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MINISTRY OF INDUSTRY
AND COMMERCE (MOIC)

JAPAN INTERNATIONAL
COOPERATION AGENCY (JICA)

PREPARATORY SURVEY ON INDUSTRIAL ZONE DEVELOPMENT IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC

FINAL REPORT
PART II

INDUSTRIAL ESTATE DEVELOPMENT IN VIENTIANE CAPITAL, SAVANNAKHET AND CHAMPASAK

JUNE 2010

NIPPON KOEI CO., LTD.
INTERNATIONAL DEVELOPMENT CENTER OF JAPAN
MINTECH CONSULTANTS INC.

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in
the Lao People's Democratic Republic

Final Report

Part II

Part II: Industrial Estate Development in Vientiane Capital, Savannakhet and Champasak

Table of Contents

Page

CHAPTER 1 INDUSTRIAL ESTATE DEVELOPMENT II-1-1
1.1 Necessity of Industrial Estate Development in the Lao PDR II-1-1
1.2 Potential Regions for Industrial Estate Development II-1-2
1.2.1 Identification of Potential Regions for Industrial Estate Development II-1-2
1.2.2 Current Industrial Zoning in the Three Regions II-1-3

CHAPTER 2 INDUSTRIAL ESTATE DEVELOPMENT IN VIENTIANE CAPITAL II-2-1
2.1 General Socioeconomic Conditions II-2-1
2.1.1 Demography II-2-1
2.1.2 Economy II-2-2
2.2 Urban Development Trend in Vientiane Capital II-2-5
2.2.1 Greater Mekong Economic Corridors and Vientiane II-2-5
2.2.2 Planning Context for Vientiane Capital II-2-6
2.2.3 Planning Context for Vientiane City Center II-2-8
2.3 Existing Infrastructure II-2-8
2.3.1 Road Network and Transportation II-2-8
2.3.2 Telecommunication II-2-15
2.3.3 Power Supply II-2-17
2.3.4 Water Supply II-2-18
2.3.5 Drainage and Sewerage Systems II-2-24
2.3.6 Urban Sanitation II-2-28
2.4 Industrial Location II-2-31
2.4.1 Existing Industrial Location II-2-31
2.4.2 Potential Industrial Location II-2-34
2.5 Conceptual Plan for Industrial Estate II-2-36
2.5.1 Future Prospects II-2-36

2.5.2 Development Framework II-2-36
2.5.3 Site Alternative II-2-38
2.5.4 Planned Industrial Estate Development II-2-40
2.5.5 Infrastructure Development Plan II-2-40
2.5.6 Evaluation of Investment Climate II-2-41
2.5.7 Development Roadmap II-2-43

CHAPTER 3 INDUSTRIAL ESTATE DEVELOPMENT IN SAVANNNAKHET II-3-1
3.1 General Socioeconomic Conditions II-3-1
3.1.1 Demography II-3-1
3.1.2 Economy II-3-2
3.2 Urban Development Policy in Savannakhet Province II-3-7
3.2.1 Future Vision II-3-7
3.2.2 Urban Development Policy for Land Use in the Future II-3-8
3.3 Existing Infrastructure II-3-9
3.3.1 Road Network and Transportation II-3-9
3.3.2 Telecommunication II-3-11
3.3.3 Power Supply II-3-12
3.3.4 Water Supply II-3-13
3.3.5 Drainage and Sewerage Systems II-3-15
3.3.6 Urban Sanitation II-3-16
3.4 Industrial Location II-3-17
3.4.1 Existing Industrial Location II-3-17
3.4.2 Potential Industrial Location II-3-18
3.5 Conceptual Plan for Industrial Estate II-3-20
3.5.1 Future Prospects II-3-20
3.5.2 Development Framework II-3-20
3.5.3 Site Alternatives II-3-22
3.5.4 Current Industrial Estate Development II-3-24
3.5.5 Infrastructure Development Plan II-3-25
3.5.6 Evaluation of Investment Climate II-3-26
3.5.7 Development Roadmap II-3-28

CHAPTER 4 INDUSTRIAL ESTATE DEVELOPMENT IN CHAMPASAK II-4-1
4.1 General Socioeconomic Conditions II-4-1
4.1.1 Demography II-4-1
4.1.2 Economy II-4-1
4.2 Urban Development Policy in Pakse II-4-4
4.2.1 Future Vision II-4-4
4.2.2 Urban Development Policy for Land Use in the Future II-4-5
4.3 Existing Infrastructure II-4-6
4.3.1 Road Network and Transportation II-4-6
4.3.2 Telecommunication II-4-9

4.3.3 Power Supply II-4-10
4.3.4 Water Supply II-4-11
4.3.5 Drainage and Sewerage Systems II-4-13
4.3.6 Urban Sanitation II-4-13
4.4 Industrial Location II-4-16
4.4.1 Existing Industrial Location II-4-16
4.4.2 Potential Industrial Location II-4-17
4.5 Conceptual Plan for Industrial Estate II-4-18
4.5.1 Future Prospects II-4-18
4.5.2 Development Framework II-4-18
4.5.3 Site Alternatives II-4-20
4.5.4 Planned Industrial Estate Development II-4-21
4.5.5 Infrastructure Development Plan II-4-23
4.5.6 Evaluation of Investment Climate II-4-23
4.5.7 Development Roadmap II-4-26

CHAPTER 5 SELECTION OF A PRIORITY REGION FOR AN INDUSTRIAL PARK DEVELOPMENT STUDY II-5-1
5.1 Selection Process of a Priority Region for the First Industrial Estate in the Lao PDR II-5-1
5.2 Conclusion II-5-5

Part I: National Industrial Development

and

Part III: Feasibility Study for Vientiane Industrial Park

are bound separately.

