land Use | 44 |
| Figure 4.3: Land Use Plan of Core Urban Area 2030..... | 45 |
| Figure 4.4: Current Land Use and Land Use Plan of KM21 | 47 |
| Figure 4.5: Current Land Use and Land Use Plan of Thanaleang | 48 |
| Figure 4.6: Current Land Use and Land Use Plan of Dongdock | 49 |
| Figure 4.7: Current Land Use and Land Use Plan of Naxaithong | 50 |
| Figure 4.8: Current Land Use and Land Use Plan of Railway Town..... | 51 |
| Figure 4.9: Land Use Concept and Plan of Tha Ngon | 52 |
| Figure 4.10: Land Use Concept and Plan of Ban Phao..... | 53 |
| Figure 4.11: Land Use Concept and Plan of Khok Hae | 54 |
| Figure 4.12: Proposal of Special Plot Allowance Case..... | 56 |
| Figure 4.13: Concept for Road Network Master Plan | 58 |
| Figure 4.14: Proposed Public Transport Network (Long-term) | 59 |
| Figure 4.15: Road Development Program | 60 |
| Figure 4.16: Water Service Area (Core Urban Area) | 62 |
| Figure 4.17: Proposed location of Wastewater Treatment Plant for Short and Medium Term Plan..... | 64 |
| Figure 4.18: Proposed location of Wastewater Treatment Plant for Long Term Plan | 64 |
| Figure 4.19: Frequent Flooding Area in Vientiane Capital | 66 |
| Figure 4.20: Future Drainage System for Urban Area | 66 |
| Figure 4.21: Estimation of Annual Volume of Solid Waste Generation..... | 67 |
| Figure 4.22: Proposed Green Spaces Coverage Ratio in Development site | 69 |
| Figure 4.23: Service Distance for Use of District Park and Pocket Park..... | 70 |
| Figure 4.24: Proposed Scenario of Making District Parks in Inner Area..... | 71 |
| Figure 5.1: Principles for Effective and Implementation of Urban Development Management Program | 72 |
| Figure 5.2: Concept of Urban Development Management Governance..... | 80 |
| Figure 5.3: Ideal Relation and Cooperation System among Related Organizations | 81 |
| Figure 5.4: Correlation with Each Organization on Urban Planning Phase..... | 81 |
| Figure 5.5: Correlation with Each Authority on Management Phase | 82 |
| Figure 5.6: Proposed Organization of VUDAA..... | 82 |
| Figure 5.7: Country to Study Abroad of Personnel in PTI and DHUP | 86 |
| Figure 5.8: Structure of Program Approach..... | 89 |
| Figure 5.9: Program Approach and Priority Program..... | 89 |
| Figure 5.10: Implementation of Urban Master Plan | 94 |

LIST OF ABBREVIATIONS

| | |
|--------|--|
| ADB | Asian Development Bank |
| AFTA | ASEAN Free Trade Zone |
| AIT | Asian Institute of Technology |
| APB | Agriculture Promotion Bank |
| ASEAN | Association of South-East Asian Nations |
| BRT | Bus Rapid Transit |
| BST | Bituminous Surface Treatment |
| CBD | Central Business District |
| CBS | Community Based Sanitation |
| COS | Building Total Floor Area/Area Ratio |
| C/P | Counterpart |
| DANIDA | Danish International Development Agency |
| DAF | Department of Agriculture and Forestry |
| DIC | Department of Information and Culture |
| DOIC | Department of Industry and Commerce |
| DOE | Department of Environment |
| DoS | Department of Statistic |
| DF/R | Draft Final Report |
| DHUP | Department of Housing and Urban Planning |
| DMA | District Metered Area |
| DPI | Department of Planning and Investment |
| DPRA | Development Projects Responsible Agency |
| DPWT | Department of Public Works and Transport |
| FTA | Free Trade Agreements |
| EA | Environmental Assessment |
| ECC | Environmental Compliance Certificate |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| EPA | Economic Partner Agreement |
| ERP | Electric Road Pricing |
| ESIAD | Environment and Social Impact Assessment Department |
| FDI | Foreign Direct Investment |
| F/R | Final Report |
| GIS | Geographic Information System |
| GMS | Greater Mekong Sub-region |
| GOL | Government of Lao People's Democratic Republic |
| GOJ | Government of Japan |
| GDP | Gross Domestic Products |
| GPZ | German Technical Cooperation |
| GRDP | Gross Regional Domestic Products |
| GTZ | Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (German society for technical cooperation) |
| IC/R | Inception Report |
| IEE | Initial Environmental Evaluation |
| IEIA | Initial Environmental Impact Assessment |
| IT/R | Interim Report |
| JICA | Japan International Cooperation Agency |
| JST | JICA Study Team |
| LOI | Law on Investment |
| LAK | Lao PDR Kip |
| LMA | Land Management Authority |
| MAF | Ministry of Agriculture and Forestry |
| MIC | Ministry of Information and Culture |
| MOIC | Ministry of Industry and Commerce |
| MOH | Vehicle Capacity Ratio |
| MPI | Ministry of Planning and Investment |
| MPWT | Ministry of Public Works and Transport |

| | |
|-------|---|
| MRC | The Mekong River Commission |
| NLMA | National Land Management Authority |
| NGO | Non-governmental Organization |
| NRW | Non Revenue Water |
| NUL | National University of Laos |
| NPVC | Nam Papa Vientiane Capital, Water Supply Company of the Vientiane Capital |
| OJT | On the Job Training |
| OPWT | Office of Public Works and Transport |
| PACSA | Public Administration and Civil Service Authority |
| P/R | Progress Report |
| PTI | Public Works and Transportation Institute |
| PPP | Public Private Partnership |
| S/C | Steering Committee |
| SEA | Strategic Environmental Assessment |
| SHM | Stakeholder Meeting |
| S/W | Scope of Work |
| SWMDS | Solid Waste Management and Disposal Section |
| SWOT | Strength, Weakness, Opportunity, and Threat |
| TDM | Traffic Demand Management |
| UCDS | Urban Cleaning and Decoration Service |
| UDAA | Urban Development Administration Authority |
| UD MP | Urban Development Master Plan |
| USD | US Dollar |
| VC | Vientiane Capital |
| VCR | Vehicle Capacity Ratio |
| V-GIS | GIS Database of Vientiane |
| VIP | Vientiane Industrial Park |
| VLP | Vientiane Logistic Park |
| VSBC | Vientiane State Bus Company |
| VSWCS | Vientiane Solid Waste Collection Service |
| WASA | Water Supply Authority |
| WaSRO | Water Supply Regulatory Office |
| W/G | Working Group |
| WREA | Water Resources and Environment Administration |
| WTO | World Trade Organization |
| WSD | Water Supply Division |
| WSRC | Water Supply Regulatory Committee |
| WTP | Water Treatment Plant |
| WUA | Water User's Association |
| VUDAA | Vientiane Urban Development Administration Authority |

THE STUDY IN PICTURES



Steering Committee (1st)
(29th January 2010)



Training Workshop (3rd)
(10th August 2010)



Working Group Meeting (9th)
(27th October 2010)



Scientific Seminar in the 450th
Anniversary (20th November 2010)



Steering Committee (4th)
(9th February 2011)



Final Seminar
(4th March 2011)

Chapter 1: Introduction

1.1 Background of the Study

Background of the Study: Vientiane Capital, which is the capital city of Lao PDR, has high economic and demographic growth potential. It is thus quite likely that the urban area would rapidly expand toward the suburbs along the arterial roads with inadequate infrastructure facilities, creating the problem of urban sprawl with bad living conditions and inappropriate social services, and the pastoral charms of the city might be lost. To counter this problem, appropriate measures must be taken promptly based on a comprehensive urban development plan. In the light of this situation, it is recommended that the local government of Vientiane Capital as well as all its citizens carefully examine the problems which they are confronted with and consider the best way to develop Vientiane Capital toward the year 2030, so that it should be a more attractive capital for both Lao people and foreign visitors as well. This year is a good occasion for the master plan, as Vientiane Capital marks the 450th anniversary of the transfer of the capital to the city.

Undertaking the Study: In response to the request from the Government of Lao PDR, the Government of Japan decided to conduct “The Project for Urban Development Master Plan Study in Vientiane Capital”. Accordingly, JICA undertakes the Study in close cooperation with the concerned authorities of the Government of Lao PDR.

1.2 Objectives of the Study

Objectives of the Study: The objectives of the Study are as follows.

- (a) To formulate an urban development master plan in Vientiane Capital, targeting the year 2030.
- (b) To examine a methodology to improve the effectiveness of the urban development master plan.
- (c) To implement a technical transfer of knowledge related to urban development and planning.

Output of the Study: The output of the Study is as follows.

- (a) An urban development master plan in Vientiane Capital.
- (b) An urban development management program.

1.3 Study Area

Study Area: The study area covers the whole area of Vientiane Capital, 3,920 km² as shown in Figure 1.1.



Source: JST

Figure 1.1: Study Area

1.4 Implementation Arrangement

Implementation Arrangement: The executing agency for the Study was set as the Public Works and Transport Institute (PTI), together with Vientiane Capital. PTI belongs to Ministry of Public Works and Transport (MPWT), in-charge of establishing and formulating the urban plans and Vientiane Capital is in-charge for its enforcement. Accordingly the Steering Committee (S/C) was established under the co-chairmanship of Minister of MPWT and Governor of Vientiane Capital.

1.5 Work Progress

The Study started in January 2010, and was completed in March 2011.

Inception Report: A team to carry out this study (JICA Study Team), consisting of experts in relevant fields, was dispatched by JICA to Lao PDR in January 2010. The Study was carried out based on the schedule as agreed upon in the first S/C meeting that was held on 29th January 2010.

Progress Report: Progress Report summarizes the current condition, issues and basic policies related to Vientiane Capital which will establish a base for further planning. In June 2010, the Progress Report was submitted to the Lao PDR side, and on 2nd July 2010, the second S/C meeting was held in Vientiane to review and discuss the subject of the report.

Interim Report: Interim Report summarizes the current conditions and issues, visions, basic policies, and basic strategies. This analysis will establish the base for the formulation of urban development master plan. In November 2010, the Interim Report was submitted and the third S/C was held on 30th November.

Draft Final Report: In January 2011, JICA Study Team prepared the Draft Final Report (this report), consisting of Book1 and Book2, and the Report will be submitted to Lao PDR side in the fourth S/C meeting, which was held on 9th February 2011.

Final Report: At the end of the study, the Final Report was submitted to Lao PDR side through JICA in March 2011.

1.6 Formulation Methodology

Outline: For formulation of this urban development master plan, mainly steering committee (S/C), stakeholder meetings (SHM) and working group meetings (WGM) as mentioned below were held.

S/C: A S/C was established under the co-chairmanship of Governor of Vientiane Capital and Minister of MPWT in 29th January 2010 in order to share present information and perceptions, and oversee the formulation of an urban development master plan to be proposed in this study. The outline of the past four (4) times meetings is shown in Table 1.1.

Table 1.1: Outline of the S/Cs

| No. | Date (DD/MM/YY) | Main Topics | Chair Person | The Number of Lao Attendees |
|-----|--------------------|---|--|--------------------------------|
| 1 | 29/ 01/ 2010 | 1) Inception Report | Mr. Sommad PHOLSENA (Minister of MPWT) | 36 |
| 2 | 02/ 07/ 2010 | 1) Progress Report | Mr. Sombath YIALIHER (Mayor of Vientiane Capital) | 32 |
| 3 | 30/ 11/ 2010 | 1) Interim Report 2) Visual Presentation (Urban Landscape) | Mr. Bunchanh SIHTHAVONG (Vice Mayor of Vientiane Capital) | 64 |
| 4 | 09/ 02/ 2011 | 1) Draft Final Report 2) Priority Program | Mr. Keophilavanh APHAYLATH (Director of DPWT) | 41 |

Source: JST

SHM and Seminar: A SHM was held on 12 July 2010 chaired by the Vice Mayor of Vientiane Capital, following the 2nd S/C. Later, on 20 November, a Scientific Seminar was held, namely Sustainable Urban Development, chaired by the Vice Mayor of Vientiane Capital and to also celebrate the 450th Anniversary of Vientiane. Finally, a Seminar on the main results of the Study was held chaired by the Deputy Director of PTI to close the Study.

Table 1.2: Outline of the SHMs

| No. | Date (DD/MM/YY) | Title and Main Topics | Chair Person | The Number of Lao Attendees |
|-----|--------------------|--|--|--------------------------------|
| 1 | 12/ 07/ 2010 | Stakeholder Meeting 1) Progress Report | Mr. Bounchanh SINTHAVONG (Vice Governor of Vientiane Capital) | 92 |
| 2 | 20/ 11/ 2010 | Scientific Seminar 1) Interim Report 2) Visual Presentation (Urban Landscape) | Mr. Bounchanh SINTHAVONG (Vice Governor of Vientiane Capital) | 167 |
| 3 | 04/ 03/ 2011 | Final Seminar 1) Final Report 2) Visual Presentation 3) Result of Technical Transfer | Mr. Thenkham THONGBONH (Deputy Director of PTI) | 105 |

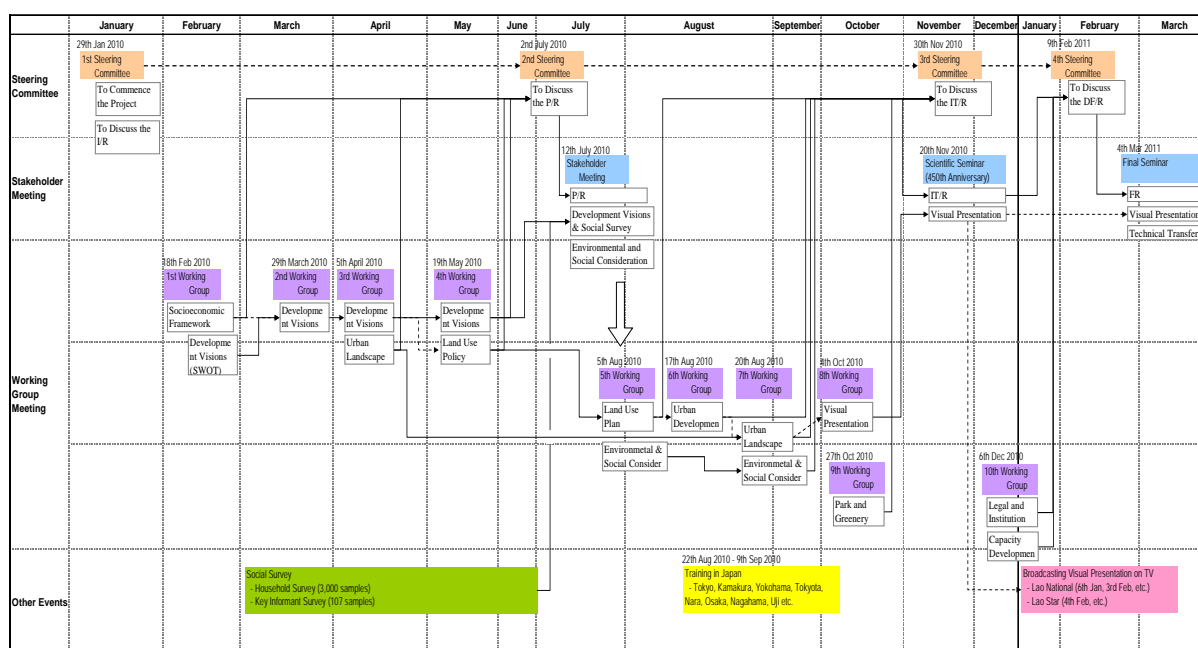
Source: JST

WGM: A WGM was constituted in February 2010 in order to discuss various topics regarding urban planning in Vientiane Capital. In the conducted meetings, the members from the related organizations, have continuously fed their ideas and elaborated their concept for development visions including structure plan, a land use policy, strategies for the infrastructure sectors, and the development of entire Vientiane Capital with the target year of 2030. The WGM has met ten (10) times.

Table 1.3: Outline of the WGM

| No. | Date (DD/MM/YY) | Lao Attendees | | | | | | | Main Topics |
|-----|--------------------|---------------|------|------|--------------|------|-------|-------|---|
| | | PTI | DPWT | DHUP | VC/ VUDAA | OPWT | Other | Total | |
| 1 | 18/ 02/ 2010 | 10 | 2 | 2 | 1 | 9 | 0 | 24 | - Socioeconomic Framework - Development Visions (1 st) |
| 2 | 29/ 03/ 2010 | 9 | 1 | 2 | 0 | 0 | 0 | 12 | - Development Visions (2 nd) |
| 3 | 05/ 04/ 2010 | 9 | 1 | 1 | 1 | 0 | 2 | 14 | - Development Visions (3 rd) - Urban Landscape (1 st) |
| 4 | 19/ 05/ 2010 | 6 | 2 | 1 | 2 | 9 | 1 | 21 | - Development Visions (4 th) - Land Use Policy |
| 5 | 05/ 08/ 2010 | 10 | 3 | 1 | 6 | 7 | 1 | 28 | - Land Use Plan - Environmental and Social Consideration (1 st) |
| 6 | 17/ 08/ 2010 | 11 | 1 | 1 | 5 | 5 | 4 | 27 | - Urban Development |
| 7 | 20/ 08/ 2010 | 9 | 2 | 0 | 4 | 2 | 6 | 23 | - Urban Landscape (2 nd) - Environmental and Social Consideration (2 nd) |
| 8 | 04/ 10/ 2010 | 4 | 2 | 2 | 1 | 0 | 0 | 9 | - Visual Presentation (1 st) |
| 9 | 27/ 10/ 2010 | 8 | 2 | 0 | 7 | 9 | 0 | 26 | - Parks and Greenery - Visual Presentation (2 nd) |
| 10 | 06/ 12/ 2010 | 10 | 2 | 0 | 5 | 8 | 2 | 27 | - Legal and Institutional Framework - Capacity Development Strategy |

Source: JST



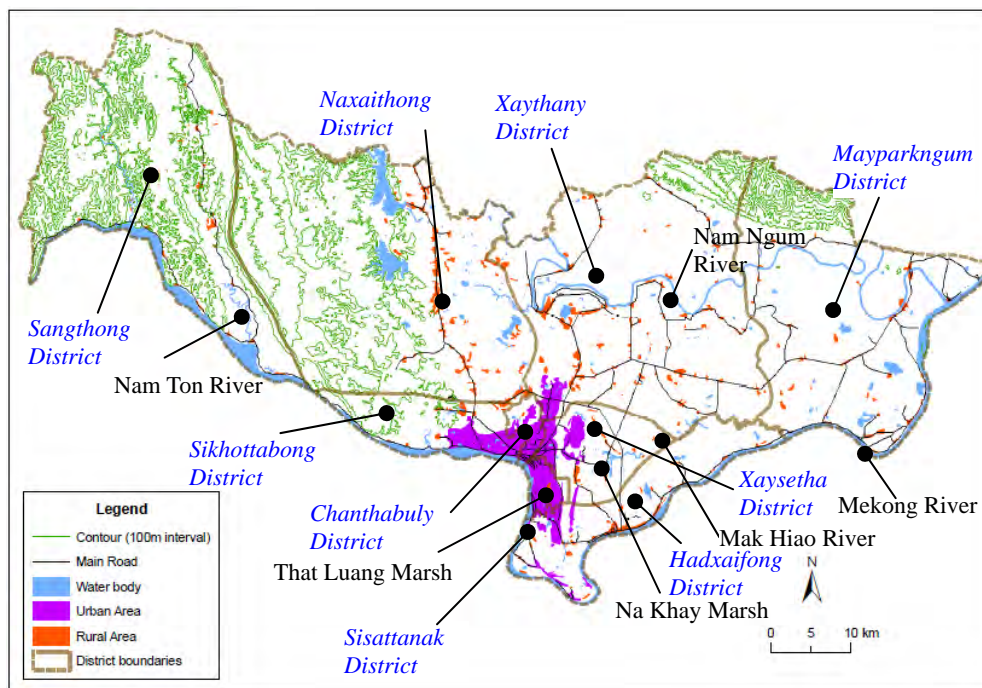
Source: JST

Figure 1.2: Flow of the Discussion

Chapter 2: Current Conditions and Regulatory Framework

2.1 Current Environmental Conditions

Topography: Vientiane Capital is located on the left bank of the Mekong River. The urbanized areas are mainly part of Chanthabouly, Sisattanak, Sikhottabong and Xaysetha Districts which are located on the natural plain formed by the Mekong River at an altitude of 160m – 180m.