List of Tables

		Page
Table 1.2.1	Current Site Conditions of Savan-Seno SEZ	II-1-4
Table 1.2.2	Land Use Plan for Savan Park	II-1-5
Table 1.2.3	Current Site Conditions of the Industrial Zones in Pakse	II-1-6
Table 2.1.1	Population Growth in the Lao PDR and Vientiane Capital	II-2-1
Table 2.1.2	Change of Population and Urban Population by Districts	II-2-2
Table 2.1.3	Rice Production in Vientiane Capital	II-2-3
Table 2.1.4	Vegetable Production in Vientiane Capital	II-2-3
Table 2.1.5	Location of Business Establishment in the Secondary Industry	II-2-3
Table 2.1.6	FDI in Vientiane Capital and the Lao PDR	II-2-3
Table 2.1.7	Tourism-Related Statistics	II-2-4
Table 2.1.8	Public Investment in Vientiane Capital	II-2-4
Table 2.1.9	Revenue and Expenditure of Vientiane Capital	II-2-5
Table 2.3.1	Road Length by Type of Pavement (2007) (km)	II-2-9
Table 2.3.2	Bus Stations in Vientiane	II-2-10
Table 2.3.3	Public Bus Transportation Schedule (as of October 2009)	II-2-12
Table 2.3.4	Outline of Wattay International Airport	II-2-12
Table 2.3.5	Flight Schedule (2009)	II-2-13
Table 2.3.6	List of Telecommunication Company and Internet Provider	II-2-15
Table 2.3.7	Unit of Multiplexing and Transmission Capacity	II-2-15
Table 2.3.8	Internet Service in Vientiane Capital	II-2-16
Table 2.3.9	Existing 115/22 kV Substation in Vientiane Capital	II-2-18
Table 2.3.10	Bacteriological Parameters	II-2-19
Table 2.3.11	Physical-Chemical Parameters	II-2-19
Table 2.3.12	Health Significant Chemical Parameters	II-2-19
Table 2.3.13	Present Water Service Levels in Vientiane	II-2-20
Table 2.3.14	Water Demand Projection in Vientiane	II-2-20
Table 2.3.15	Existing WTPs in Vientiane	II-2-21
Table 2.3.16	New Water Tariff for Domestic and Non-Domestic Customers	II-2-23
Table 2.3.17	Service Condition of NPVC	II-2-24
Table 2.3.18	Flood Water Level of Mekong and Probable Rainfall	II-2-26
Table 2.3.19	Industrial Wastewater Effluent Standard	II-2-27
Table 2.3.20	Wastewater Effluent Standard Parameters	II-2-27
Table 2.3.21	Wastewater Effluent Standard Categories	II-2-27
Table 2.3.22	Wastewater Effluent Standard for Wastewater Treatment Plant	II-2-28
Table 2.3.23	Solid Waste Collection in Vientiane	II-2-29
Table 2.3.24	Number of Equipment	II-2-29

Table 2.3.25 Volume of Solid Waste II-2-30
Table 2.4.1 Existing Factories in Vientiane Capital II-2-31
Table 2.4.2 Observation of Site of Garment Factories II-2-32
Table 2.4.3 Members of the Association of the Lao Garment Industry in Vientiane Capital II-2-33
Table 2.4.4 Potential Industries in Vientiane Capital II-2-35
Table 2.5.1 Forecasted Employed Population II-2-37
Table 2.5.2 Industrial Employment II-2-37
Table 2.5.3 Required Additional Industrial Area II-2-37
Table 2.5.4 Required Additional Industrial Estate Area II-2-37
Table 2.5.5 Estimated Industrial Park Development Demand II-2-38
Table 2.5.6 Site Alternative for Vientiane Industrial Zone Development II-2-40
Table 2.5.7 Demand Estimation for Vientiane Industrial Zone Development II-2-40
Table 2.5.8 Infrastructure Development Concepts II-2-41
Table 2.5.9 Examination Result of Investment Climate II-2-42

Table 3.1.1 Change of District Population in Savannakhet Province II-3-1
Table 3.1.2 Business Enterprises in Savannakhet Province II-3-4
Table 3.1.3 Foreign Direct Investment in Secondary Industry II-3-4
Table 3.1.4 Major Tourism Statistics of Savannakhet Province in Recent Years II-3-7
Table 3.1.5 Public Investment Program in Savannakhet Province II-3-7
Table 3.3.1 Road Length by Type of Pavement (2006) II-3-10
Table 3.3.2 Outline of Savannakhet Airport II-3-10
Table 3.3.3 Flight Schedule (2009) II-3-10
Table 3.3.4 Internet Service in the Surrounding Area of Savannakhet District II-3-12
Table 3.3.5 Existing 115/22kV Substation for the Surrounding Area of Savannakhet District II-3-13
Table 3.3.6 Present Conditions and Water Demand Projection in Kaisone Phomvihan District II-3-13
Table 3.3.7 Present Water Supply Conditions in Outhoumphone District II-3-14
Table 3.3.8 Water Tariff II-3-15
Table 3.3.9 Service Condition of NPS II-3-15
Table 3.3.10 Garbage Collection Fee II-3-16
Table 3.4.1 Existing Factories in Savannakhet II-3-18
Table 3.4.2 Potential Industries in Savannakhet Province II-3-19
Table 3.5.1 Forecasted Employed Population II-3-21
Table 3.5.2 Industrial Employment II-3-21
Table 3.5.3 Required Additional Industrial Area II-3-21
Table 3.5.4 Required Additional Industrial Estate Area II-3-21

Table 3.5.5 Estimated Industrial Park Development Demand II-3-22
Table 3.5.6 Site Alternatives for Savannakhet Industrial Zone Development II-3-23
Table 3.5.7 Land Use Plan for Savan Park.....II-3-24
Table 3.5.8 Phasing Development.....II-3-24
Table 3.5.9 Estimated Demand for Savannakhet Industrial Zone Development II-3-25
Table 3.5.10 Infrastructure Development Concepts.....II-3-26
Table 3.5.11 Examination Result of Investment Climate.....II-3-27