Source: National Geographic Office, JST compilation

Figure 2.1: Geography and Hydrology

Climate: Vientiane Capital has a tropical monsoon climate which is divided into two seasons: the rainy season from May to October and the dry season from November to April. The hottest season is in April, the season for Pee Mai Lao (Lao New Year). Annual rainfalls have fluctuated between 1,500 - 2,000 mm over the last decade except in years 1999 and 2008 when it was about 2,200mm.

Hydrology: There are three major rivers in Vientiane Capital. The largest river, the Mekong River, runs at the east side of Vientiane Capital on the border of Thailand. The second largest river, the Nam Ngum River, passes east and west straddling Xaythany District and Mayparkngum District toward the Mekong River in the eastern area. In the western area, the Nam Ton River runs north and south on the border of Sangthong District and Naxaithong District. For the drainage system, discharged water from the urban area first runs into That Luang Marsh which is located at the east edge of the urban area and then the drained water flows eastward through the Mak Hiao River to the Mekong River. That Luang Marsh and the Na Khay Marsh plays an extremely valuable role in storing the drained water before discharging to the Mekong River.

2.2 Current Socioeconomic Conditions

Population of Lao PDR: The population of Lao PDR had doubled from 2.9 million in 1976 to 5.6 million in 2005, which shows a growth rate higher than the average in the East Asia and Pacific region. However, the growth rate is gradually getting lower, from 2.5% in the decade between 1976 and 1985 to 2.0% between 1995 and 2005. According to the Statistical Yearbook 2009, population passed the 6.1 million mark in 2009.

Table 2.1: Population and Annual Average Growth Rate in Census Years

| Year | 1976 | 1985 | 1995 | 2005 |
|--------------------------------|-------|-------|-------|-------|
| Total Population (000 persons) | 2,886 | 3,618 | 4,605 | 5,622 |
| Annual Average Growth Rate (%) | - | 2.5 | 2.4 | 2.0 |

Source: Statistical Yearbook 1975-2005, 2007, Department of Statistic (DoS)

Population of Vientiane Capital: The population of Vientiane Capital was 795,000 in 2009. The population growth of Lao PDR was 2.2% during 1985 and 2005; while the growth rate of Vientiane Capital recorded 3.1% in the same period. As a result, share of population in Vientiane Capital to Lao PDR has increased from 10.5% to 12.4% during the same period.

Population Density: Considering the population density in 1995, 2005 and 2009, it is possible to classify the districts into 4 groups. The first group consists of Chanthabouly District and Sisattanak District with the population density of more than 2,500 persons/ km² in 2009. Sikhottabong District and Xaysetha District constitutes the second group which had the population density of 750 to 800 persons/ km² in 2009. The third group is Hadxaifong and Xaythany with the population density of 150 to 350 persons/ km², and the fourth and the final group is Mayparkngum, Naxaithong and Sangthong which had the population density of less than 100 persons/ km².

Table 2.2: Change of Population Density by Districts

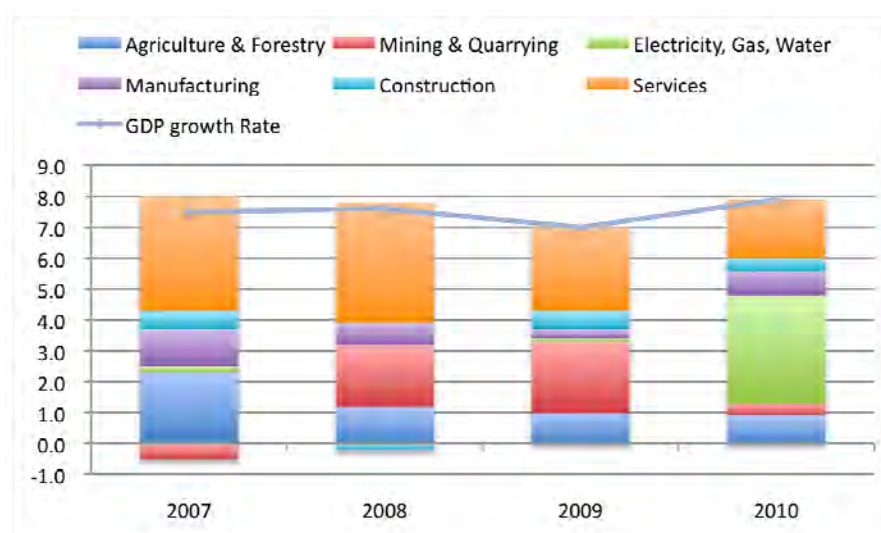
| District | Population (Persons) | | | Area (km ²) | Population Density (Persons/km ²) | | |
|--------------|----------------------|---------|---------|-------------------------|---|---------|---------|
| | 1995 | 2005 | 2009 | | 1995 | 2005 | 2009 |
| Chanthabouly | 58,855 | 68,858 | 78,407 | 29 | 2,029.5 | 2,374.4 | 2,703.7 |
| Sikhottabong | 74,251 | 99,908 | 113,763 | 140 | 530.4 | 713.6 | 812.6 |
| Xaysetha | 75,255 | 97,514 | 111,037 | 147 | 511.9 | 663.4 | 755.4 |
| Sisattanak | 58,178 | 68,686 | 78,211 | 31 | 1,876.7 | 2,215.7 | 2,522.9 |
| Naxaithong | 44,104 | 58,368 | 66,462 | 1,131 | 39.0 | 51.6 | 58.8 |
| Xaythany | 97,829 | 150,793 | 171,705 | 916 | 106.8 | 164.6 | 187.5 |
| Hadxaifong | 64,962 | 78,338 | 89,202 | 258 | 251.8 | 303.6 | 345.7 |
| Sangthong | 16,728 | 24,215 | 27,573 | 622 | 26.9 | 38.9 | 44.3 |
| Mayparkngum | 33,945 | 45,041 | 51,287 | 646 | 52.5 | 69.7 | 79.4 |

Source: Results of Census in 1995 and 2005; Basic Statistics Data on Socio-Economic Development 2008/2009 of Vientiane Capital

Labor Force: According to Census 2005 Report, 49.1% of the total population of Vientiane Capital was classified as “Economically Active Population” in which people can work and are willing to work. Out of the remaining 50.9%, 17.3% were children under 10 years old, 20.5% were students, 7.4% were engaged in household duties and 5.1% were either retired or suffering with diseases or were old persons.

Farming Population: At the national level, in 2005, the percentage of farming population was 78.5%. However, the percentage was quite low in Vientiane Capital and was 35.3% only.

GDP Growth: Out of 7.6% growth, the sum of service and the mining & quarrying occupied 5.9% in 2008. Contribution of agriculture, manufacturing and construction is around 0.5% to 1.0% during the period. In 2010, large contribution of electricity, gas and water is expected due to the starting of operation of Nam Then 2 Dam.



Note: Figures in 2009 are estimation and figures in 2010 are projection.

Source: Lao PDR Economic Monitor Mid-Year Update May 2010, World Bank Lao Office

Figure 2.2: GDP Growth Rate and Contribution of Industries

Economic Development: The annual average growth rate of Gross Regional Domestic Products (GRDP) from 2001 to 2005 was 9.8%. Composition share of industry in 2005 was 23% from the primary, 52% from the secondary and 25% from the tertiary sector. GRDP of Vientiane Capital in 2008 accounted for LAK 10.5 trillion and occupied 23% of national GDP (LAK 46.2 trillion). GRDP per capita in Vientiane Capital was equivalent to USD 1,585, which is 1.7 times higher than the average of Lao PDR (USD 891) in the same year.

Socioeconomic Development Plan: According to the on-going socioeconomic development plan, 2006 to 2010, the estimated population of Vientiane Capital was 838,000 persons in 2010 with an estimated increase of 136,000 persons in 5 years. The target GRDP for the year 2010 was LAK 11,130 billion.

Factory: Table 2.3 shows that 66% of the large scale factories (Level-1) in Lao PDR were concentrated in Vientiane Capital in 2008. However on considering the other level (Level 2 & 3) of industries, the average share of Vientiane Capital falls to 9% only. The apparel industry makes up a vast majority of Level-1 factories in Vientiane Capital and 530 out of 566 apparel factories are located there.

Table 2.3: No. of Factories in Vientiane Capital in 2008

| | No. of Factories | | | |
|------------------------------------|------------------|---------|---------|--------|
| | Level-1 | Level-2 | Level-3 | Total |
| Vientiane Capital (A) | 566 | 103 | 1,503 | 2,172 |
| Lao PDR (B) | 857 | 492 | 22,817 | 24,166 |
| Share of Vientiane Capital (A)/(B) | 66% | 21% | 6.6% | 9% |

Note: Level-1 means large-scale factory (more than 200 labors, etc.), Level-2 means medium-scale (51-200 labors, etc.), and Level-3 means small-scale (10-50 labors, etc.).

Source: Ministry of Industry and Commerce (MOIC)

Foreign Factories: There are 134 foreign invested factories in Vientiane Capital in 2008, which accounted for 55% of those in Lao PDR as shown in Table 2.4.

Table 2.4: No. of Foreign Factories in Vientiane Capital in 2008

| | No. of Factory |
|------------------------------------|----------------|
| Vientiane Capital (A) | 134 |
| Lao PDR (B) | 245 |
| Share of Vientiane Capital (A)/(B) | 55% |

Source: MOIC

Factory Labor: In 2008, the number of factory labor were approximately 50,000 in Vientiane Capital which accounts to approximately 41% of total Lao PDR's factory labor force.

Industrial Zone: In Vientiane Capital, there are following industrial zones or industrial areas located within the commercial, residential, and agricultural areas.

- Central part where many factories are located such as apparel factories
- Old industrial zone on the sides of Thadeua Road with the total area of 673 ha
- New industrial zone with the total area of 2,000 ha located south of Km 21 National Road No.13 South (Koksaat Industrial Zone)

Agriculture: Agriculture is active in the central and eastern plain areas, particularly in rice farming. Swamps are one of features of the Vientiane Plain, but they do not always have water all the year. Such areas are submerged during the wet season and the depth depends on the increase in water level. However, these areas do dry up during dry season. Such swamp areas are not utilized for agriculture. Rice farming is done in the areas between such lowland swamps and Butties, where the drainage condition is relatively good and is not submerged during wet season. As for other agriculture crops, considering the advantage of adjacent location to a big market like Vientiane Capital, various kinds of vegetable and industrial cash crops such as tobacco plantation are in practice from a very long time.

Irrigation: The production of the dry season irrigated rice has increased more than twice from 40,000 ton in 1996 to 930,000 ton in 2000, however since then irrigated rice production has been between kept 90,000 to 100,000 ton per year. Presently, there are 102 irrigation facilities under the management of Vientiane Capital.

Market: There are 83 markets in Vientiane Capital at present. There are large numbers of market as many as 22 in Xaysetha district.

Hotel and Guesthouse: The number of foreign visitors to Vientiane Capital was approximately 200,000 in year 2006 and 2007, respectively, while in comparison to the foreign visitors to Luang Prabang, which is a World Heritage Site, was approximately 240,000 visitors visited. The number of hotels was 175 and one of guesthouses was 187 in Vientiane Capital

Table 2.5: No. of Hotels and Guesthouses in Vientiane Capital in 2007, 2008 and 2009

(Unit: buildings)

| | Hotel | | | Guesthouse | | |
|-------------------|-------|------|------|------------|-------|------|
| | 2007 | 2008 | 2009 | 2007 | 2008 | 2009 |
| Vientiane Capital | 79 | 114 | 175 | 169 | 185 | 187 |
| Luang Prabang | 21 | 31 | 41 | 203 | 161 | 201 |
| Other provinces | 111 | 120 | 141 | 748 | 774 | 956 |
| Total Lao PDR | 211 | 265 | 357 | 1,120 | 1,120 | 1344 |

Source: Lao National Tourism Administration

2.3 Legal and Regulatory Framework

The structure of the Government: There are 16 ministries including Prime Minister's Office and MPWT in the central government. Each ministry has their own agencies at local level (Provinces and Districts).

MPWT and DPWT: MPWT has DPWT at provinces including Vientiane Capital and OPWT at districts. MPWT and its line agencies is the main player for urban planning and urban management.

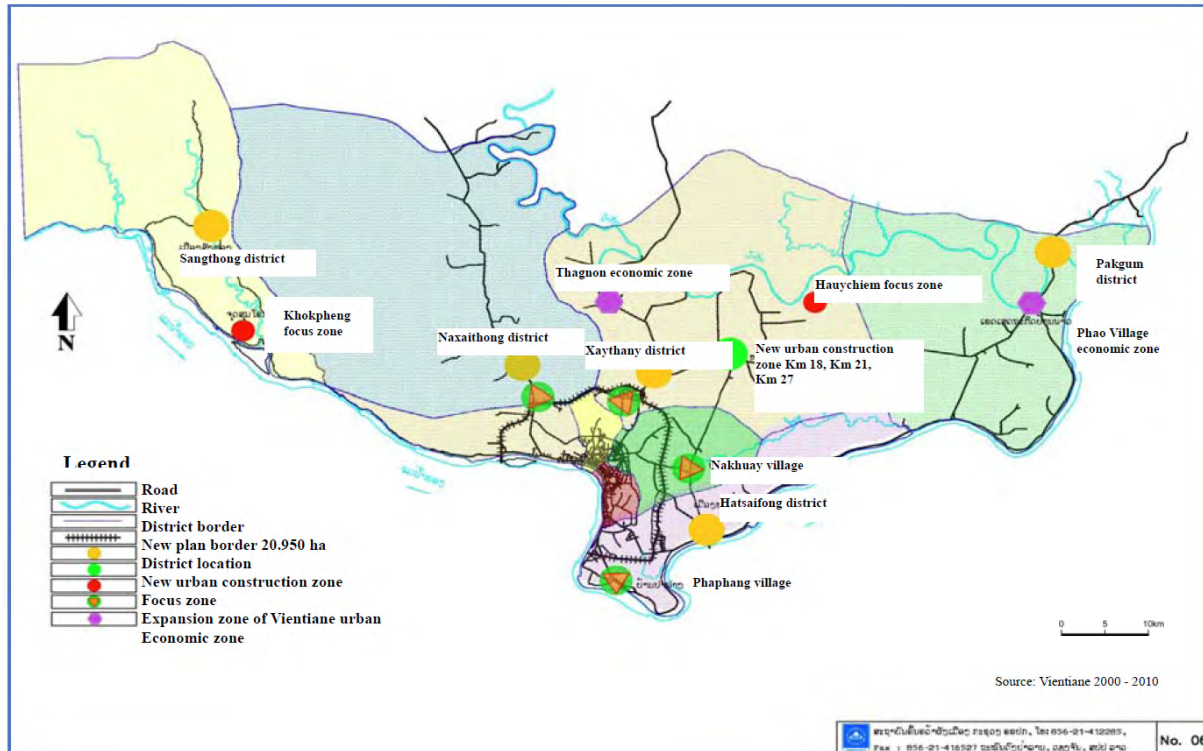
OPWT and VUDAA: There are 9 districts in Vientiane Capital, namely Chanthabouly, Sikhottabong, Xaysetha, Sisattanak, Naxaithong, Xaythany, Hadxaifong, Sangthong, and Mayparkngum District. Urban planning and management of Vientiane Capital are implemented by DPWT and OPWT in 9 districts. In addition, VUDAA exists in the Capital which is responsible for the management of urbanized area of the Capital. Districts officially covered by VUDAA are four (4) – Chanthabouly, Sikhottabong, Xaysetha and Sisattanak District.

Relevant Organizations: Responsibilities of Relevant organizations are as follows:

- (a) MPWT (Ministry of Public Works and Transport) is responsible for macro-management of land, water, and air transport, housing, urban and rural housing in Lao PDR. MPWT consists of ten (10) departments including Department of Housing and Urban Planning and Department of Roads, one authority (Railway Authority), and one Institute (PTI).
- (b) DHUP (Department of Housing and Urban Planning) is responsible for research of decree and law and technical standard, management of budget, management and monitoring of planning and construction, and training to staff.
- (c) PTI (Public Works and Transport Institute) is the main institute responsible for preparation of urban plans in Lao PDR. Between 1991 and 2007, about 115 urban master plans have been prepared in Lao PDR and more than 70% (81 urban master plans) of them are provided by PTI.
- (d) DPWT (Department of Public Works and Transport) in Vientiane Capital manages the other areas that are not managed by VUDAA. There are two management organizations in the Capital – DPWT and VUDAA. VUDAA covers highly urbanized area of villages in districts of Capital based on Decree on the Implementation and Activities of VUDAA. DPWT manages other area (villages in districts).
- (e) OPWT (Office of Public Works and Transport) in Districts is the organization responsible for the management of public works and transport in the district which are under the control of DPWT in the Capital.
- (f) VUDAA (Vientiane Urban Development Administration Authority) has been established for the management of highly urbanized area in the districts of Vientiane Capital. This is based on the Decree on the Implementation and Activities of UDAA of Vientiane Capital promulgated in February 1997. There are 500 villages in 9 districts in the Capital. Of which, 400 villages in 9 districts are managed by DPWT. Other 100 villages in four districts are covered by VUDAA.

2.4 Urban Planning

Present Urban Planning: In the Vientiane 2010 plan (2000-2010), the functional distributions were proposed within Vientiane Capital. The Vientiane 2010 plan specifies the location and function of urban centers in Vientiane Capital and shown in Figure 2.3. This figure illustrates a clear need for dis-concentrating the urban functions from the Vientiane city center towards the District centers, and need for industrial development in the suburbs of Vientiane city.



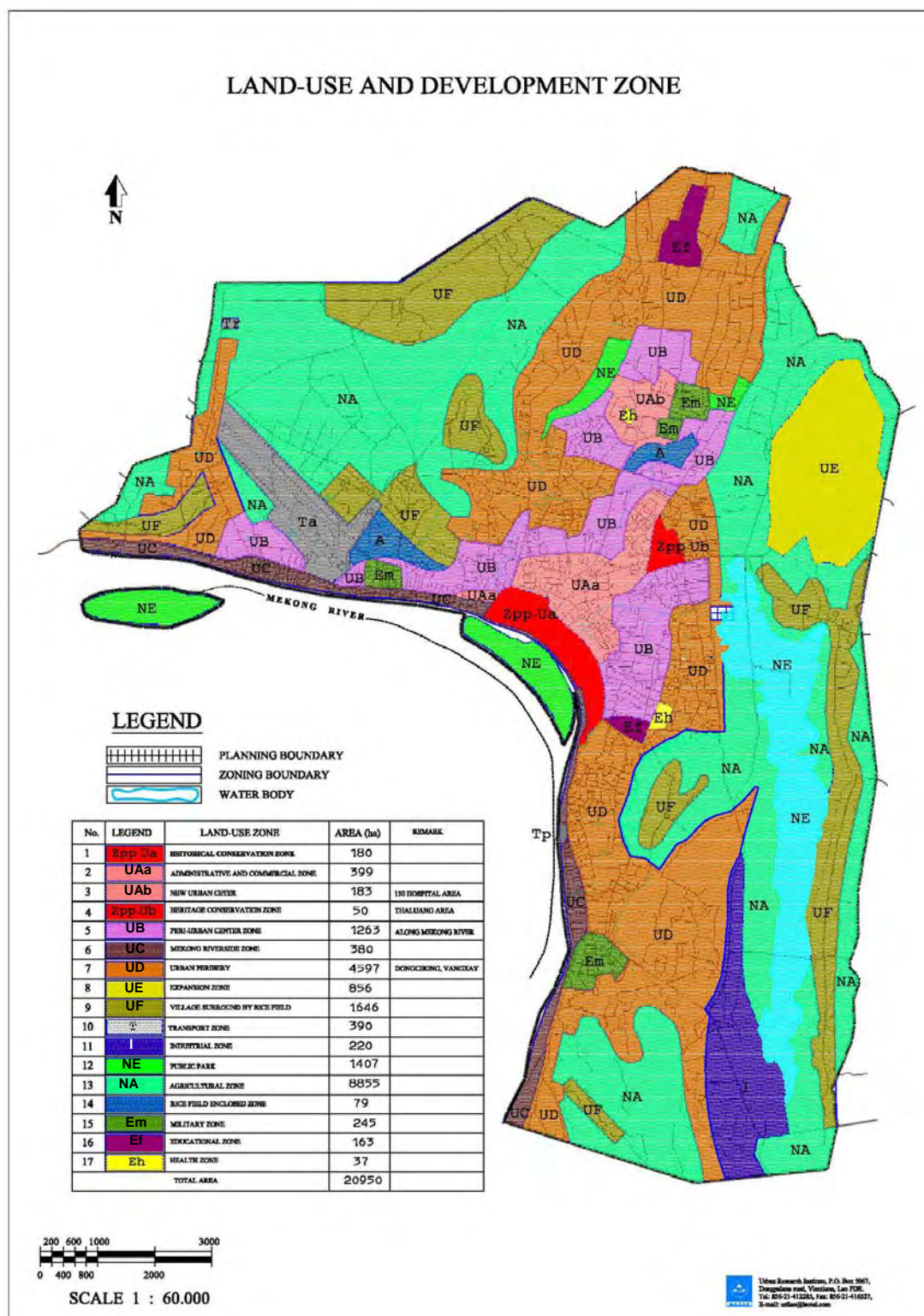
Source: Urban Development Master Plan Vientiane Capital 2000 – 2010

Figure 2.3: Location and Function of Urban Centers in Vientiane Capital

Urban Planning Area: In the Vientiane 2010 plan, three boundaries are proposed for the existing urban area (100 villages); new urban area (150 village); and future urban areas (189 villages). The total urban areas of these three categories are 20,950 ha.

Zoning Scheme: Figure 2.4 shows a proposed zoning scheme for Vientiane 2010. In all 17 zoning categories are established and applied to the proposed urban planning area for 2010. The basic scheme for the zoning seems to be straight forward and rational.

Buildings permission: OPWT handles application and permission of buildings having floor area less than 200m². In case if the building having a floor area of more than 200m² than OPWT receives an application form of a building and sends it to DPWT with OPWT's comment. DPWT gives permission for a building having floor area more than 200m².



Source: Urban Development Master Plan Vientiane Capital 2000 – 2010

Figure 2.4: Present Urban Planning Area and Land Use Zoning

2.5 Urban Landscape

Overview: Urban landscape of Vientiane Capital is still characterized by its traditional green feature, surrounding wetlands and fertile agricultural land. Distinctive urban landscape elements are composed of rich green trees around low-rise public and private building and light-brown color high roofs of temples in urbanized area. However, newly constructed major roads are inducing and enhancing ribbon or corridor type commercial and urban development and started dominating the prevailing agricultural scenery. At the moment, high-rise buildings sometimes with miller walls have started to come up in the urbanized area and agricultural land. Wet lands are changing and developing to urban area in the suburbs.

Relevant Legal Framework: The four measures for urban landscape conservation and improvement are based on the National Historical and Cultural Heritage Preservation Law and its related action, Land Use Zoning System on the Urban Development Master Plan Vientiane Capital, and Building Permit System and are as follows,

- (a) Existing land use zoning of the Master Plan 2000 – 2010 clearly define and designate the important areas, historical heritages in urban area, etc.
- (b) Building Permit system is enforced to control building height (H), building coverage area ratio (E), building total floor area/area ratio (COS) and building set-back.
- (c) National Historical and Cultural Heritage Preservation Law defines the historical and cultural heritages at two levels i.e. at nation and local level.
- (d) Urban heritages in the designated Historical Conservation Zone have been investigated, which defined 286 buildings that include Lao traditional, French colonial and other arch type buildings.

Land Use Zoning: Improvement and conservation zones of urban and rural scenery had been defined and designated on the land use plan of Vientiane Urban Development Master Plan 2000 – 2010. The land use plan was formulated based on the compiled data and information of historical heritages, high productive farmland and water source, and others. And it clearly defines and set Historical Conservation zone, Heritage Conservation zone, Public Park (greenification) zone, and Agricultural zone.

Heritages Preservation: Five temples, one national monument, and one surrounding area of national monument have been investigated, registered and preserved as national level of historical and cultural heritages in Vientiane Capital by MIC.

- (a) Five Temples: Inpeang, Onteu, Sisaket, Ho Pakeo, Si Muang
- (b) 1 National Monument: That Luang
- (c) 1 Surrounding area of the national Monument: That Luang

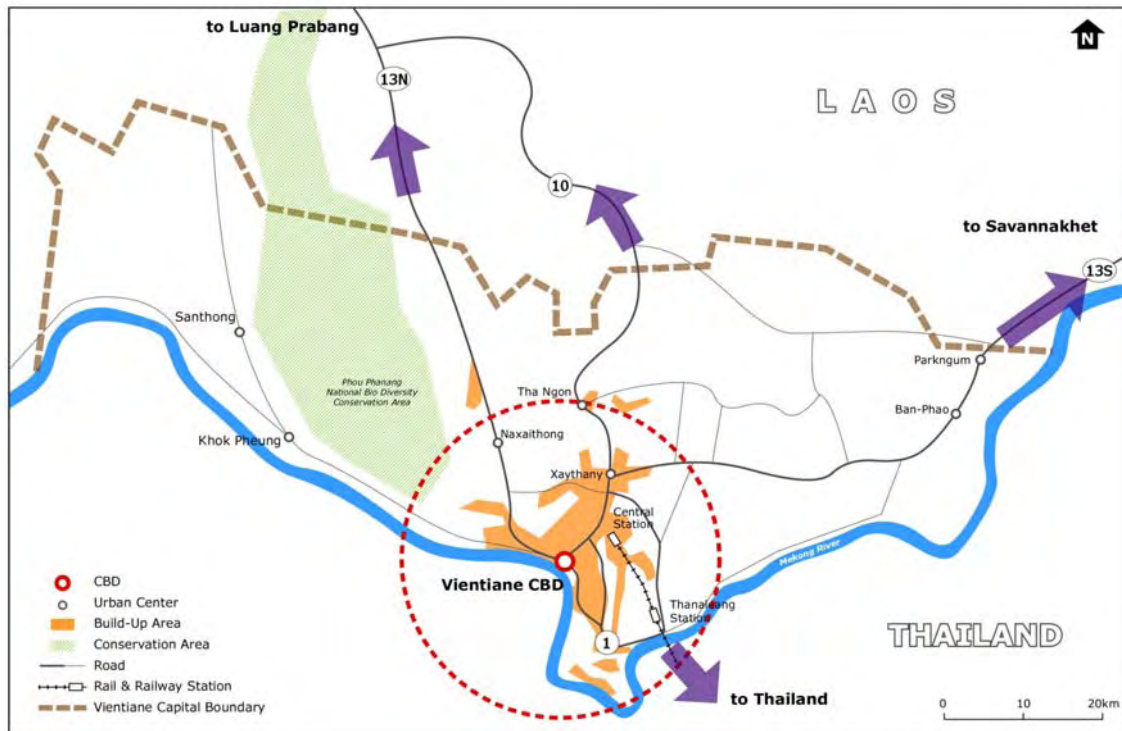
Source: Ministry of Information and Culture
2010



Figure 2.5: Location Map of Registered National Historical and Cultural Heritage

2.6 Present Land Use

Overview: The origin of township of Vientiane Capital is on a river bank of the Mekong in front of Don Chan Island, which still performs as the downtown and city center of Vientiane Capital with the concentration of business and commercial activities. Currently, approximately the areas within 5 Km radius from Patu Xay or the area within Kampengmouang and Kaison Phmvihan Roads and the suburban areas with three directions of northeast and west and south along National Road No.13N, NR.13S up to 10 km radius area has been urbanized. Peri-urban areas are still kept in traditional rural landscape expect for the areas along major national roads where ribbon type development occurred.



Source: JST

Figure 2.6: Current Spatial Structure of Vientiane Capital

Transport Network: Urban road network in Vientiane Capital is developed in the form of ring and radius systems. The radius system is formed by the National Road No.13N, NR.13S, NR.10 and Vientiane Road No.1, while the ring system is formed by the inner ring road and outer ring road. The inner ring road covers approximately 5 km of radius area, while the outer ring road covers approximately 15 km of radius area.

Land Use: Looking at the land use composition of Vientiane Capital in 1995, the dominant land use type was forest area, which occupied about 70% of total area, followed by 17% of paddy area. Built-up area or urbanized area was only approximately 3 % of the total land. The built-up area doubled from approximately 3% of total area in 1995 to 6% in 2005. In other words, between 1995 and 2005, the built-up areas increased by 87 km² while the forest area and vacant area decreased by 65 km² and 108 km², respectively. In 2005, the net population density was estimated to be 33.9 person/ha. This was calculated based on built-up area form, Land-sat analysis and census population.

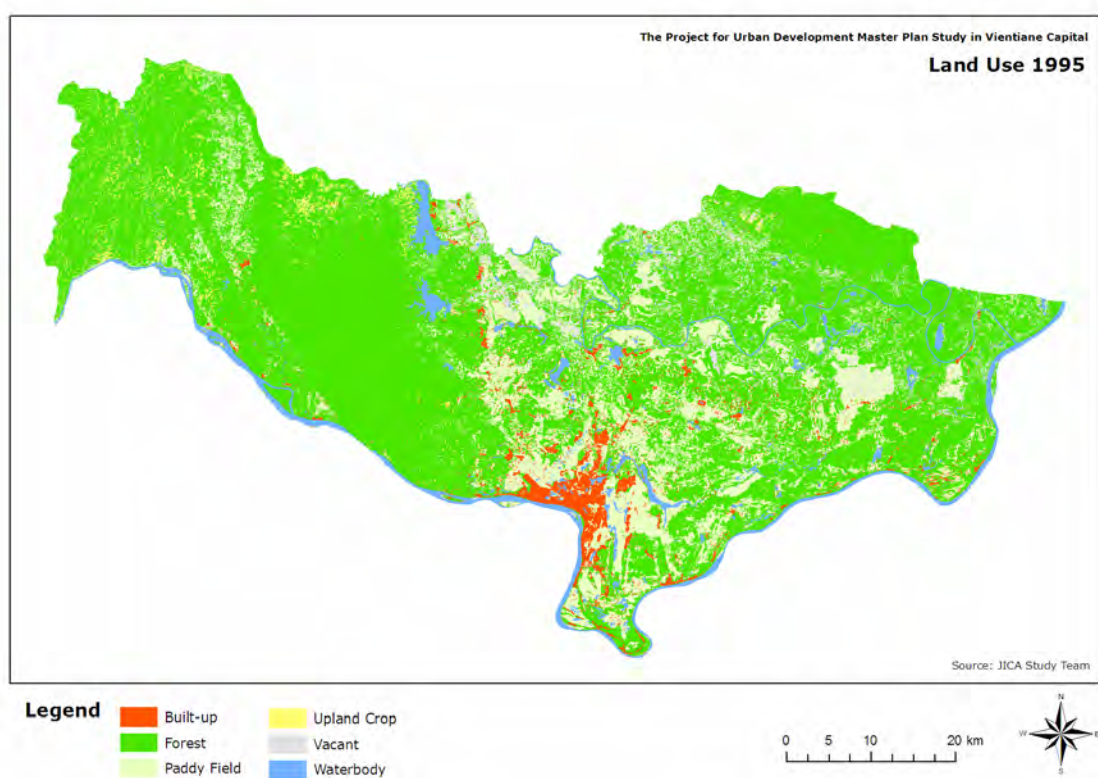


Figure 2.7: Land use 1995

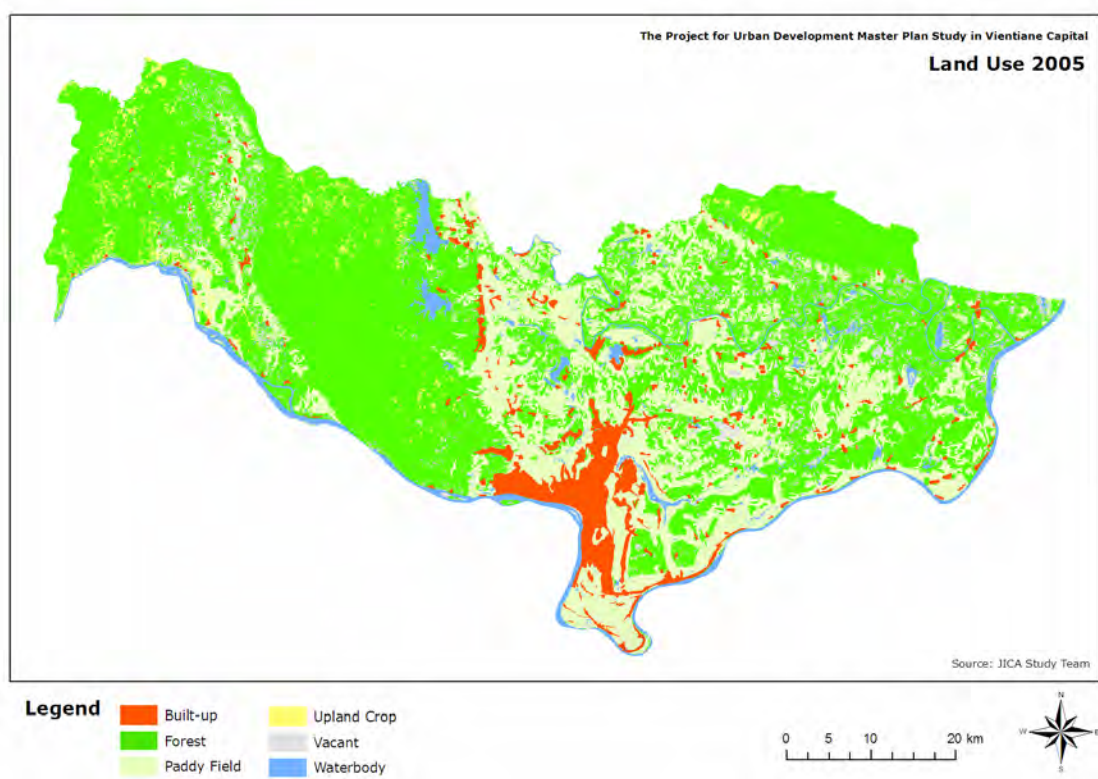


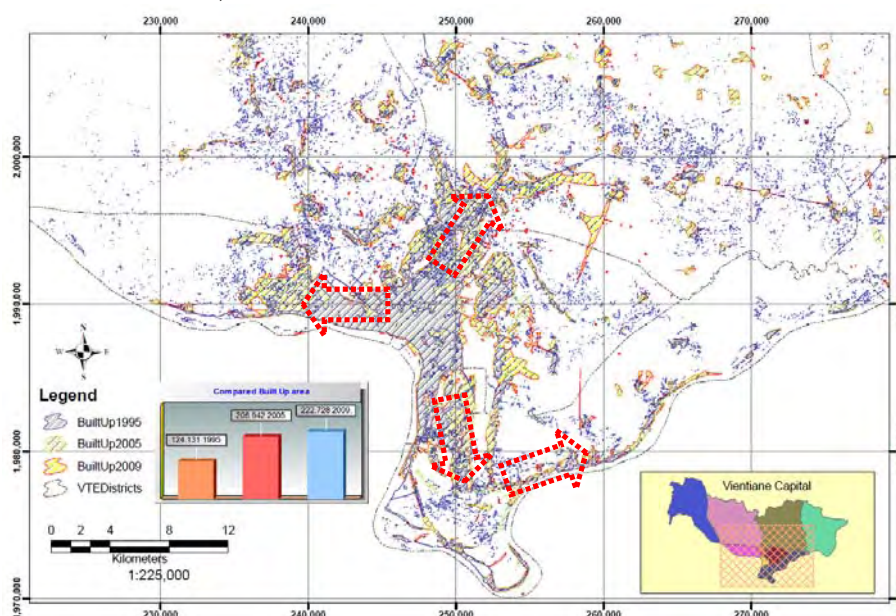
Figure 2.8: Land use 2005

Table 2.6: Land Use Changes

| | 1995 | | 2005 | | Difference (2005-1995) |
|------------------|------------|-------|------------|-------|---------------------------|
| | Area (Km2) | (%) | Area (km2) | (%) | |
| Built-up Area | 132.84 | 3.4% | 220.66 | 5.6% | 87.82 |
| Paddy Area | 655.11 | 16.7% | 659.93 | 16.8% | 4.81 |
| Upland Crop Area | 52.86 | 1.3% | 65.17 | 1.7% | 12.31 |
| Forest Area | 2,710.88 | 69.2% | 2,645.56 | 67.5% | -65.32 |
| Vacant Land Area | 221.08 | 5.6% | 113.01 | 2.9% | -108.06 |
| Water Body Area | 147.23 | 3.8% | 215.67 | 5.5% | 68.44 |
| Total | 3,920.00 | | 3,920.00 | | 0.00 |

Source: GIS Analysis of JST

Urbanization: Urbanization in Vientiane Capital occurred mainly along the major national roads such as National Road NR.13N, NR.13S, NR.10 and Vientiane Road No.1. As a result, the current urban area spreads towards the western, northeastern and southern directions.