Table 4.1.1 Change of District Population in Champasak Province II-4-1
Table 4.1.2 Business Enterprises in Champasak Province.....II-4-3
Table 4.1.3 Foreign Direct Investment in Secondary Industry.....II-4-3
Table 4.1.4 Major Tourism Statistics in Champasak Province.....II-4-4
Table 4.1.5 Public Investment in FY 2006-2007 and FY 2007-2008.....II-4-4
Table 4.3.1 Road Length by Type of Pavement (2006).....II-4-8
Table 4.3.2 Bus Stations in Pakse II-4-8
Table 4.3.3 Outline of Pakse International Airport II-4-8
Table 4.3.4 Flight Schedule (2009).....II-4-8
Table 4.3.5 Internet Service for Surrounding of the Pakse District II-4-10
Table 4.3.6 Existing 115/22kV Substation for the Surrounding of the Pakse District II-4-11
Table 4.3.7 Present Conditions and Water Demand Projection in Pakse and Champasak Province.....II-4-11
Table 4.3.8 Existing Water Facilities in Urban Pakse II-4-12
Table 4.3.9 Water Tariff II-4-13
Table 4.3.10 Service Condition of NPS II-4-13
Table 4.3.11 Garbage Collection and Disposal Fees.....II-4-14
Table 4.3.12 Monthly Garbage Transport Volume at Sanitary Landfill Site.....II-4-14
Table 4.3.13 Number of Vehicles for Garbage Transportation.....II-4-15
Table 4.4.1 Existing Factories in Vientiane Capital.....II-4-17
Table 4.4.2 Potential Industries in Champasak Province.....II-4-17
Table 4.5.1 Forecasted Employed Population.....II-4-18
Table 4.5.2 Industrial Employment.....II-4-19
Table 4.5.3 Required Additional Industrial Area II-4-19
Table 4.5.4 Required Additional Industrial Estate Area.....II-4-19
Table 4.5.5 Estimated Industrial Park Development Demand II-4-19
Table 4.5.6 Site Alternatives for Champasak (Pakse) Industrial Zone Development II-4-21
Table 4.5.7 Demand Estimation for Champasak (Pakse) Industrial Zone Development II-4-23
Table 4.5.8 Infrastructure Development Concepts.....II-4-24
Table 4.5.9 Examination Result of Investment Climate.....II-4-25

Table 5.1.1 Population Growth Rate of Vientiane, Savannakhet and Pakse (1995-2007) II-5-2
Table 5.1.2 Number and Percentage of Foreign Companies Interested in the Lao PDR and in Each of Its Three Regions II-5-3
Table 5.1.3 Number and Percentage of Factories Owned by Foreign Investors Located in Vientiane II-5-3
Table 5.1.4 Scheduled International Flights to/from Vientiane Airport (As of April, 2009) II-5-4
Table 5.2.1 Summary of the Valuation for Selecting a Priority Region II-5-5

Table I.1.1 Fundamentals of Thailand (2007) AI-1-1
Table I.1.2 Export and Import by Item in Thailand (2007) AI-1-2
Table I.1.3 Index Number of Primary Goods Exports for 1969-1979 ..... AI-1-3
Table I.1.4 Preferential Treatment of BOI AI-1-7
Table I.1.5 Investment Promotion Zones of BOI AI-1-8
Table I.1.6 Comparison of Incentives Granted by BOI and IEAT AI-1-8
Table I.1.7 List of Industrial Estates AI-1-9
Table I.1.8 Price of Industrial Estate Lands AI-1-12

Table I.2.1 Fundamentals of Vietnam (2007) AI-2-1
Table I.2.2 Change in FDI in Vietnam AI-2-5
Table I.2.3 Corporate Income Tax AI-2-7
Table I.2.4 Industrial Zone (Municipality & Northern Region) AI-2-8
Table I.2.5 Industrial Zone (Central Region) AI-2-9
Table I.2.6 Industrial Zone (Southern Region) AI-2-10

Table I.3.1 Educational Background of MoIC Personnel (1/2) AI-3-4
Table I.3.2 Educational Level of MoIC Personnel by Age Group AI-3-5
Table I.3.2 Educational Level of MoIC Personnel by Age Group AI-3-6
Table I.3.3 Staffing of DoIC of Vientiane Capital AI-3-9
Table I.3.4 Educational Background of DoIC Personnel of Vientiane Capital AI-3-9
Table I.3.5 Duties and Responsibilities of Savan-SENO SEZA by Position/Division AI-3-12
Table I.3.6 Educational Level of Personnel of Savan-SENO SEZA AI-3-13
Table I.3.7 Current Functions of Savan-SENO SEZA AI-3-14

Table I.4.1 Sample Size of Questionnaire Survey AI-4-2
Table I.4.2 Types of Industry of the Potential Investors in the Lao PDR AI-4-4

Table I.4.3 Size of Factories of the Respondents Operating in the Neighboring Countries AI-4-4
Table I.4.4 Priority Ranking of Factors for FDI Inducement AI-4-5
Table I.4.5 No Response Ratio AI-4-6
Table I.4.6 Questions regarding Interests in the New Business Opportunities in the Lao PDR AI-4-12

Table I.5.1 Roles and Functions of Each Legal Act AI-5-1

List of Figures

Page

Figure 1.2.1 Land Use Plan for Vientiane Capital 2010 ..... II-1-3
Figure 1.2.2 Site Location of Savan-Seno SEZ II-1-4
Figure 1.2.3 Locations of the Industrial Zones in Pakse II-1-5

Figure 2.2.1 Recent Modifications in GMS Economic Corridor Network II-2-6
Figure 2.2.2 Location and Function of Urban Centers in Vientiane II-2-7
Figure 2.2.3 Plan for Location of National Activities II-2-7
Figure 2.2.4 Existing, New and Future Urban Areas for Vientiane, 2010 ..... II-2-8
Figure 2.2.5 Land Use Zoning Plan for Vientiane, 2010 ..... II-2-8
Figure 2.3.1 Major Road Network II-2-9
Figure 2.3.2 Country Border Gate and Major Road II-2-10
Figure 2.3.3 Types of Public Transportation II-2-10
Figure 2.3.4 Major Public Bus Transportation Routes (as of October 2009) II-2-11
Figure 2.3.5 Thanaleng Station II-2-13
Figure 2.3.6 450 Year Road II-2-13
Figure 2.3.7 Outline of the 450 Year Road Construction Project II-2-14
Figure 2.3.8 Ring Road Plan for Vientiane II-2-14
Figure 2.3.9 Trunk Line Diagram of ETL in Vientiane Capital II-2-15
Figure 2.3.10 Trunk Line Diagram of Lao Telecom in Vientiane Capital II-2-16
Figure 2.3.11 Power Grid System Surrounding Vientiane Capital II-2-17
Figure 2.3.12 Dongmakkhay WTP and Kaolieo WTP II-2-21
Figure 2.3.13 Existing Water Supply System in Vientiane Capital II-2-22
Figure 2.3.14 Nam Ngum River II-2-23
Figure 2.3.15 Organization Chart of NPVC II-2-24
Figure 2.3.16 Existing Drainage System in Vientiane Capital II-2-25
Figure 2.3.17 Organization of VUDAA II-2-28
Figure 2.3.18 Location of Km 32 Landfill II-2-30
Figure 2.3.19 Recycling Company II-2-30
Figure 2.4.1 Distribution of Apparel Factories in Vientiane Capital II-2-34
Figure 2.5.1 Site Alternative for Vientiane Industrial Zone Development II-2-39
Figure 2.5.2 Industrial Estate Development Factors II-2-41
Figure 2.5.3 Evaluation Summary of Investment Climate II-2-42
Figure 2.5.4 Roadmap for Successful Implementation (Vientiane) II-2-44