Source: JST

Figure 2.9: Urban Expansion of Central Area

Population and Density: The area within 5 km of radius has very limited population increase with an annual population growth rate of 0.9% during 1995 and 2005. The area within 10 km radius has the highest population growth, which is approximately 4.5%/year. The area outside 10 km radius has population growth rate of 3.4 %/year.

Population Distribution Pattern: Vientiane Capital has the population of approximately 700 thousands persons in 2005. Approximately 350 thousand persons or 50 % of the total population is concentrated in the urban area of Vientiane Capital. Out of it, the urban center has only 203 thousands persons, while the suburban area has 145 thousands persons. As mentioned in the previous section, the urban center has a very limited population growth rate due to non-existence of any vacant spaces for development, while the suburban area has high population growth rate, where there are plenty of available spaces for further urbanization. On an average, the population density of the urban center is 36.7 person/, whilst some areas may be more densely inhabited with more than 80 persons/ha. There are other local settlements scattered all over Vientiane Capital. The village with

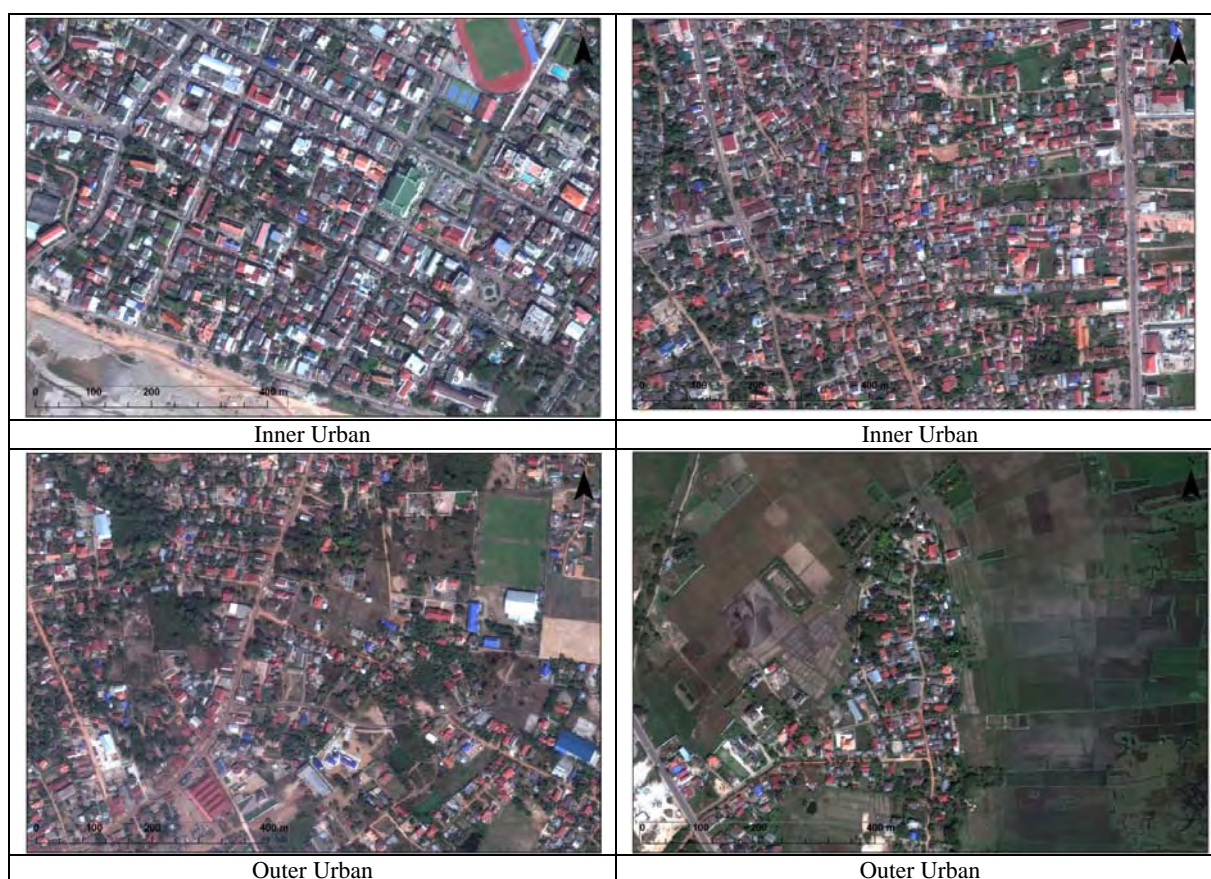
certain facility and accessibility is defined as “urban village”¹. The population increased in these local settlements, in particular the urban villages with the annual population growth rate of approx. 3.1 %. (Table 2.7 indicates that 13.4% and -4.5 % of annual population growth rate in other urban villages and rural villages, respectively. However, during the same period, many “rural village” were upgraded to “urban villages resulted in much higher population growth rate.)

Table 2.7: Population Distribution Pattern (2005)

| | Area (ha) | Population | | | Population Density (persons/km ²) | | Household | | | Persons/HH | |
|----------------------|-----------|------------|---------|--------------------|--|---------|-----------|---------|--------------------|------------|------|
| | | 1995 | 2005 | Growth Rate (%) | 1995 | 2005 | 1995 | 2005 | Growth Rate (%) | 1995 | 2005 |
| Urban Center | 5,549 | 185,453 | 203,660 | 0.9% | 3,342.1 | 3,670.2 | 31,174 | 34,994 | 1.2% | 5.9 | 5.8 |
| Suburban Area | 18,964 | 88,197 | 145,375 | 5.1% | 465.1 | 766.6 | 15,008 | 26,557 | 5.9% | 5.9 | 5.5 |
| Total | 24,513 | 273,650 | 349,035 | 2.5% | 1,116.3 | 1,423.9 | 46,182 | 61,551 | 2.9% | 5.9 | 5.7 |
| Other Urban Villages | 367,487 | 62,543 | 220,694 | 13.4% | 69.6 | 93.3 | 11,604 | 42,954 | 14.0% | 5.4 | 5.1 |
| Rural Villages | | 193,309 | 121,992 | -4.5% | | | 33,705 | 23,124 | -3.7% | 5.7 | 5.3 |
| Total | 392,000 | 529,502 | 691,721 | 2.7% | 135.1 | 176.5 | 91,491 | 127,629 | 3.4% | 5.8 | 5.4 |

Source: Results of Census in 1995 and 2005

Typical Land Use: Typical Land use Patterns in Satellite Images are as follows:



Source: Quick Bird Images

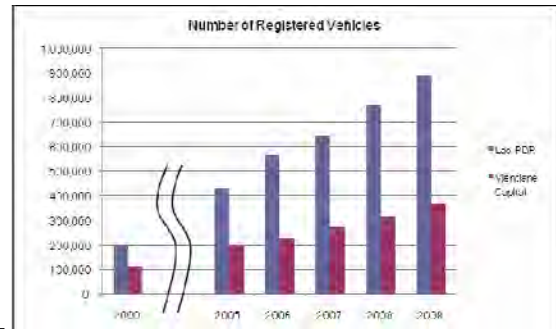
¹ The “Urban village” is defined from some characteristics, such as the number of residents, access road, electrified conditions.

2.7 Current Conditions of Infrastructure

2.7.1 Road and Transport

Increase of Traffic Volume: The growth of traffic volume counted at the National Road No.10, No.13 North and 13 South generally ranges from 2.2 and 2.3 times (2007-2010), which is equivalent to about 30% of an annual increase. This value indicates that the traffic growth has been much higher than the growth of population in Vientiane Capital.

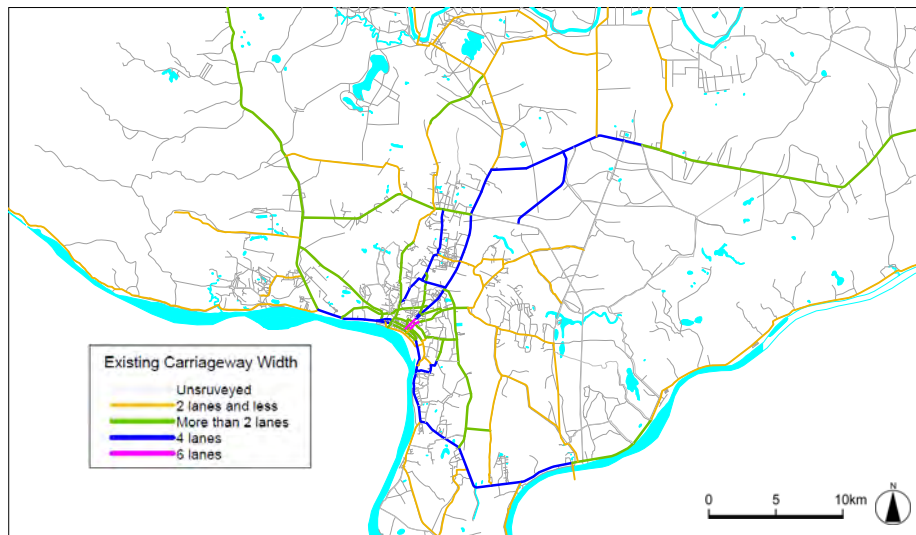
Motorization: The total number of passenger vehicles such as sedans, pickups and vans is 140 thousand in the whole country and more than half of the passenger vehicles, or 79 thousand vehicles, are registered in Vientiane Capital. The registered passenger vehicles in Vientiane Capital increased about four times from the year 2000 to 2009. This growth is about 17 % annually.



Source: JST

Figure 2.10: Number of Registered Vehicles in Lao PDR

Carriageway: Some road sections of national road are composed with four lanes or more. Other parts of national road are composed with two lanes in the both directions even though there are enough width available or 4 lanes in the right of way (ROW). In the urban area, most roads are two lanes for the both directions with a narrow lane for slow speed vehicles. The district roads in rural area are mainly two lanes road without having sidewalk. A sidewalk is basically provided in the urban area but the width of the sidewalk varies according to road side conditions.



Source: JST

Figure 2.11: Existing Carriageway Width

Road Surface Condition: In Vientiane Capital, bituminous surface treatment (BST) is the most common used surface type. National roads are no exception. In suburban area, gravel surface are common.

2.7.2 Water Supply

Overview: Two type of water supply system are applied in Vientiane Capital, i) water network system in urbanized area which is served by Nam Papa Vientiane Capital, Water Supply Company of the Vientiane Capital (NPVC) and ii) independent wells / bore holes or small scale water networks in rural area is served by resident itself or villages. Currently, the service ratios of i) and ii) are same i.e. approx. 50% in Vientiane Capital.

National Policy: National policy based on DHUP, MPWT for water service ratio is as follows:

- Urbanized area: Service ratio will be 80% by 2020.

Vientiane Capital Policy: Vientiane Capital policy for water service ratio follows DPWT, as mentioned in an article described in the 7th Five year plan for Vientiane Capital.

- Urbanized area: 100% by 2015
- Rural area: 90% by 2015 and 100% by 2020 for whole Vientiane Capital

Future Water Demand: According to Water Supply Master Plan, the future water demand has been projected separately for domestic and non-domestic uses. The table below shows summary of future water demand projection.

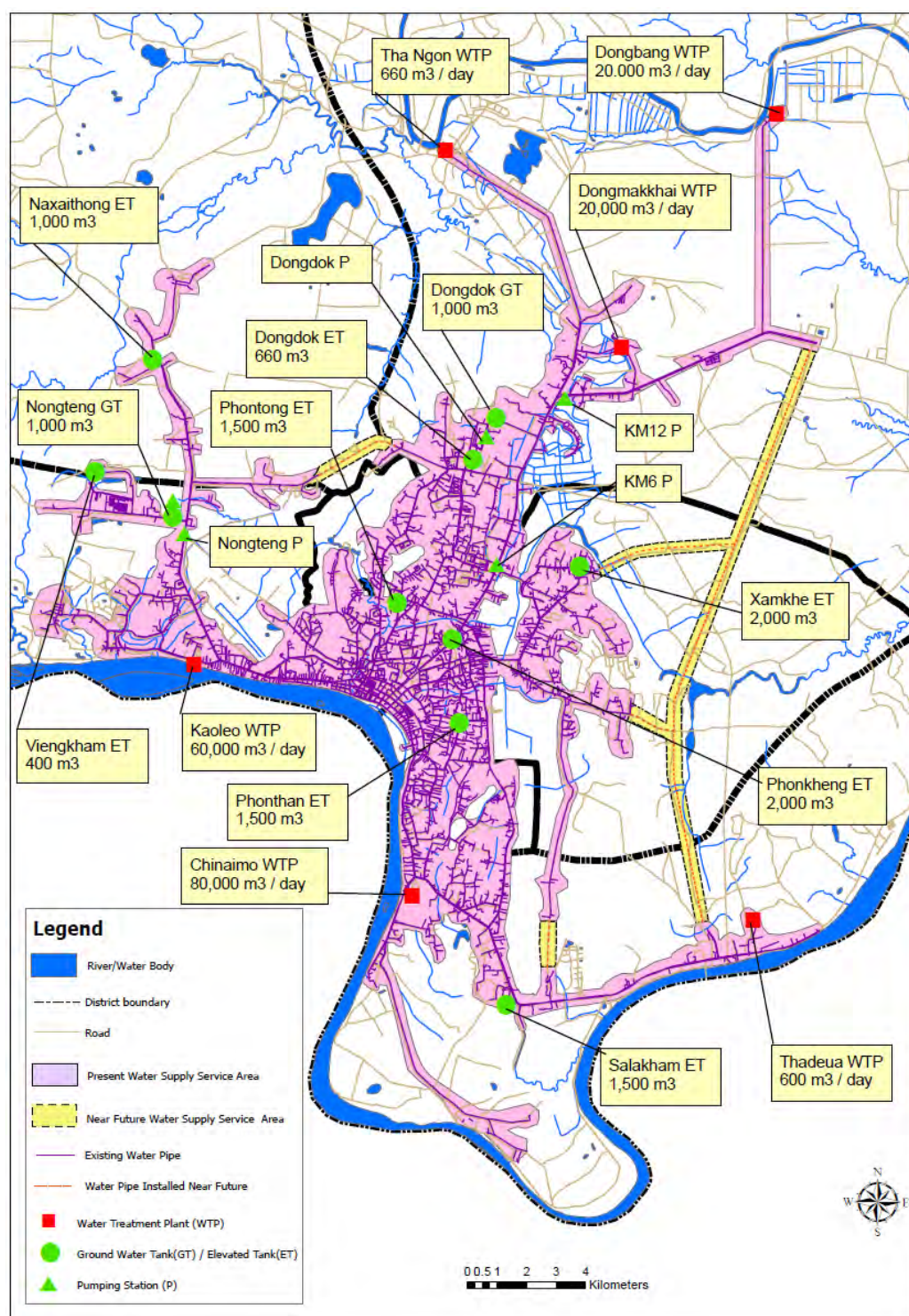
Table 2.8: Water Demand Projection in Vientiane Capital

| | Unit | 2000 | 2005 | 2010 | 2015 | 2020 |
|--|--------|---------|---------|---------|---------|-----------|
| Population | person | 599,000 | 687,084 | 788,165 | 902,716 | 1,034,521 |
| Served Population | person | 215,522 | 275,567 | 370,269 | 466,981 | 564,648 |
| Service Ratio | % | 36.0% | 40.1% | 47.0% | 51.7% | 54.6% |
| Population in Service Area | person | 297,575 | 380,342 | 499,737 | 586,710 | 662,441 |
| Service Ratio in Service Area | % | 72.4% | 72.5% | 74.1% | 79.6% | 85.2% |
| Number of Domestic Connections | nos. | 34,210 | 43,741 | 58,773 | 74,124 | 89,627 |
| Number of Non-domestic Connections | nos. | 5,095 | 6,340 | 7,889 | 9,817 | 12,215 |
| Total Number of Connections | nos. | 39,305 | 50,081 | 66,662 | 83,940 | 101,842 |
| Served Population (Incremental) | person | | 60,046 | 94,702 | 96,712 | 97,667 |
| Number of Domestic Connections (Incremental) | nos. | | 9,531 | 15,032 | 15,351 | 15,503 |
| Per Capita Consumption | lpcd | 174 | 172 | 170 | 170 | 170 |
| Total Domestic Water Demand | m3/day | 37,501 | 47,398 | 62,946 | 79,387 | 95,990 |
| Non-Domestic Water Demand | m3/day | 30,361 | 37,780 | 47,011 | 58,499 | 72,793 |
| Total Water Demand | m3/day | 67,862 | 85,177 | 109,957 | 137,885 | 168,783 |
| UFW Ratio | % | 33% | 28% | 25% | 25% | 25% |
| Day Average Water Demand | m3/day | 101,286 | 118,302 | 146,609 | 183,847 | 225,044 |
| Day Maximum Water Demand | m3/day | 111,415 | 130,132 | 161,270 | 202,232 | 247,548 |

Source: The Study on Vientiane Water Supply Development Project in Lao People's Democratic Republic, Master Plan, JICA, 2004

Present Water Sources: Basically main water sources for drinking water in Vientiane Capital are surface water of the Mekong River, Nam Ngum River and underground water except water on the market. WREA there are no water rights in Lao PDR for the water sources. According to Nam Saat, few groundwater sources in the southern part of Lao PDR contain arsenic, which is over the permissible standards for drinking water. According to NPVC, arsenic content and salty water were also found at some groundwater in Vientiane Capital

The present service area and location of main water supply facilities are presented in Figure below.