Figure 3.1.1 Change of Rice Production II-3-2
Figure 3.1.2 Production of Sugarcane II-3-3
Figure 3.1.3 Production of Gold and Copper II-3-3

Figure 3.1.4 Merchandise Trade and Its Major Items II-3-4
Figure 3.1.5 Site Development Plan Site A II-3-5
Figure 3.1.6 Site Development Plan Site C II-3-6
Figure 3.1.7 Site Development Plan Site D II-3-6
Figure 3.2.1 Proposed Urban Structure and Land Use Concept Plan (Savannakhet Province) II-3-8
Figure 3.3.1 Major Road Network II-3-9
Figure 3.3.2 Current Road Condition of National Road No.13 South (left), National Road No.9 West (center) and National Road No.9 West in City Center (right) II-3-9
Figure 3.3.3 Trunk Line Diagram of ETL in the Surrounding Area of Savannakhet District II-3-11
Figure 3.3.4 Trunk Line Diagram of Lao Telecom in the Surrounding Area of Savannakhet District II-3-11
Figure 3.3.5 Power Grid System in Savannakhet Province II-3-12
Figure 3.3.6 Present and Future Service Area in Savannakhet's Urban Area II-3-14
Figure 3.3.7 Layout of Sanitary Landfill II-3-17
Figure 3.5.1 Site Alternatives for Savannakhet Industrial Zone Development II-3-23
Figure 3.5.2 Development Phases II-3-25
Figure 3.5.3 Progress of Construction Works II-3-25
Figure 3.5.4 Industrial Estate Development Factors II-3-26
Figure 3.5.5 Evaluation Summary of Investment Climate II-3-27
Figure 3.5.6 Roadmap for Successful Implementation (Savannakhet) II-3-29

Figure 4.1.1 Change of Rice Production in Champasak Province II-4-2
Figure 4.1.2 Vegetable Production in the Lao PDR and Champasak Province II-4-3
Figure 4.2.1 Proposed Urban Structure Plan (Pakse) II-4-5
Figure 4.2.2 Proposed Land Use Concept Plan (Pakse) II-4-6
Figure 4.3.1 Alternatives for Industrial Estates Site and Major Road Network II-4-7
Figure 4.3.2 Current Road Condition of National Road No. 16W (left), National Road No. 13S (center) and National Road No. 13S in City Center (right) II-4-7
Figure 4.3.3 Trunk Line Diagram of ETL in the Surrounding Area of Pakse District II-4-9
Figure 4.3.4 Trunk Diagram of Lao Telecom in the Surrounding Area of Pakse District II-4-9
Figure 4.3.5 Power Grid System in Champasak Province II-4-10
Figure 4.3.6 Present Service Area II-4-12
Figure 4.3.7 Organization of UDAA II-4-14
Figure 4.3.8 Km 17 Sanitary Landfill Site at Pakse II-4-15

Figure 4.3.9 Sanitary Landfill Site at Pakse II-4-16
Figure 4.5.1 Rough Sketch of Existing Bachiang and Pathoumphon Industrial Estate.....II-4-22
Figure 4.5.2 Feasibility Study on Vietnamese Industrial Estate II-4-22
Figure 4.5.3 Industrial Estate Development Factors.....II-4-24
Figure 4.5.4 Evaluation Summary of Investment Climate II-4-24
Figure 4.5.5 Roadmap for the Successful Implementation (Champasak).....II-4-27

Figure 5.1.1 Demographic Scale of Vientiane, Savannakhet and Pakse (1995-2007).....II-5-2
Figure 5.1.2 International Scheduled Flight Routes to/from the Lao PDR (As of Apr. 2009) II-5-4

Figure I.1.1 GDP by Industrial Sector (1998).....AI-I-1
Figure I.1.2 GDP by Industrial Sector (2007, estimated).....AI-I-2
Figure I.1.3 Change in Economic Growth (1969-1978) AI-I-3
Figure I.1.4 Changes in Industrial Policy in Thailand AI-I-4
Figure I.1.5 Change in Economic Growth (1987-1997) AI-I-6

Figure I.2.1 GDP by Industrial Sector (Vietnam, 1998) AI-2-1
Figure I.2.2 GDP by Industrial Sector (Vietnam, 2007) AI-2-2
Figure I.2.3 Export Value by Item (Vietnam, 2007) AI-2-2
Figure I.2.4 Import Value by Item (Vietnam, 2007) AI-2-3
Figure I.2.5 Changes in Industrial Policy in Vietnam.....AI-2-4
Figure I.2.6 Real GDP Growth Rate in Vietnam (1998-2007).....AI-2-5
Figure I.2.7 No. of FDI Licensed (1997-2007).....AI-2-6

Figure I.3.1 Organizational Structure of MoIC.....AI-3-2
Figure I.3.2 Educational Level of MoIC Personnel by Age Group.....AI-3-6
Figure I.3.3 Organizational Structure of DoIC of Vientiane Capital AI-3-8
Figure I.3.4 Organizational Structure of the PMO.....AI-3-10
Figure I.3.5 Organizational Structure of the SoG AI-3-11
Figure I.3.6 Organizational Structure of Savan-SENO SEZA.....AI-3-11
Figure I.3.7 Organizational Structure of MPWT AI-3-15

Figure I.4.1 Work Flow of the Investment Demand Survey AI-4-1
Figure I.4.2 Types of Industry of the Potential Investors in the Lao PDR.....AI-4-3
Figure I.4.3 Degree of Investment Demand in the Lao PDR.....AI-4-5
Figure I.4.4 Needs Analysis for Infrastructure.....AI-4-6
Figure I.4.5 Needs Analysis for Human Resources AI-4-7
Figure I.4.6 Needs Analysis for Logistics.....AI-4-8

Figure I.4.7 Needs Analysis for Incentives for Investment.....AI-4-9
Figure I.4.8 Needs Analysis for Geographic Condition.....AI-4-10
Figure I.4.9 Needs Analysis for Locating in Industrial Estate.....AI-4-11
Figure I.4.10 Preference of Location for Investment in the Lao PDR.....AI-4-12
Figure I.4.11 Intention of the New Business Opportunity Based on the Potential and Competitiveness of the Lao PDR.....AI-4-13
Figure I.4.12 Advantage for Mineral and Agricultural Resources of the Lao PDR.....AI-4-14
Figure I.4.13 Reasons for Not Considering Mineral and Agricultural Resources as Decisive Factors for Investment.....AI-4-15
Figure I.4.14 Advantage for Cheap Labor Cost in the Lao PDR and the Main Reasons for Not Considering Cheap Labor Cost as a Decisive Factor for Investment.....AI-4-16
Figure I.4.15 Investment Style and Reasons for Not Fully Relocating in the Lao PDR.....AI-4-17

List of Abbreviations

450-YR	450 Year Road
ADB	Asian Development Bank
AFTA	ASEAN Free Trade Area
AISP	ASEAN Integrated System of Preferences
ASEAN	Association of Southeast Asian Nations
BOI	Board of Investment
BPS	Bit Per Second
BRICs	Brazil, Russia, India, China
CA	Concession Agreement
CBR	California Bearing Ratio
CBTA	Cross Boarder Transport Agreements
CCA	Common Control Area
CDR	Crude Death Rate
CEPT	Common Effective Preferential Tariff
CIQ	Customs, Immigration and Quarantine
CLMV	the four newer ASEAN members consisting of Cambodia, Laos, Myanmar and Vietnam
CPI	Consumer Price Index
CPMI	Committee for Promotion and Management of Investment
D/D	Detailed Design
DDFI	Department for Promotion and Management of Domestic and Foreign Investment
DHUP	Department of Hosing and Urban Planning
DMS	Detailed Measurement Survey
DOF	Department of Forestry, Ministry of Agriculture and Forestry
DoIC	Division of Industry and Commerce
DoS	Department of Statistics, Ministry of Planning and Investment
DPI	Department for Planning and Investment
DPRA	Development Project Responsible Agency
DR-	District Road Number
EA	Environmental Assessment
ECC	Environmental Compliance Certificate
EDL	Electricité du Laos
EIA	Environmental Impact Assessment
EMDP	Ethnic Minority Development Plan
EMP	Environmental Monitoring Plan

EPZ	Export Processing Zone
ESCC	Environmental and Social Compliance Certificate
ESIA	Environmental and Social Impact Assessment
ESIAD	Department of Environmental and Social Impact Assessment
ETL	Enterprise of Telecommunications Lao
EU	European Union
F/S	Feasibility Study
FDI	Foreign Direct Investment
FIA	Foreign Investment Agency
FTZ	Free Trade Zone
FY	Fiscal Year
GDP	Gross Domestic Product
GEL	General Exception List
GMS	Greater Mekong Sub-region
GPS	Global Positing System
GRDP	Gross Regional Domestic Product
GSP	General System of Preference
HQO	Head Quarter's Office
HS	Harmonized System
IE	Industrial Estate
IEAT	Industrial Estate Authority of Thailand
IEE	Initial Environmental Evaluation
IEZ	Industrial Estate Zone
IL	Inclusion List
IMF	International Monetary Fund
IP	Industrial Park
IPZ	Import Processing Zone
ISA	Initial Social Assessment
ISO	International Organization for Standardization
JBIC	Japan Bank for International Cooperation
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JIT	Just-In-Time
JST	JICA Survey Team
LACR	Land Acquisition and Compensation Report
Lao PDR	Lao People's Democratic Republic
LCL	Less Container Load

LDC	Least Development Country
LIEPDA	Laos Industrial Estate Promotion and Development Authority
LMA	Land Management Authority
LNCCI	Lao National Chamber of Commerce and Industry
LPCD	Liter Per Capita Day
MAF	Ministry of Agriculture and Forestry
M/M	Minutes of Meeting
MDGs	Millennium Development Goals
MLW	Ministry of Labor and Social Welfare
MoF	Ministry of Finance
MoIC	Ministry of Industry and Commerce
MoPI	Ministry of Planning and Investment
MOU	Memorandum of Understanding
M/P	Master Plan
MPI	Ministry of Planning and Investment
MPWT	Ministry of Public Works and Transport
MSL	Mean Sea Level
NEC	National Environmental Committee
NEM	New Economic Mechanism
NGPES	National Growth and Poverty Eradication Strategy
NPC	Nam Papa UAD
NPS	Nam Papa Savannakhet
NPSEs	Nam Papa State Owned Enterprises
NPVC	Nam Papa Vientiane Capital
NR-	National Road Number
NSEDP	National Socio-Economic Development Plan
NTFPs	Non-Timber Forestry Products
O&M	Operation and Maintenance
O&M	Operation & Maintenance
OBOI	Office of the Board of Investment
ODA	Official Development Assistance
OSU	One-Stop-Service Unit
PAPs	Project-affected peoples
PD	Project owner must submit project Description
PDA	Project Development Agreement
PI	Public Involvement
PIs	Public Involvements