Source: NPVC, JST

Figure 2.12: Existing Water Supply System in Vientiane Capital

Water Treatment Plant: For water treatment purpose, currently, there are four water treatment plants (WTPs) and one borehole station operated by NPVC.

2.7.3 Sewerage/Wastewater

Overview: Sewerage in the Vientiane Capital is at present being considered as a serious problem especially in urban area, where major development and growth are expected. Such future development without effective sewerage system in place in the city will result in more pollution to the natural water resources. Since there are no separate wastewater pipe network, untreated wastewater from all areas are disposed to the nearby drainage system, as result quite dark color water with a lot of garbage on the surface of water especially in the dry season can be observed in most of the open channels or canals in the urban area. This is very clear indication of deteriorating water environment in the city. While most of the wastewater generated in Vientiane Capital is from domestic household or commercial buildings which are major sources, there is some volume of wastewater also generated from the industry, though relatively small in comparison with the domestic wastewater. This is partly due to the fact that most of the large scale factory has its own wastewater treatment system or located in the industrial zone where special wastewater treatment plant has been installed.

Wastewater Generation: Approximately 85,000 m³ of wastewater from the urban area is drained to the public waterways every day, only about half of which is treated by the current on-site treatment system such as septic tanks and contributes in reducing the pollution. Due to natural purification and dilution from existing water channels, ponds and rivers and the limited wastewater load from the current population, the water quality in the natural waterway is still not so severe, only some points during dry season in the water channel can be noticed with dark color. .

Sanitation Facility: According to the National Statistics in 2005, approximately 90% of households in Vientiane Capital have an access to proper toilet facilities. This shows that sanitary coverage is relatively good, but methods adopted in general for treatment is not satisfactory and maintenance is poor.

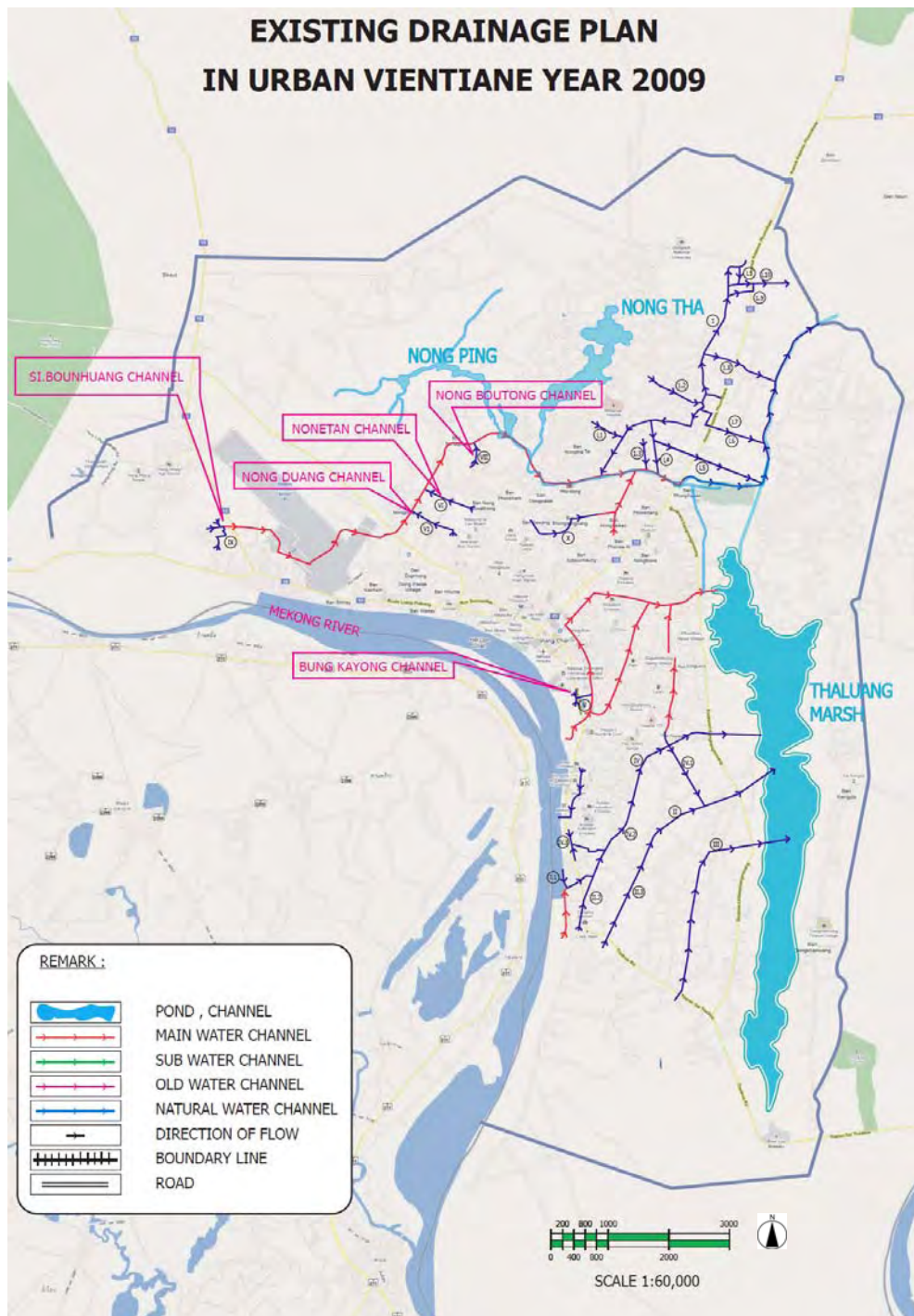
Collection and Treatment: Currently, there is no separate wastewater collection system in Vientiane City or in other provinces of Lao PDR. Only some sewerage pilot projects had been constructed on a small scale basis by the EU/DANIDA in year 1994/2004. The service area is a center of urban Vientiane city around the Nong Chan marsh and the Northwestern part of the That Luang Marsh, where pilot stabilization pond (140m x 410m) suitable to treat wastewater in hot climatic condition by utilizing the natural biological treatment with less maintenance was developed. But due to a failure of the pumping stations in 2008, the plant has stopped its operation and the facilities have been devastated. Natural marsh or ponds are mostly used as a natural wetland treatment system. Especially, the That Luang Marsh, which is a very large marsh next to the urban area has been mentioned as good wetland and flood retention pond by several studies.

2.7.4 Drainage

Overview: The drainage system in Vientiane Capital has been studied and improved every year with various foreign supports, which includes the installation of new drainage pipes and channels along the improved roads which will reduce the flood problem in the city especially in urban area. At present the drainage situation is comparatively quite better than the ten years ago, and the flooding seldom occurs and when it does, it lasts for a very short period.

Basic Facilities: The basic facilities in the drainage system for Vientiane Capital include the drainage network i.e. pipe, channel, canal, river and marsh to convey and discharge all the rain water from the city area to the Mekong River. Also included are flood prevention facilities and river bank protection works within the Vientiane Capital. However, these needs to be properly planned and improved to prevent any seasonal flooding from the Mekong River especially during July and August when the water level is at peak.

Drainage System: Urban area of Vientiane Capital is covered by 2 main catchments areas as shown in the schematic layout in Figure 2.13: (a) Hong Xeng system consists of Hong Xeng and its tributaries, Hong Kai Keo, (b) Hong Ke system consists of Hong Ke and its tributaries. These areas are a sub-catchment area of the Mak-Hiao River.



Source: VUDAA

Figure 2.13: Existing Drainage System in Urban Vientiane Capital

2.7.5 Solid Waste

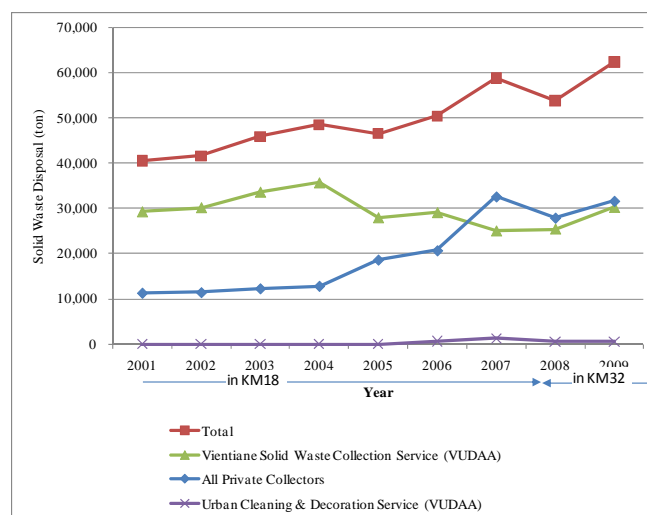
Management Matters: According to the definitions, there are no clear legislations or written policies related to discharge, collect and dispose solid waste. VUDAA has an implementation division consisting of three sections to manage the solid waste treatment. These sections are Urban Cleaning & Decoration Service (UCDS), Vientiane Solid Waste Collection Service (VSWCS) and Solid Waste Management and Disposal Section (SWMDS). UCDS manages and maintains parks and street trees/plants and conducts cleaning, solid waste collection and sprinkling of water. VSWCS is in charge of collecting and transporting the solid waste to the final disposal site. SWMDS manages the final disposal site located at the point KM32 in Naphasouk Village.

Collection service: Five (5) private companies are operating for the solid waste collection service through a contract with village offices and individuals. VUDAA gives them permission to go for the collection service business and allocate the coverage area. The total 63,312 households in the areas, only 23,505 households are covered under the contract with either of the garbage collection service providers.

Generation of Solid Waste: The coverage rate of the households with a contract for the waste collection is still under 40%, while the remaining more than 60% of household wastes get disposed without the collection service. The individual households are probably burning or burying the solid wastes.

Intermediate Treatment and Final Disposal: There is no intermediate treatment system to reduce the volume and weight and for stabilization (from decay and toxicity) of the waste in the Vientiane Capital. The present final disposal site is the KM32 landfill site which was constructed utilizing local design. The site has a total 748 ha of land although the boundary is unclear, and approximately 100 ha of land is currently used for disposal.

Volume of Solid Waste Disposal: With an increase of private collectors, the annual volume of solid waste disposal is increasing every year. Total 68,089 tons of solid wastes were disposed in 2009, which means that about 187 tons of garbage was carried daily to the site in approximately 50 truck-trips.

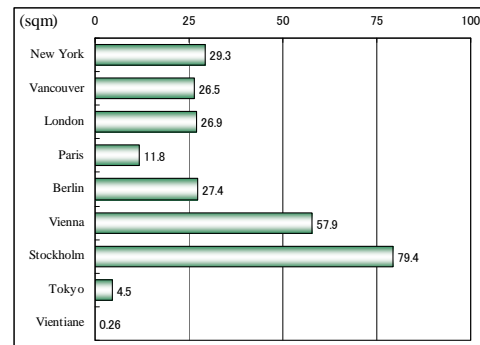


Source: VUDAA Environment Section, compilation by JST

Figure 2.14: Annual Volume of Solid Waste Disposal of KM32 Landfill Site

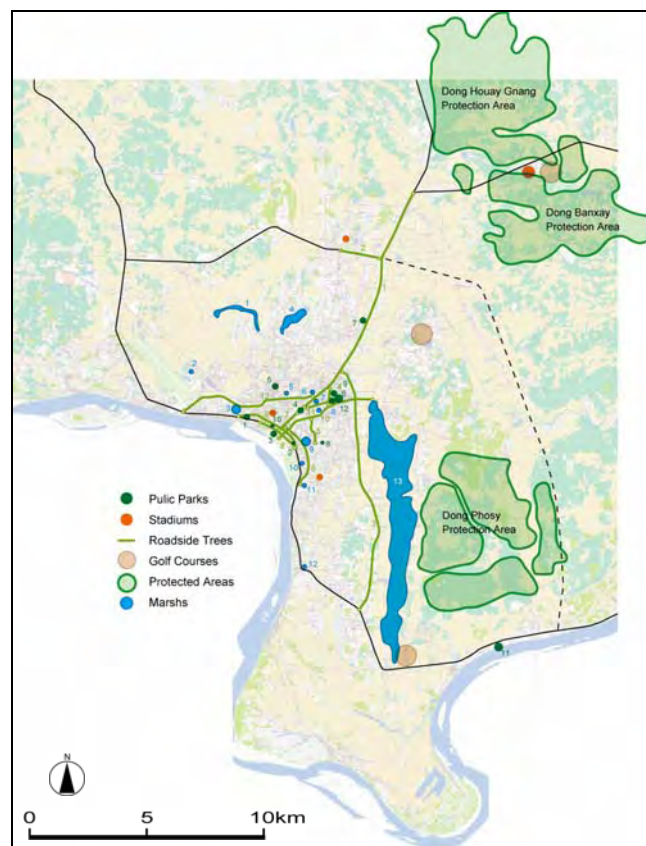
2.7.6 Parks, Open spaces and Greenery

Overview: There are only 9 public parks with a total area of 20.6ha. Considering the population of 795,000 in the capital city, the parks area seems to be quite less. If the area of public parks is divided by the population, it gives a parameter of park area per person and for Vientiane Capital, it is quite less with 0.26m² of park space per person.



Source: Public Parks Census of Tokyo Metropolitan (2006)

Figure 2.15: Park Area per Person in Comparison with Cities around the World



Source: JST

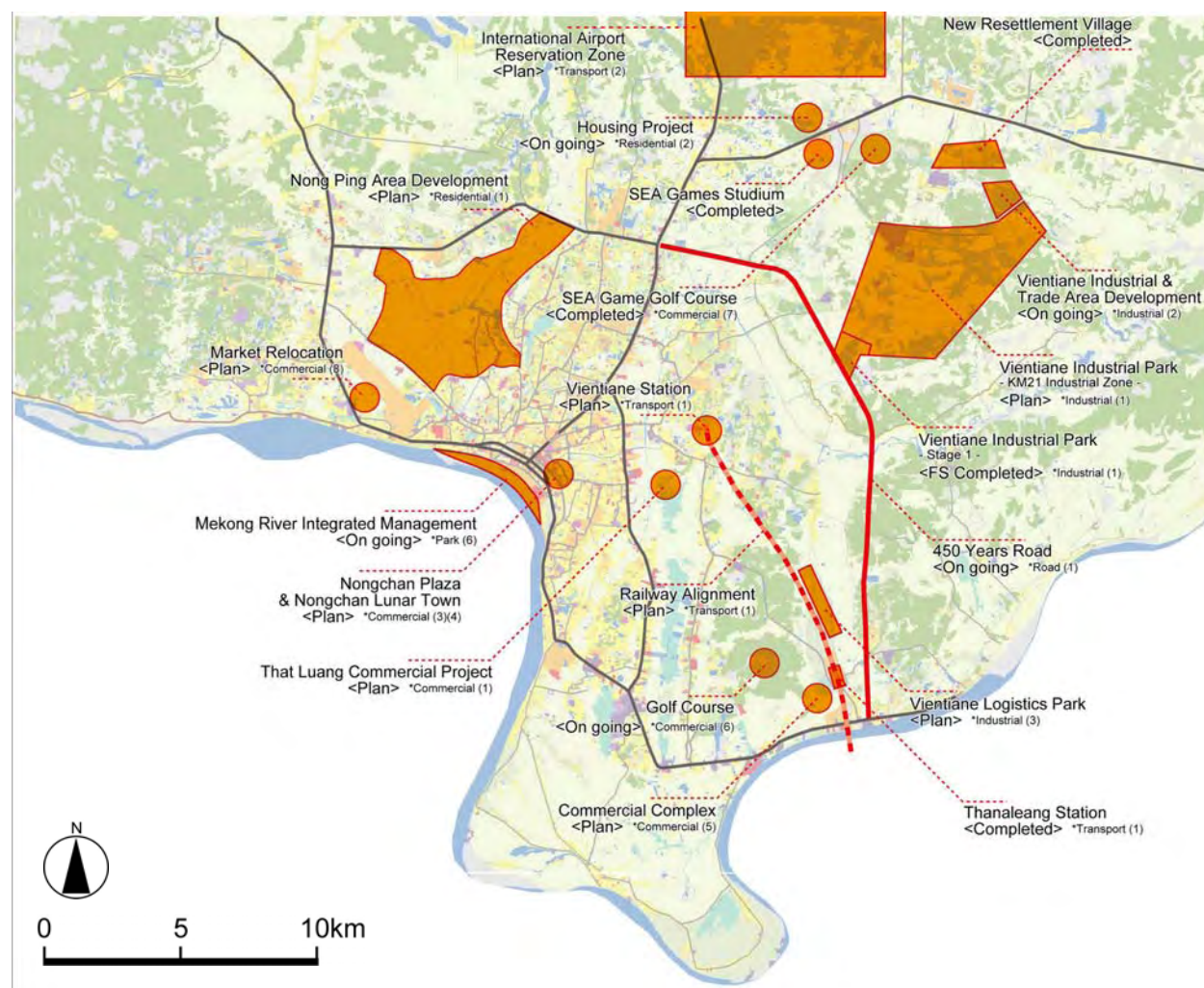
Figure 2.16: Locations of Public Parks, Open Spaces and Greenery in Urban Areas of Vientiane Capital

Public Parks: As there is no regulation directly governing the public parks, there is no accurate definition of “public park” and thus no comprehensive data of public parks are available. For example, VUDAA which is one of major management authorities of public parks has only the data of “Daily Record for Management” which include roadside trees, public park trees, flowers at round about and the mixed data of these.

NE Land Use Zone: NE zone is for nature conservation. There are some special areas such as memorial museum, islands, ponds and natural marshes. In this zone all type of building construction is prohibited except the one which are related to recreation or relaxation activities.