PM	Prime Minister
PMO	Prime Minister's Office
PMU	Project Management Unit
PPA	Power Purchase Agreement
PPP	Public Private Partnership
R&D	Research and Development
RAP	Resettlement Action Plan
S/W	Scope of Work
SA	Social Assessment
SASEZ	Savan-Seno Special Economic Zone
SC	Steering Committee
SDH	Synchronous Digital Hierarchy
SED	Social and Environment Division
SEMC	Social and Environment Management Committee
SEZ	Special Economic Zone
SEZA	Savan-Seno Special Economic Zone Authority
SIDA	Swedish International Development Cooperation Agency
SL	Sensitive List
SOG	Secretariat of Government
SPT	Standard Penetration Test
STEA	Science, Technology and Environment Agency
STM	Synchronous Transport Module
TA	Technical Assistance
TEL	Temporary Exclusion List
TFR	Total Fertility Rate
TOR	Term of Reference
UDAA	Urban Development and Administration Authority
UNDP	United Nations Development Program
UNIDO	United Nations Industrial Development Organization
USD	United States Dollar
UXO	Unexploded Ordinance
VAT	Value-Added Tax
VEPZ	Vientiane EPZ
VIP	Vientiane Industrial Park
VIPA	Vientiane Industrial Park Authority
VIZ	Vientiane Industrial Zone
VLP	Vientiane Logistics Park

VMI	Vendor Management Inventory
VUDAA	Vientiane Urban Development and Administration Authority
WASA	Water Supply Authority
WREA	Water Resources and Environment Agency
WREO	Office of Water Resources and Environment
WSD	Water Supply Division
WSRC	Water Supply Regulatory Committee
WSRO	Water Supply Regulatory Office
WTO	World Trade Organization
WTPs	Water Treatment Plants

PART II INDUSTRIAL ESTATE DEVELOPMENT IN VIENTIANE CAPITAL, SAVANNAKHET AND CHAMPASAK

CHAPTER 1 INDUSTRIAL ESTATE DEVELOPMENT

1.1 Necessity of Industrial Estate Development in the Lao PDR

In Japan, industrial estates or industrial parks have been initially developed only for the purpose of accommodating production facilities. Nowadays, however, supporting facilities for factories such as logistics, operation, research and development, and other facilities are also considered with a view to improving the efficiency of production activities. Also, there have been industrial parks equipped with residential and commercial functions for those who work in the park.

A single generic term "industrial estate" is given to all industrial parks specified by types of industry, scale and activity. In other words, there are various types of specialized estates, namely: "food processing estate", "machinery and metal estate", "toy industrial estate", "small and medium enterprise (SME) estate", "wholesale estate", "techno park", "soft park", "high-tech park", and so on. Export processing zone (EPZ) and special economic zone (SEZ) are also regarded as different types of specialized estates in terms of production system and policy. To sum up, an industrial estate can be defined as a cluster of land development projects equipped with the requisite infrastructure to effectively facilitate daily production activities.

An industrial park will bring effectiveness to concerned stakeholders, especially to the region and investors as summarized below:

(1) Effectiveness for the Region:

- Efficient infrastructure development is expected at an early stage;
- The ripple effect, such as creation of the supporting industries as well as services outside of the industrial estate, is expected through the formulation of industrial cluster;
- Improvement of fiscal balance via incremental tax revenue as well as creation of employment is expected; and
- Balanced land use is expected by preventing mixed development of factory and housing areas.

(2) Effectiveness for Investors:

- Commencement of operation is promised (surefire business plan);
- Procedures and negotiations for land acquisition, which are huge burden for independent location, are not required:
    - Negotiations of land acquisition as well as public meetings regarding land development with the local residents are not necessary;

  - Preparation period for the operation is much shorter due to the available infrastructure; and
  - Miscellaneous costs and problems generally encountered when developing the infrastructure independently are not assumed.

- Profit raised via industrial cluster as well as the possibility for the establishment of supporting industries is expected;
- Common facilities and amenities are available in the industrial estate;
- Creation of service industries is expected in the surrounding areas; and
- Troubles with the local residents are minimized.

Fundamentally, the above-mentioned benefits can also be expected in developing countries. The construction of an industrial estate contributes to the reduction of both cost and time needed for infrastructure development, which is profitable for the regional authority and the local society. Besides, for investing companies, especially foreign direct investors, it is recommendable to alleviate various risks in developing infrastructure by themselves as well as to prepare a surefire business plan since the commencement of operation can be guaranteed. In some countries, government policies for supporting business operations like one stop service are also available. Such policies are indispensable for the speedy procedures of import/export as well as for the transparency of customs.

1.2 Potential Regions for Industrial Estate Development

Following the previous section about the necessity of industrial park development in the Lao PDR, this section is provided to discuss the potential regions for industrial estate development.

1.2.1 Identification of Potential Regions for Industrial Estate Development

As already described in detail in Part I, Section 4.5, the Lao PDR has several potential regions for industrial estate development. They are all major urbanized areas in the Lao PDR, each with a comparatively large population: Vientiane, Savannakhet, Pakse, Thakek, Luang Prabang, and Luang Namtha.

Besides, the "Sixth Five-Year Industry and Commerce Development Plan (2006-2010)" clearly states that among these urbanized areas, priority should be especially given to three areas, namely: Vientiane, Savannakhet and Pakse, for introducing industrial zones and enhancing foreign direct investment (FDI) promotion.

In this context, it can be concluded that the three focal locations, namely: Vientiane, Savannakhet and Pakse, should be developed strategically in order to make the best use of local advantages.

It is recommended that the Lao PDR government make sure that the industrial estates to be developed have distinct advantages compared with those of the neighboring countries that have better access to seaports.

All the following conditions are necessary for attracting foreign investors:

- To offer low land lease price.
- To develop sufficient infrastructure such as electricity, water supply, roads, telecommunication, rental factories, rental warehouses, and rental machinery.