2.8 Relevant Development Project

Relevant Development Projects in Vientiane Capital are as follows;



Source: JST

Figure 2.17: Main Relevant Development Projects in Vientiane Capital

Table 2.9: Main Relevant Development Projects in Vientiane Capital

| Sector | Activity (Project) Name | Funded by | Year |
|------------|---|-------------------|-----------|
| Industrial | Vientiane Industrial Park | Japan | 2009-2010 |
| | Vientiane Industrial & Trade Area Development | Taiwan | 2009-2010 |
| | Vientiane Logistics Park | Japan | 2009-2010 |
| Commercial | That Luang Commercial Project | China | - |
| | Talatsao Mall Market Construction | - | - |
| | Nongchan Plaza | Vietnam | - |
| | Nongchan Lunar Town | Korea | - |
| | Commercial Complex | - | - |
| | Golf Course | - | 2010- |
| | SEA Game Golf Club | Korea | -2010 |
| | Nong Ping Area Development | Vientiane Capital | - |
| Transport | Nongkhai to Vientiane Railway Project | KRTC | 2002 |
| | International Airport Reservation Zone | - | - |

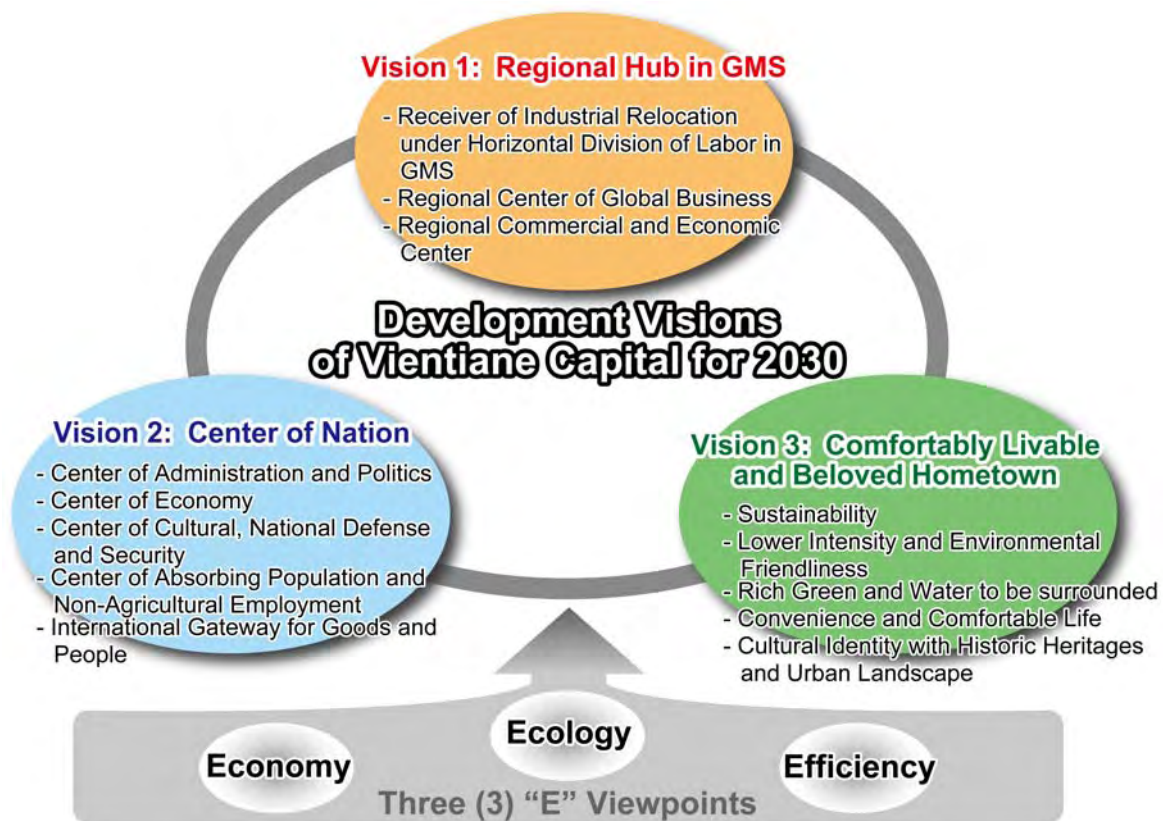
Source: JST

Chapter 3: Development Visions and a Structure Plan for Vientiane Capital

3.1 Development Visions

Development Visions: A development vision is an ideal future images of a city to be materialized based on the citizens' needs and foresight of the stakeholders and experts regarding urban planning. Therefore all the actors can able to share their concepts and ideas about the future urban development policy. The development visions are formulated through discussions in the meetings. And the “Strengths” and the “Opportunities” in the SWOT analysis relate to positive resources for Vientiane Capital, and are the basis for the future development visions.

Three (3) visions: The future vision for Vientiane Capital are formulated with three pillars; namely 1) a regional hub in Greater Mekong Sub-Region, 2) center for Nation, and 3) comfortably-livable and beloved hometown for all. Three (3) development visions are related to each other, and for their realization, three viewpoints are also needed and should be considered, which are “Economy”, “Ecology” and “Efficiency”.



Source: JST

Figure 3.1: Development Visions for Vientiane Capital

Key Planning Issues: Key planning issues are embodied based on the “Weaknesses” and the “Threats” of the SWOT analysis so that appropriate measures can be taken by the stakeholders to accomplish the development visions for 2030. The key issues that need to be overcome are described below.

- (a) Build and Expand Industrial Infrastructure to be a Host of Active Economy and Trade

Vientiane Capital is located on a GMS economic corridor which is called “the Central Corridor” as shown in Figure 3.2, and is expected to develop as a regional gateway of Lao PDR. At present there is no industrial park or logistic center, which is placing a limitation to the industrial promotion in the country. In this context, to accomplish “Vision 1: Regional Hub in the GMS”, it is important to develop an industrial park and a logistics center at an earliest timing, which are now being planned as JICA studies.

- (b) Strengthening one of the Main Urban Functions: “Center of Qualified Human Resources”

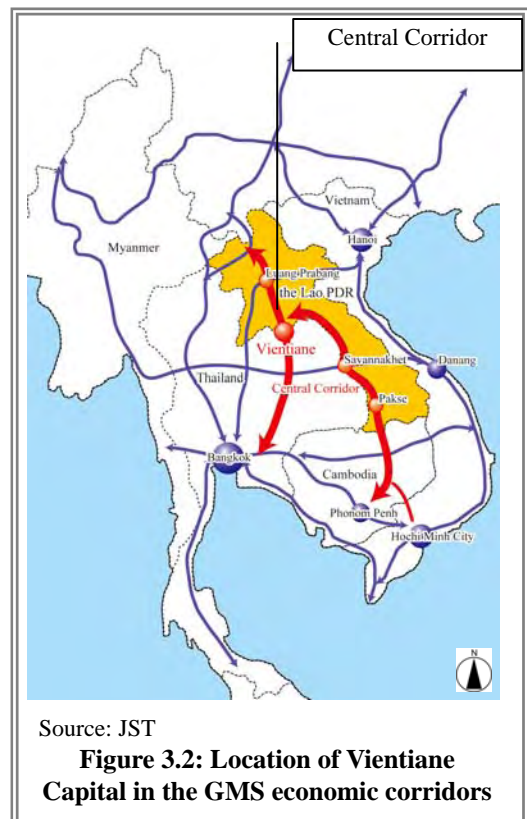
Apart from the infrastructure mentioned in (1), it is necessary to strengthen the function of “center of qualified human resources”. Human resources will be the key factor for many of the foreign and domestic investors to make decision to establish its business function. There are some basic needs to fulfill to be qualified human resources, not only in the foreign investors’ business world or scientific world but also at the domestic governmental administration level to support economic activities. In this context, to accomplish “Vision 2: Center of the Nation”, it is recommended to enhance the education and the vocational training in Vientiane Capital as well as in Lao PDR as a whole. Students or trainees from other provinces should also be able to study or master skills in Vientiane Capital.

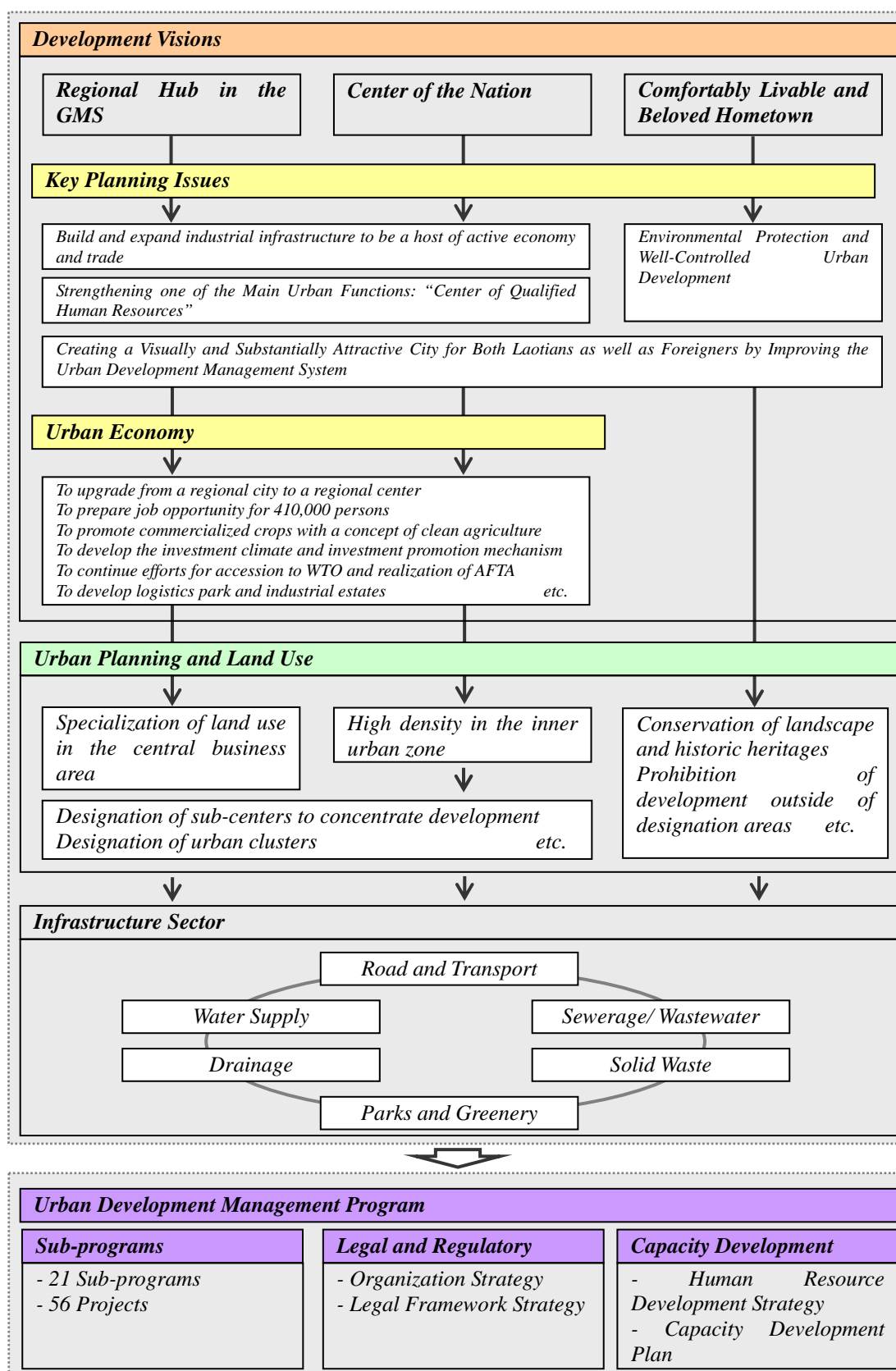
- (c) Environmental Protection and Well-Controlled Urban Development

Nowadays, new types of urban problems are recognized in Vientiane Capital: traffic congestion/ accidents, housing shortage, disappearance of historically valuable buildings, degradation of natural and living environment, etc. In this context, to accomplish “Vision 3: Comfortably Livable and Beloved Hometown”, it is important to have considerations for environmental protection along with controlling and regulating urban development.

- (d) Creating a Visually and Substantially Attractive City for Both Laotians and Foreigners by Improving the Urban Development Management System

Vientiane Capital is inhabited mostly by Lao people and visited by a number of foreigners from all over the world. In other words, the capital should be attractive enough to meet different needs from different types of people. Vientiane Capital is expected to be beautiful, comfortable, and convenient to travel, do business and to live in. In this context, to accomplish three (3) development visions, it is essential to create a visually attractive and comfortable city for both Laotians and foreign visitors, by means of improving the urban development management system. In other words, a drastic change of mindset might be needed in the government of Lao PDR, in private sector participants in urban development and in the ordinary citizens so as to create a restored new Vientiane Capital.



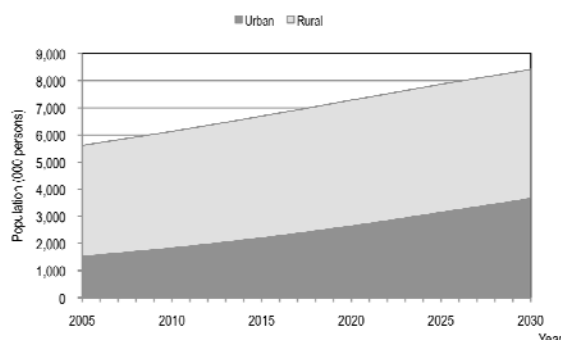


Source: JST

Figure 3.3: Framework of Development Visions and a Master Plan

3.2 Socioeconomic Framework

National Socioeconomic Framework: The percentage of urban population to the total population increased from 17% in 1995 to 27% in 2005. This increase is mainly due to the change of village category from Rural to Urban Village. The study based on the broad analysis and assumptions predicts that this percentage will increase from 27% in 2005 to 40% in 2025 and 43.5% in 2030.

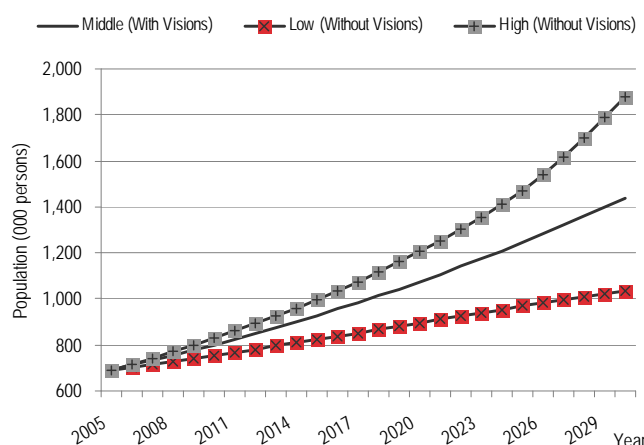


Source: JST (Industrial Development Study, Logistics Network Study and Study on Regional Core Cities)

Figure 3.4: Change of Total Population, Urban Population and Rural Population

Development Alternatives: JICA Study Team prepares 3 different scenarios. These scenarios are a low, middle and a high scenario. (For details refer Chap 3.2.1 of the main report)

- (a) Low Scenario: If Vientiane Capital did not presume the vision and if the economic development led only by Hydropower development and mining that will mainly occur outside of Vientiane Capital than the population growth in Vientiane Capital would be limited.
- (b) Middle Scenario: This is the case when Vientiane Capital presumes the development vision. Economic development will take place and population of Vientiane Capital will increase in line with the defined vision and implementation measures to achieve the vision.
- (c) High Scenario: This is the case based on recent population trend and not presuming the vision. In reality, the population growth of Vientiane Capital is higher than DPI expected in recent years, which is mainly due to the migration of rural areas. In the High Scenario case, magnitude of migration from rural area of other provinces to Vientiane Capital will be continued and the overall population increase will be greater than other scenarios.



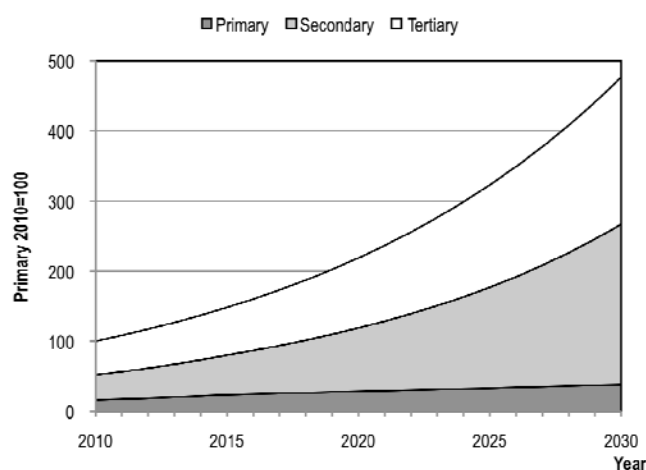
Source: JST

Figure 3.5: Population Projection of Vientiane Capital in Different 3 Scenarios

Selection of Optimum Alternative: Based on the development visions, Vientiane Capital has a mission to lead the national and regional economic development. In the national context, Vientiane Capital also has a role to absorb in-migration population. As per estimates, the percentage of urban population will increase from 27% in 2005 to 43.5% in 2030. In the middle scenario, population in 2030 will double from the current population with an average growth rate of 3.0% and an increase of 400,000 persons in labor population in 20 years. Annual average growth rate of GRDP will likely be 8.0% during the same period. This will be a high growth level but at the same time a possible target in terms of urban growth, economic development, attractiveness of the city and infrastructure development. Therefore, JICA Study Team selected the Middle Scenario as an optimum alternative.

3.3 Promotion of Urban Economy

GRDP Growth Scenario: Figure 3.6 shows the growth of GRDP (optimum scenario) from 2010 to 2030. GRDP will increase by 4.8 times in 20 years. Growth of the economic sectors will be 2.4 times for the primary sector (4.4% growth per year), 6.4 times for the secondary sector (9.8% growth per year), and 4.3 times for the tertiary sector (7.6% growth per year).



Source: JST

Figure 3.6: GRDP Growth from 2010 to 2030

Primary Sector: In the short term till 2015, the public sector should continue to develop infrastructure such as irrigation systems and rural access roads and re-lot the irrigated fields to promote agriculture. In the medium and long terms, the public sector should continue to improve infrastructure in the priority districts. Besides, the public sector in the short term should also provide training about new technologies to small land holders and promote the commercial agriculture based on the results of research and study.

Secondary and Tertiary Sectors: In the short-term till 2015, the public sector should improve the investment climate: particularly providing the one-stop service; and reforming taxation and land management. The public sector should develop and adopt investment promotion mechanism to attract more FDI to Vientiane Capital. In order to promote the logistics business and the manufacturing industry, Vientiane Logistic Park (VLP) and Vientiane Industrial Park (VIP) should be developed, in the short-term. In the medium and long-terms, it is necessary to take measures for promoting the secondary and tertiary industries and building on the achievements of the short-term. With these efforts, international trade and FDI will be enhanced.

3.4 A Structure Plan for Vientiane Capital

3.4.1 Concept of Urban Structure

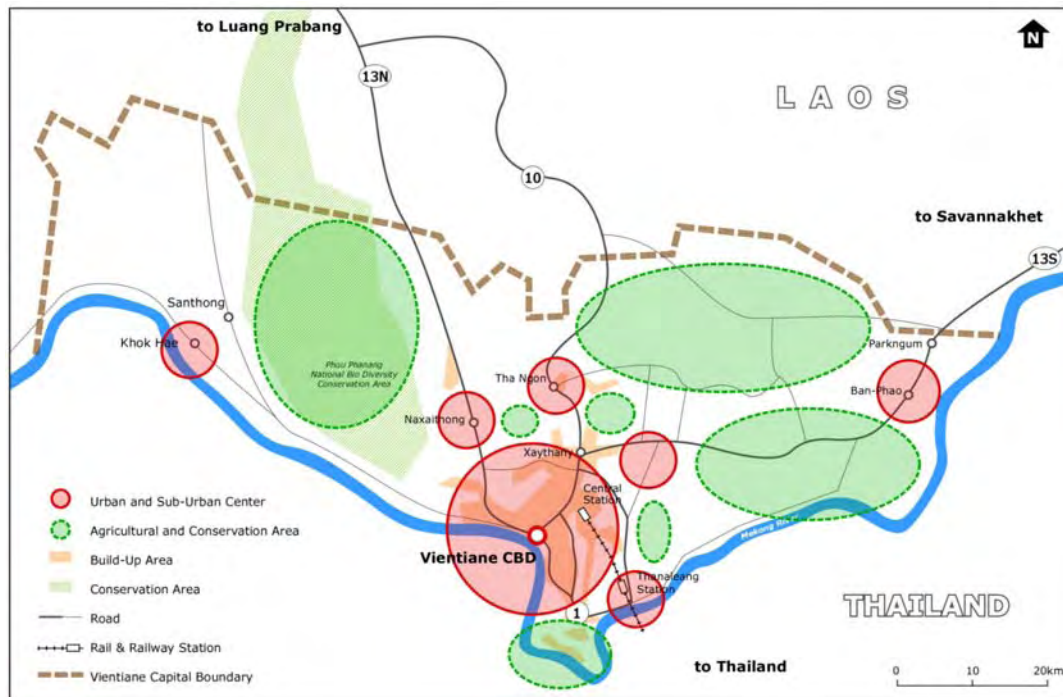
Spatial Structure: Vientiane Capital is required to strengthen its urban economy functions, particularly, commercial and business, industry and logistics, and improving livability at the same time under rapid population growth. Urban structure will be determined by considering location and size of necessary functions to be accommodated through a comparison among two alternatives of urban pattern as follow;

- (a) Multi-core Structure: This urban structure aims at controlling expansion of existing urban center by creating a few of sub-centers and urban clusters to avoid over-concentration and disordered expansion of the existing urban center. The urban center will be specialized commercial and business center and for urban residence. Specific functions should be decentralized to each of sub-centers located around 15 to 20 Km radius area from the urban center. An urban cluster is a local urban agglomeration to provide public and commercial services to surrounding local villages. Urban development shall be limited in the designated area and other area will be designated as agricultural or conservation area, which will basically be maintained with existing land use or conservation regulations.
- (b) Single-core Structure: This urban structure follows naturally concentrated urbanization and suburban development pattern with minimum intervention to maintain agricultural area and conservation area.

Table 3.1: Comparison of Alternatives

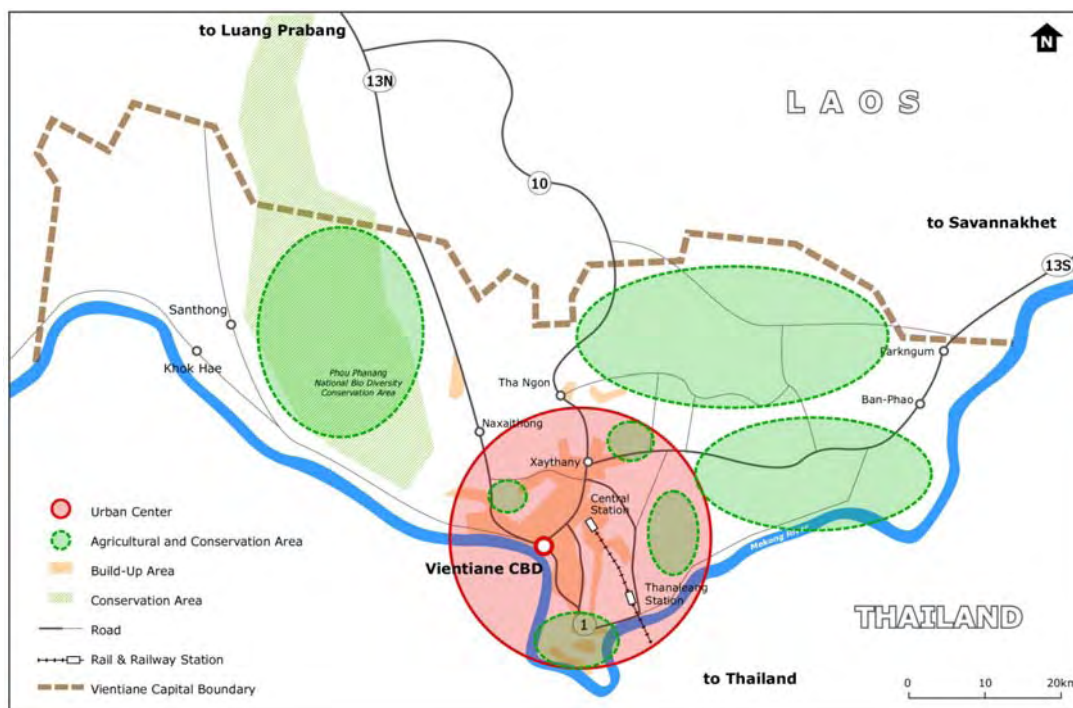
| | | (a) Multi-core Structure | (b) Single-core Structure |
|----------------------------|-----------------------------------|--|--|
| Urban System | | Decentralizing certain urban functions from existing urban center to newly developing sub-centers in order to avoid disordered expansion / urban sprawl in outskirts | Centralizing all urban functions to single urban center to fully utilize existing urban accumulation with minimal investment and public intervention. |
| Size of Urban | | 10,000 ha for Sub-center 20,000 ha for residential area Limited expansion of existing urban center to distribute urban function and population to sub-centers | 35,000 ha for new urbanized area linked with urban center Larger expansion of existing urban center to accommodate all necessary urban functions and population in the single existing urban center |
| Density (Spatial Extent) | Historic Conservation Inner Urban | Lower density area for historic conservation Limited higher density areas for business and commercial use Lower density area for residential use | Lower density area for historic conservation Middle density for mixed use |
| | Outer Urban Outskirts | Higher density in Sub-centers Lower density area for residential use | Lower density area for residential use |
| Conservation Nature | | Designated urban planning area to be urbanized (urban center, sub-center, urban cluster, etc) and other areas to be protected area. This principally means nature conservation by restricting urbanization in important areas. | By defining it under one of land use zoning which intend to maintain and conserve the nature or agricultural land in an urban planning area |
| Public Role for Investment | | Large investment is needed to construct sub-centers and urban clusters by either Public investment or PPP. | Minimum investment as same as present is needed. |

Source: JST



Source: JST

Figure 3.7: Concept of Multi-core Structure



Source: JST

Figure 3.8: Concept of Concentrate Structure

Evaluation of Alternatives: Multi-core structure has most advantages compared to the single-core structure. However it is important to acknowledge that large investment, sufficient capacity and

institution are required to manage and materialize urbanization and urban development as specified under the multi-core structure.

Table 3.2: Evaluation of Alternatives

| | (a) Multi-core Structure | (b) Single-core Structure |
|--|--|---|
| Traffic in Urban Center | Good High mobility can be maintained with distribution of traffic attractions points. | Bad There is a risk to generate heavy traffic and congestion in the urban center in future. |
| Travel time | Good Travel time can be shortened by developing a balance between working and living areas in sub-centers and urban clusters. | Bad Travel time will be longer due to large distance between working place and living place. |
| Further Environmental Improvement | Good Improvement target area can be minimized with initial investment. | Bad Target area will be larger than others. |
| Necessity of Improvement in Urban Planning and Management Capacity | Bad Need many improvements in urban planning and management capacity | Good No need to strengthen current capacity in urban planning and management |
| Cost to realize the structure | Bad Need much investment for infrastructure and utility | Good No special investment |
| Total | Good | Bad |

Source: JST

Multi-core Structure Plan: Multi-core urban structure in Vientiane Capital is delineated from points of view of 1) node, 2) link, 3) urbanizing area, 4) green network, and 5) conservation area and details are described in Table 3.3.

Table 3.3: Multi-core Urban Structure

| | |
|---|--|
| 1) Node: | <ul style="list-style-type: none"> Urban center- existing central business district and surrounding residential area Sub-center: KM21 area, Thanaleang area, Dongdock area, Naxaithong area and Railway town Urban cluster: Tha Ngon, Ban Phao and Khok Hae |
| 2) Link: | <ul style="list-style-type: none"> Ring system: inner ring road, outer ring road Radius system: NR-13N, NR-13S and Vientiane Road No.1 West Link: Urban center to Khok Hae and Naxaithong (NR-13N) East link: Urban center to KM21 and Ban Phao (NR-13S) North Link: Urban center to Dongdock and Tha Ngon (NR-13S and NR-10) South Link: Urban Center to Thanaleang (Vientiane Road-1) |
| 3) Urbanizing Area | Urban area will be limited to the existing urban centers and some expansion areas. The other urban development demand will be absorbed in the sub-centers and urban clusters. |
| 4) Green Network | <ul style="list-style-type: none"> Inner green network at the edge of central urban center area, based on That Luang Marsh and Nong Tha, Nong Ping Marsh Outer green network at the edge of urban center, based on Dong Houay Gngang Protected Area, and Don Banxay Protected Area |
| 5) Conservation Area Agricultural Area | <ul style="list-style-type: none"> Historic conservation area in central Protected Area (Phu Khao Khoay National Protected Area, Phou Phanang National Protected Area, Dong Phosy Protected Area (partially), Dong Houay Gngang Protected Area, Dong Banxay Protected Area, Done Xang Fay Protected Area, That Luang Marsh, Nong Tha Marsh, Nong Ping Marsh, etc.) Agricultural area (higher productive area, water retention area) |

Source: JST

Important Agricultural Area: Agricultural development is one of important strategy to up-lift economic development of Vientiane Capital. In particular, agricultural land which can cultivate higher value crops like vegetables and fruits is important to improve farmers' income. On the other hand, agricultural area has a unique function to retain rain water which contributes to flood control. The two major importance of agriculture are:

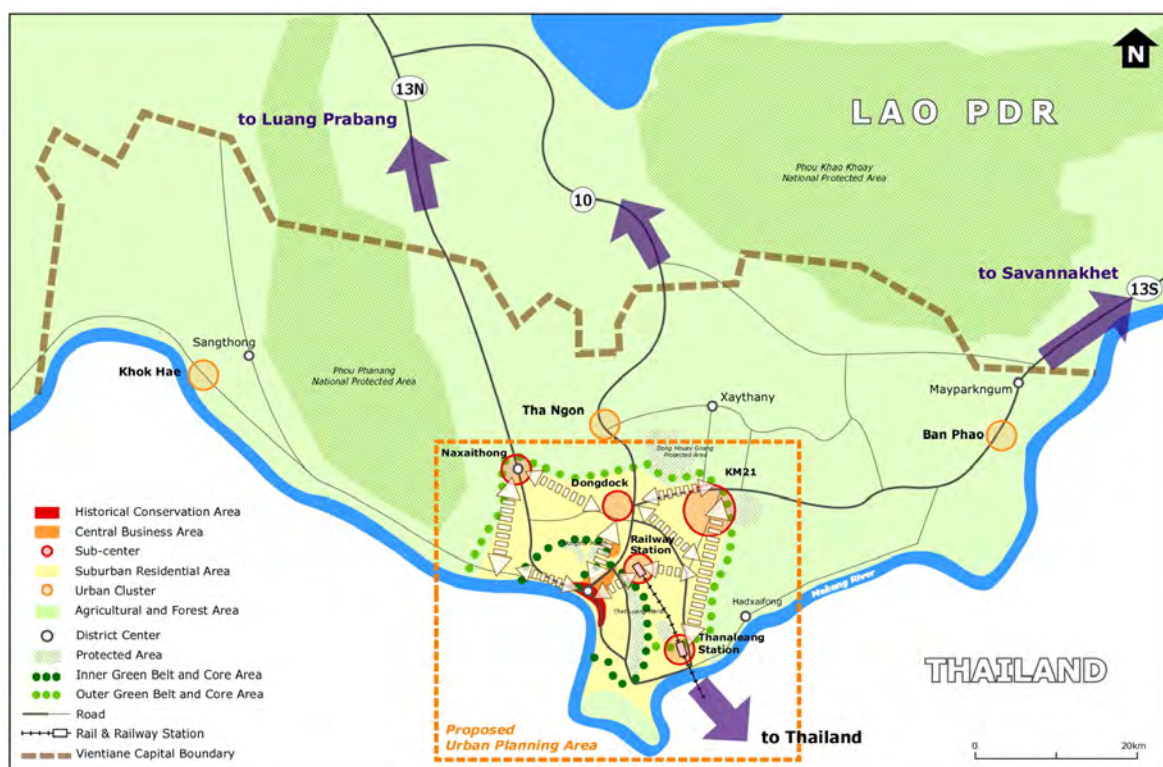
- Agricultural area suitable for higher valued crops
- Paddy fiend functioning as water retention

Population Distribution: The total population established in the socio-economic framework is distributed under the concept of multi-core structure with careful consideration of the land availability and speed of urban development. In 2030, the population in urban area will be 65% of the total (which was 47 % in 2005). Out of this, within the urban area, the share of the population in urban center, sub-center, and urban cluster will be 40%, 22 % and 3 % respectively. Decentralization will progress by 7%, which means that the concentration of population in the urban center will be reduced from 47% in 2005 to 40% in 2030. It could also be concluded that the multi-core urban structure will contribute in decentralization of Vientiane Capital.

Table 3.4: Population Distribution

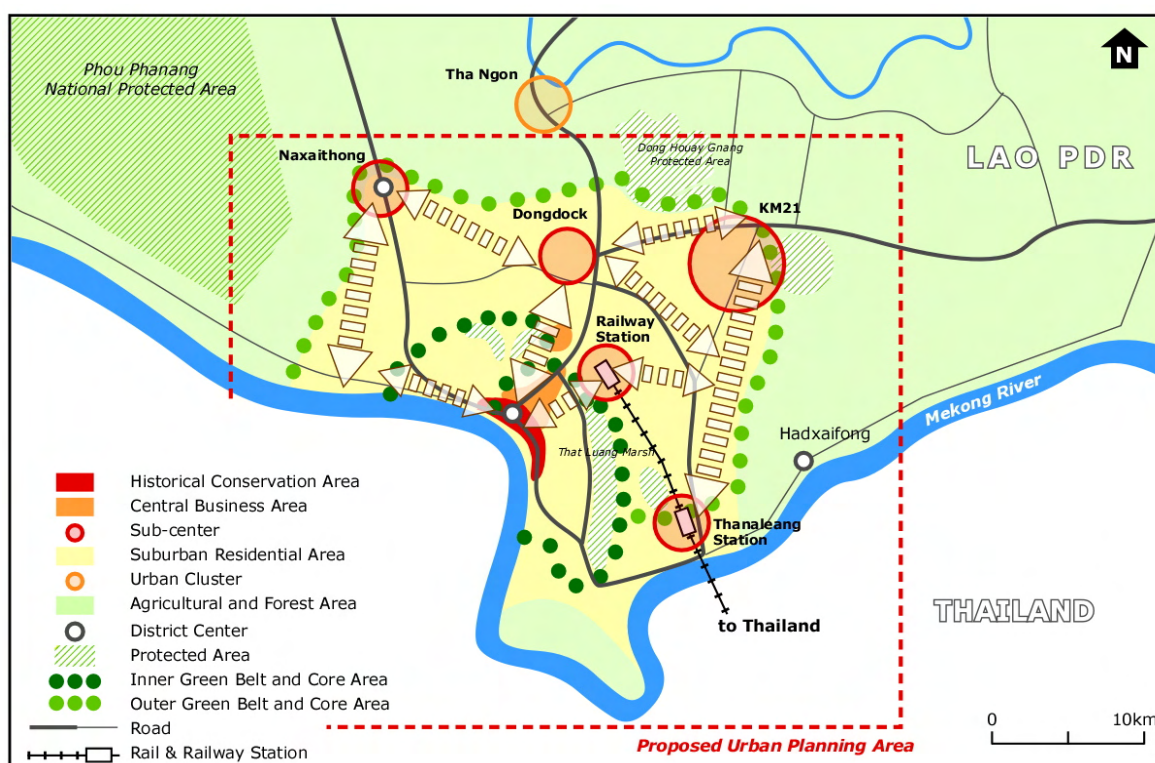
| | | Past Population | | | | |
|------------------------------------|--------------|-----------------|---------|-----------------|-----------|-----------------|
| | | 1995 | 2005 | Growth Rate (%) | 2030 | Growth Rate (%) |
| Historic Conservation Zone | | 185,453 | 203,660 | - | 11,000 | 0.5% |
| Inner Urban Zone | | | | | 219,000 | |
| Outer Urban Zone | | | 126,212 | - | 300,000 | 4.2% |
| Outskirts Zone | | | | | 50,000 | |
| Sub-center | KM21 | 16,562 | 18,701 | 1.2% | 150,000 | 8.7% |
| | Thanaleang | 3,215 | 3,809 | 1.7% | 35,000 | 9.3% |
| | Dongdack | 11,723 | 19,163 | 5.0% | 80,000 | 5.9% |
| | Naxaithong | 1,799 | 2,531 | 3.5% | 20,000 | 8.6% |
| | Railway Town | 2,858 | 3,796 | 2.9% | 30,000 | 8.6% |
| Total | | 36,157 | 48,000 | 2.9% | 315,000 | 7.8% |
| Urban Cluster | Tha Ngon | 3,888 | 5,162 | 2.9% | 20,000 | 5.6% |
| | Khok Hae | 854 | 848 | -0.1% | 10,000 | 10.4% |
| | Ban Pao | 1,686 | 2,137 | 2.4% | 5,000 | 3.5% |
| Total | | 6,428 | 8,147 | 2.4% | 35,000 | 6.0% |
| Outside of the urban planning area | | 301,464 | 305,702 | 0.1% | 509,000 | 2.1% |
| Total | | 529,502 | 691,721 | 2.7% | 1,439,000 | 3.0% |

Source: JST



Source: JST

Figure 3.9: Multi-core Structure Plan (Vientiane Capital)