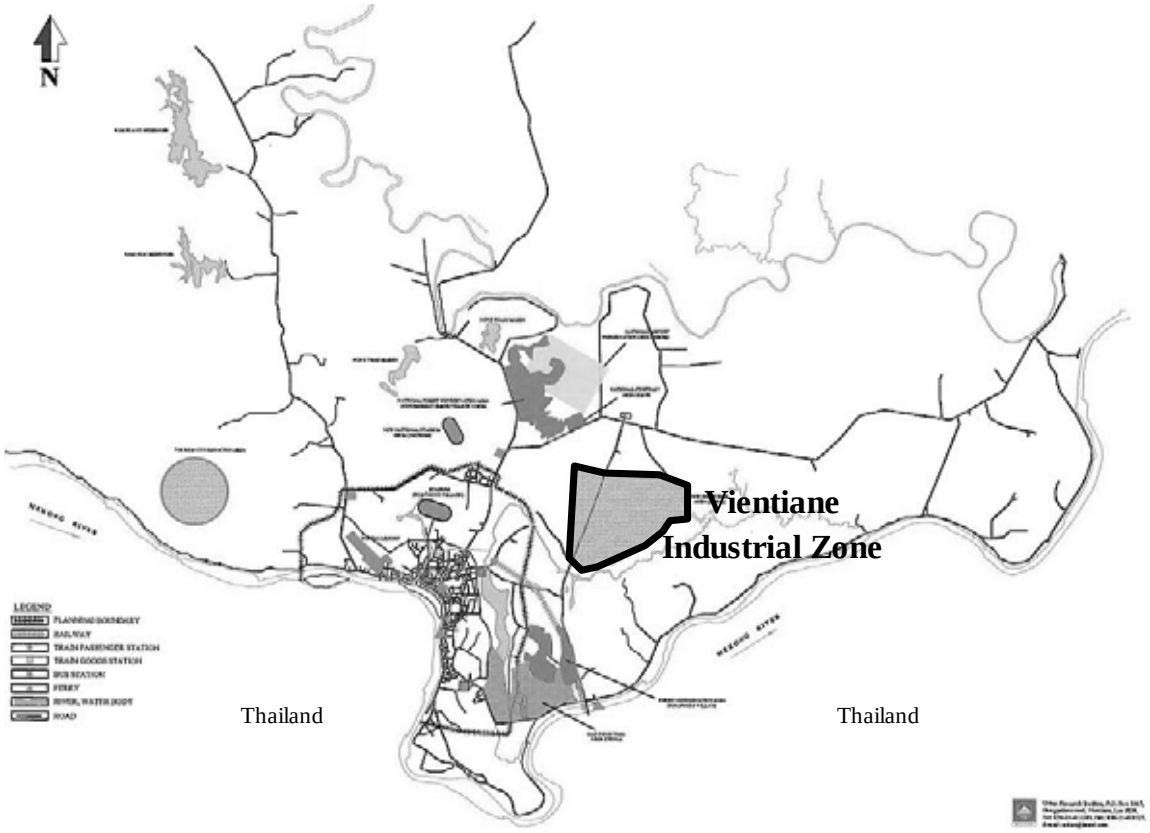
- To formulate regulations for business establishment.
- To provide high quality service for import-export.
- To provide labor and services to support business such as customs office, banking, insurance, logistics transport, advertising, raw material supply equipment, food, living environment, health care and welfare.

Highly competitive industrial bases need to be developed in the three economic centers with a view to accelerating the industrialization of the whole country.

1.2.2 Current Industrial Zoning in the Three Regions

(1) Vientiane Capital

Vientiane Capital has no industrial zone development plan. The local government has only designated an industrial area in the past land use plan of 2010 as shown in Figure 1.2.1.

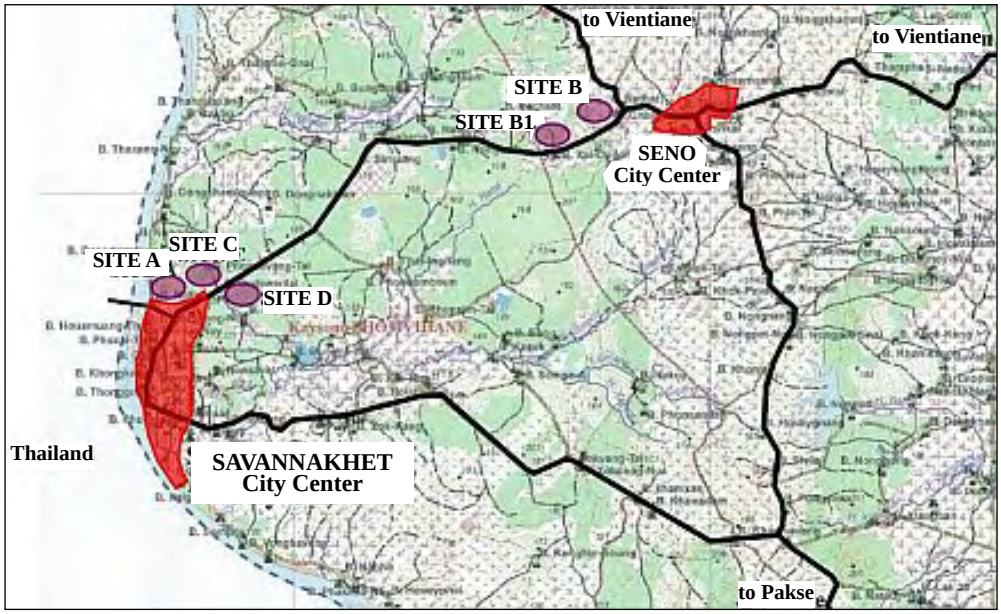


Source: JICA Survey Team

Figure 1.2.1: Land Use Plan for Vientiane Capital 2010

(2) Savannakhet

The sites of Savan-Seno Special Economic Zone (SEZ), i.e., Site A, B, B1, C and D, are located as shown in Figure 1.2.2.



Source: JICA Survey Team

Figure 1.2.2: Site Location of Savan-Seno SEZ

The current site conditions are summarized in Table 1.2.1.