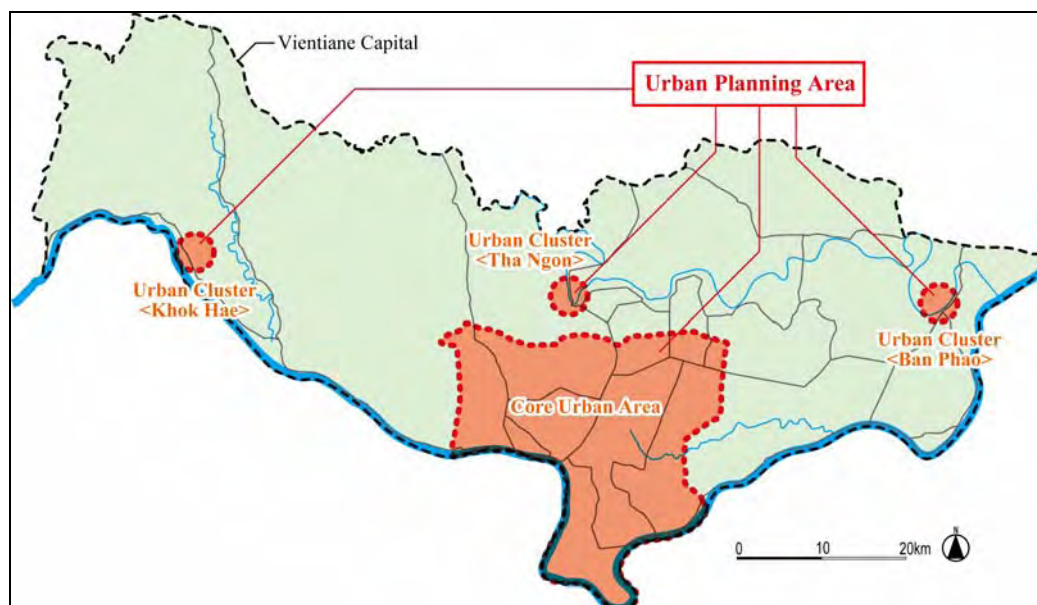


Source: JST

Figure 3.10: Multi-core Structure Plan (Core Urban Area)

3.4.2 A Basic Policy for Urban Development

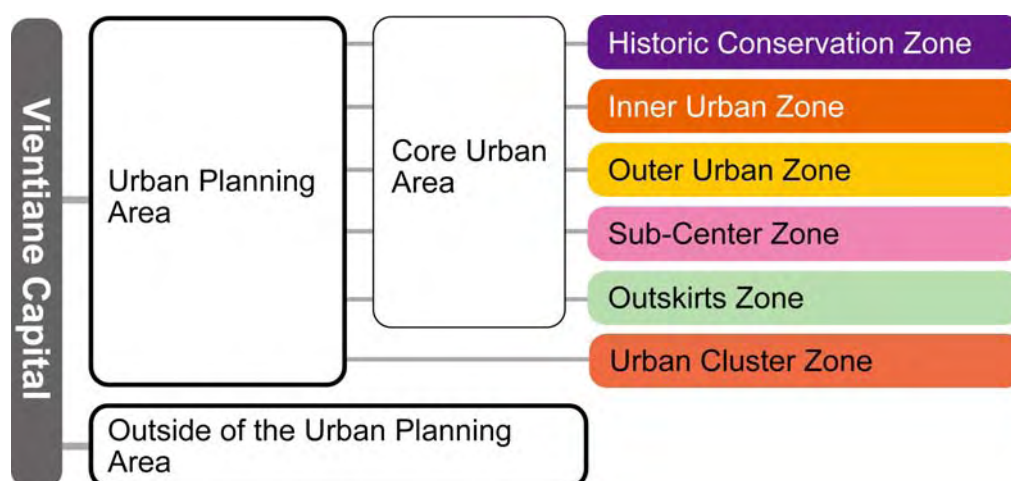
Urban Planning Area: The “Urban Planning Area” is a spatial extent where the law of urban planning is effective. In this study, the urban planning area is outlined as shown in Figure 3.11. This is based on the demographic projection and the land use planning.



Source: JST

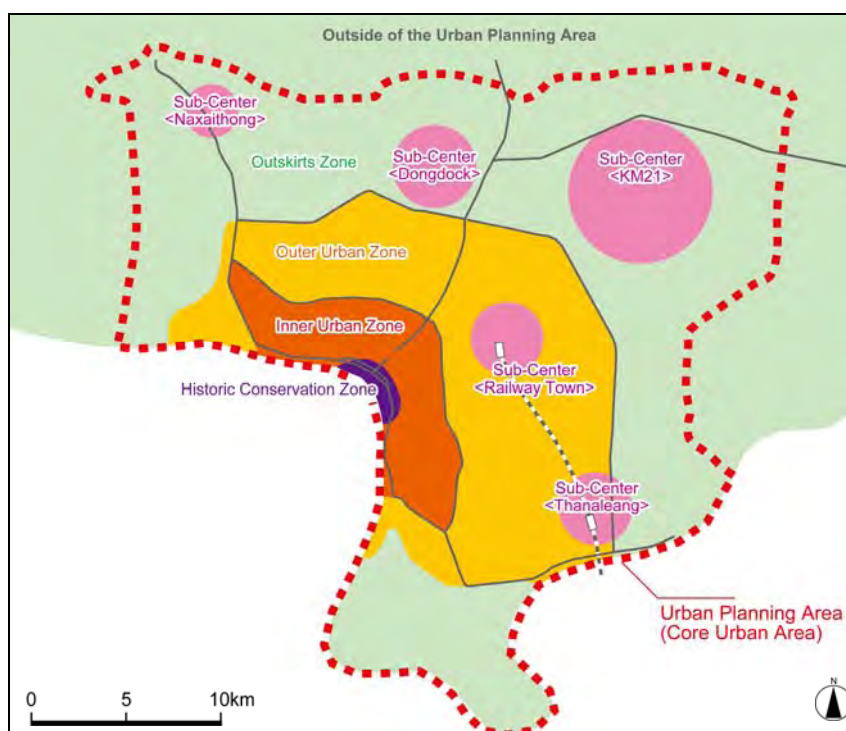
Figure 3.11: Urban Planning Area

Planning Zones: With objectives to induce appropriate spatial use and to effectively restrict the inappropriate building construction, it is recommended to divide the urban planning area into six (6) planning zones. The six (6) planning zones are “Historic conservation zone”, “Inner urban zone”, “Outer urban zone”, “Sub-center zone”, “Outskirts zone”, and “Urban cluster zone” as shown in Figures 3.12 and 3.13.



Source: JST

Figure 3.12: Planning Zones in Vientiane Capital



Source: JST

Figure 3.13: Planning Zones (Core Urban Area)

Table 3.5: Six (6) Planning Zones

| Zone | | Location | Characteristics |
|--------------------|----------------------------|--|---|
| Core Urban Area | Historic Conservation Zone | Inside the ancient ramparts | <ul style="list-style-type: none"> - Many historic buildings - Densely constructed with low-rise semi-detached buildings |
| | Inner Urban Zone | Outside the Historic Conservation Zone and inside the Inner Ring Road | <ul style="list-style-type: none"> - Newly developed area - Commercial buildings located along main roads - Sparsely constructed low and middle-rise semi-detached and independent buildings - Greenery to be protected |
| | Outer Urban Zone | Mainly between the Inner Ring Road and the Outer Ring Road | <ul style="list-style-type: none"> - Agricultural land - Urbanization rapidly increasing along main roads - Low-rise detached houses - Paved main roads and unpaved dirt feeder roads - Environmentally important water surfaces (That Luang March, etc) - Greenery to be protected |
| | Sub-Center Zone | Specific zones in the Outer Urban zone and the Outskirts zone | <ul style="list-style-type: none"> - Agricultural land - Urbanization rapidly increasing along main roads - Paved main roads and unpaved dirt feeder roads - New large-scale infrastructure (450 Year Road, Railway, etc) - Politically initiated new development - Foreign private investments |
| | Outskirts Zone | Outer side of the Outer Urban zone | <ul style="list-style-type: none"> - Overwhelmingly dominating agricultural land with typical Lao rural landscapes - Large-scale important greenery to be protected |
| Urban Cluster Zone | | Small-scale urbanized areas separately located outside the "Core Urban Area" | <ul style="list-style-type: none"> - Sparsely constructed low and middle-rise buildings - Scattered agricultural land - Greenery to be protected |

Source: JST

(1) Historic Conservation Zone

<in Core Urban Area>

(a) Current Conditions

Historic conservation zone is located in the urban center of Vientiane Capital. Downtown of Vientiane Capital consists of mainly low shop-house buildings, which is a historic landscape of Vientiane Capital since 19 century. The area has been designated as a conservation area in the previous urban plan to maintain townscape of traditional townscape, which supposes to be supported by several governmental policies as well as appreciated by peoples of Vientiane Capital. However, it is necessary to formulate more comprehensive measures to guide reconstruction of shop-house buildings and street beautification.

(b) Expected Area and Population

- Approximately 250 ha
- Approximately 11,000 persons

(c) Urban Development and Land Use Policy

- Conservation of historic heritages and buildings
- Development of the attractiveness as tourist resources (urban landscape, streetscape, land use, etc.)
- Improvement of environment and urban transport (pedestrian-friendly roads, etc.)
- Restriction and refinement of building control regulation (Guide of building reconstruction)
- Relocation of public facilities toward the Suburbs

(d) Infrastructure Development Policy

Table 3.6: Infrastructure Development Policy in the Historic Conservation Zone

| Sector | Basic Policy |
|----------------------|---|
| Road and Transport | - To eliminate private mode of transportation with a provision of public transport corridor and implementing TDM policies. |
| Water Supply | - Identification of location of under ground pipes - Renovation of the transmission and distribution pipe network. - Rehabilitation of water leakage from pipes |
| Sewerage/ Wastewater | - Improve existing septic tank or develop decentralized wastewater treatment plant |
| Drainage | - Improved existing drainage channel by removal of sediment, garbage and side wall rehabilitation. Keep existing pond or marsh area as retarding basin. |
| Solid Waste | - Awareness-raising about the importance of collection, reducing generation and discharge - Expansion of collection/transportation service area in the build-up area |
| Parks and Greenery | - Construction of additional 9 village parks in 4 phases |

Source: JST

(2) Inner Urban Zone

<in Core Urban Area>

(a) Current Conditions

Inner urban zone is located outside the historic conservation zone and inside the inner ring road. The zone has the stock of past investment and higher attractiveness for customers owing to the accumulated urban functions, which is the strength of this area for further development. There seems to be still large development demands in the zone due to market expansion as well as increase in the size and affordability of people in Vientiane Capital due to economic growth and population increase.

(b) Expected Area and Population

- Approximately 5,100 ha
- Approximately 219,000 persons

(c) Urban Development and Land Use Policy

- Specialization of land use in the central business area mainly for business and commercial use and partially for urban residence
- High density and Acceleration of urban redevelopment for business use intensification
- Relocation of large-scale factories and logistic facilities toward the suburbs
- Improvement of road network and public transport
- Encouragement of environment-friendly residential developments and improvement of living environment
- Conservation of the existing natural environment (marshes, etc.)
- Coordination with landscape and historic buildings in the historic conservation zone

(d) Infrastructure Development Policy

Table 3.7: Infrastructure Development Policy in the Inner Urban Zone

| Sector | Basic Policy |
|----------------------|--|
| Road and Transport | - To form urban structure by the construction of circular primary arterial road and, arterial and collector road complementary to the arterial road. |
| Water Supply | - Identification of location of under ground pipes - Renovation of the transmission and distribution pipe network. - Rehabilitation of water leakage from pipes |
| Sewerage/ Wastewater | - Improve existing septic tank or develop decentralized wastewater treatment plant |
| Drainage | - Same as historic conservation, drainage pump might be necessary in low area with flood prone. |
| Solid Waste | - Awareness-raising about the importance of collection and reducing generation and discharge - Expansion of collection/transportation service area in the build-up area |
| Parks and Greenery | - Construction of additional 9 village parks in 4 phases |

Source: JST

(3) Outer Urban Zone

<in Core Urban Area>

(a) Current Conditions

Outer urban zone is developed mainly as residential area. At present development is in progress along the major roads and relatively higher place (to avoid flood). Currently urbanization is taking place around 5 Km radius in the east and south and 10 Km radius in the north and west. This zone still has large vacant land within 15 to 20 Km radius area.

(b) Expected Area and Population

- Approximately 14,500 ha
- Approximately 300,000 persons

(c) Urban Development and Land Use Policy

- Acceleration of new urbanizing area (residential area with good living environment)
- Improvement of road network (primary, secondary, etc.)
- Low density in residential area and improvement of living environment (water supply, drainage and sewerage, etc.)
- Designation of urban area to regulate urban expansion
- Conservation of environmentally important area such as That Luang Marsh

(d) Infrastructure Development Policy

Table 3.8: Infrastructure Development Policy in the Outer Urban Zone

| Sector | Basic Policy |
|----------------------|--|
| Road and Transport | - Construction of trunk roads, which consist of Outer Ring Road and supporting arterial roads, and establishment of public transport service lead by BRT to connect villages to the Inner Urban Area. |
| Water Supply | - Identification of location of under ground pipes - Renovation of the transmission and distribution pipe network. - Rehabilitation of water leakage from pipes - Installation of pipes where is going to be developed - Enlargement of the WTP capacity to supply the water demand. |
| Sewerage/ Wastewater | - Provide overall treatment by on-site or decentralized system to new housing and new development |
| Drainage | - Provide proper drainage system inside the outer urban area by using additional drainage channel, pipe and retarding basin. |
| Solid Waste | - Awareness-raising about the importance of collection, reducing generation and discharge - Expansion of collection/transportation service area in the build-up area |
| Parks and Greenery | - Construction of two types of parks, district park and village park, based on the construction standard of service distance to use |

Source: JST

| | |
|----------------------------|-----------------------------------|
| (4) Sub-center Zone | <i><in Core Urban Area></i> |
|----------------------------|-----------------------------------|

(a) Current Conditions

Increasing demand and preferable future perspectives will cause more land speculation and development without provision of proper infrastructure and utility services. Such speculation will fail to utilize the land efficiently and will result in formation of poor living environment. Thus, it is required for urban development authority to guide such land development properly in outer urban zone and outskirts zone to construct well-planned sub-centers. As the sub-centers have very limited utility and infrastructure, it is necessary to develop all infrastructures in advance to develop a new town.

(b) Expected Area and Population

- Approximately 10,800 ha
- Approximately 315,000 persons

- 1) *KM21 (new town): New administration and industrial town (150,000 persons)*
- 2) *Thanaleang: Logistics and Border trade town (35,000 persons)*
- 3) *Dongdock: Academic and science town (80,000 persons)*
- 4) *Naxaithong: Satellite residential town (20,000 persons)*
- 5) *Railway town (30,000 persons)*

(c) Urban Development and Land Use Policy

- Clarification of characteristics, land use, and specific functions of each sub-center
- Designation of sub-centers to concentrate development
- Investment promotion, development inducement and PPP acceleration
- Development of an industrial estate and a logistics park
- Relocation of public facilities (public offices, universities, collages, hospitals, etc.)
- Development of infrastructure for each sub-center
- Higher density in business and production area while low density in residential area in the sub-centers
- Prohibition of development outside of designated sub-centers
- Conservation of environmentally important area such as paddy field with water retention function, agricultural land suitable for higher value added field crops

(d) Infrastructure Development Policy

Table 3.9: Infrastructure Development Policy in the Sub-center Zone

| Sector | Basic Policy |
|----------------------|--|
| Road and Transport | - Improvement and upgrade of existing roads to improve the accessibility of sub-centers and urban clusters to primary arterial road and the Inner Urban Area. |
| Water Supply | - Identification of the location of under ground pipes - Renovation of the transmission and distribution pipe network. - Rehabilitation of water leakage from pipes - Installation of pipes where is going to be developed - Enlargement of the WTP capacity to supply the water demand. |
| Sewerage/ Wastewater | - Provide overall treatment by on-site or decentralized system to new housing and new development |
| Drainage | - Provide proper drainage system inside the outer urban area by using additional drainage channel, pipe and retarding basin. |
| Solid Waste | - Awareness-raising about the importance of collection, reducing generation and discharge - Expansion of collection/transportation service area in the new urban area |
| Parks and Greenery | - Construction of two types of parks, district park and village park, based on the construction standard of service distance to use |

Source: JST

(5) Outskirts Zone

(a) Current Conditions

From environmental value, water retention function and land productivity points of view, Outskirts Zone should basically avoid urban development and maintain current land use. However, from environmental conservation and agricultural perspective, there are some areas that need to be conserved as per current land use. In these areas any further development should be avoided. These areas are rich in nature and society tends to acknowledge the importance of natural environmental conservation. Thus from the environmental perspective, these important areas are That Luang marsh, Dong Houay Gngang Protected area, Dong Phosy Protected area.

(b) Urban Development and Land Use Policy

- Development of irrigation facilities/ enhancement of rice farming
- Encouragement of cash crop production
- Prohibition of development outside of designated sub-centers and urban clusters
- Designation of natural forests, agricultural land, water surfaces for conservation of the urban greenery and the water faces
- Acceptance of minimum development by local dwellers
- Preservation of pastoral landscapes

(c) Infrastructure Development Policy

Infrastructure and utility development for basic human needs shall be taken into account.

(6) Urban Cluster Zone

(a) Current Conditions

This area mainly consists of forest and agricultural land which are rich in nature and are good for environment. It is a remote area of Vientiane Capital, which may have little influence on the urban development demand caused by economic development and increase in population.

(b) Expected Area and Population

- Approximately 3,100 ha
- Approximately 35,000 persons

- 1) *Tha Ngon: Commercial and tourism town, (20,000 person)*
 - 2) *Khok Hae: Border trade and transport town, (10,000 person)*
 - 3) *Ban Phao: Local commercial town, (5,000 person)*

(c) Urban Development and Land Use Policy

- Improvement of urban clusters' local public service
- Development of agriculture and green tourism center
- Designation of urban clusters
- Prohibition of development outside of designated urban clusters
- Acceptance of minimum development by local dwellers for their living.
- Conservation of environmentally important area such as paddy field with water retention function and agricultural land suitable for higher value added field crops

(d) Infrastructure Development Policy

Table 3.10: Infrastructure Development Policy in the Urban Cluster Zone

| Sector | Basic Policy |
|----------------------|---|
| Road and Transport | - Improvement and upgrade of existing roads to improve the accessibility of sub-centers and urban clusters to primary arterial road and the Inner Urban Area. |
| Water Supply | - Identification of the location of under ground pipes. - Renovation of the transmission and distribution pipe network. - Rehabilitation of water leakage from pipes - Installation of pipes where is going to be developed - Enlargement of the WTP capacity to supply the water demand. |
| Sewerage/ Wastewater | - Overall wastewater treatment by improved septic tank and grease trap |
| Drainage | - Provide proper drainage system inside the area by using additional drainage channel and natural pond or marsh. |
| Solid Waste | - Awareness-raising about the importance of collection, reducing generation and discharge - Expansion of collection/transportation service area in the new urban area |
| Parks and Greenery | - Construction of two types of parks, district park and village park |

Source: JST