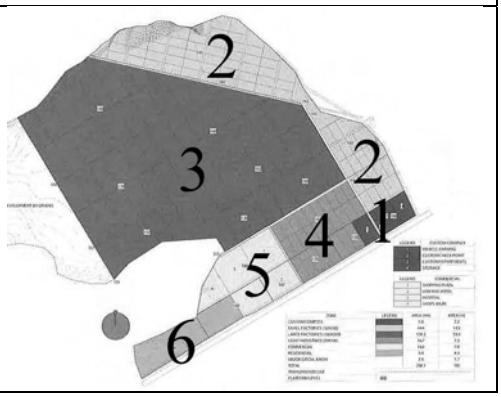
Table 1.2.1: Current Site Conditions of Savan-Seno SEZ

Item	Surrounding Savannakhet Urban Area			Surrounding Seno Urban Area	
	Site A	Site C	Site D	Site B	Site B1
1. Location	Located in Kaysone District; close to 2nd Mekong Bridge.	Located in Kaysone District, 10 km north of Savannakhet urban area by National Road No. 9; east side of Site-A.	Located in Kaysone district; southeast side of Site-C.	Located in the west side of the junction between National Road No. 9 (to Seno) and National Road No. 13 (to Vientiane); 25 km northeast of Savannakhet urban area.	Located in Outhoumphon District; beside National Road No. 9; west side of Site-B.
2. Elevation at Entrance	145 m	170 m	169 m	197 m	197 m
3. Available Land Area	App. 300 ha	App. 210 ha	App. 120 ha	App. 20 ha	App. 350 ha
4. Current Condition	Agriculture land, agriculture school, and farmer's village. There are 119 houses with around 80 registered households. Land acquisition is already agreed and most of the residents plan to move to Site D. It is planned to be developed as "Savan City" by the joint venture between the Lao PDR government and TAGS (Singapore). Part of the land reclamation work is on-going.	Mainly forest. 65 households are registered. This site will be developed as "Savan Park" and phase 1 of land reclamation work is on-going.	Forest, where 80 ha are already deforested. Land reclamation works started. Some houses are under construction.	Already occupied, including foreign investor such as Logitem (logistic services; Japan).	Residential, agricultural, forest/ green area and water body.

Source: JICA Survey Team

SEZ was planned based on "The Study on Special Economic Zone Development in Border Area (Savannakhet Province)" conducted by JICA in 2001. Currently, Savan Park, as part of Savan-Seno SEZ, started to be constructed as commercial and industrial hub under the joint venture between the Government of the Lao PDR and Pacifica Streams Development Pte. Ltd. (Malaysia).

Table 1.2.2: Land Use Plan for Savan Park

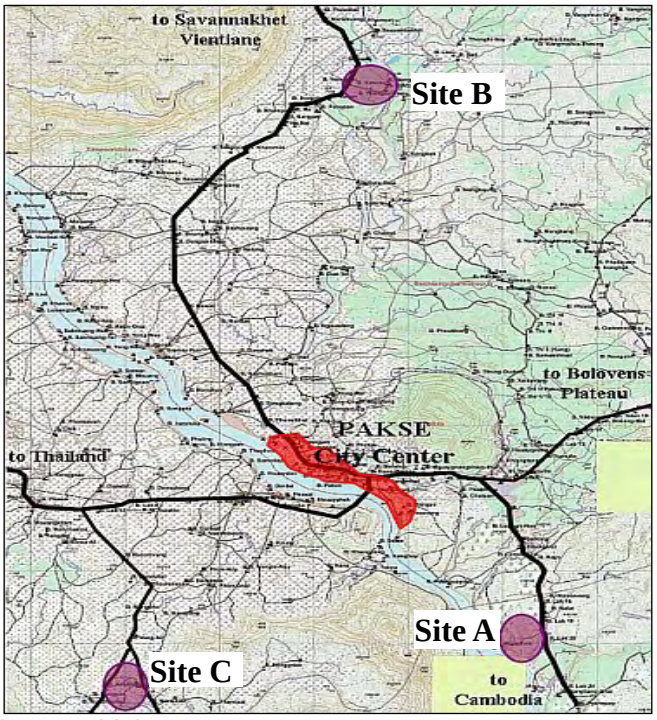
Zone		Area (ha)	Area (%)	Lot Plan
1.	Customs Complex	5.0	2.1	
2.	Small Factories (50x100)	44.4	19.3	
3.	Large Factories (100x200)	134.2	58.3	
4.	Light Industries (50x100)	16.7	7.3	
5.	Commercial	16.0	7.0	
6.	Residential	9.9	4.3	
7.	Major Circulation	3.9	1.7	
TOTAL		**230.1**	**100**	

Source: Savan Park Brochure (JICA, 2008)

(3) Pakse

Currently, Pakse and its surrounding areas have no industrial zone development plan or on-going construction project. The local government has just announced the presence of three industrial zone alternatives (Site A, Site B and Site C).

The locations of the three industrial zones in Pakse are shown in Figure 1.2.3.



Source: JICA Survey Team

Figure 1.2.3: Locations of the Industrial Zones in Pakse

The current site conditions are summarized in Table 1.2.3.

Table 1.2.3: Current Site Conditions of the Industrial Zones in Pakse

Site Alternatives	Bachiang/Pathoumphon Site A	Xanasomboun Site B	Phonethong Site C
1. Location	Located in Pathoumphon and Bachiangchareunsouk districts; along National Road No. 13 and around 12 km south of Pakse urban area.	Located in Xanasomboun District; about 33 km north of Pakse urban area; beside National Road No. 13.	Located in Phonethong District, southwest of Pakse urban area. Going about 12 km to the west by National Road No.10 and about 15 km down to the south by National Road No. 14B.
2. Elevation at Entrance	170 m	144 m	126 m
3. Available Land Area	1,388 ha	660 ha	606 ha
4. Current Condition	The development and factory construction started since 1997. 938 ha out of 1,388 ha belong to the government and 200 ha are already occupied by 45 investors/factories. Current rental cost is USD12/ha/year with flexible payment condition from 1 year to 25 years. Remaining area of 400 ha belong to the people, which consist of residential units and lakes.	Mainly forest and green area. However, some villages are located along the rural road branching from National Road No. 13, with approximate residential area of 112 ha.	Many villages are located along National Road No. 14B and roughly estimated to be about 474 ha in total, including surrounding paddy field.

CHAPTER 2 INDUSTRIAL ESTATE DEVELOPMENT IN VIENTIANE CAPITAL

2.1 General Socioeconomic Conditions

2.1.1 Demography

As indicated in Table 2.1.1, the population of the Lao PDR is estimated at around six million, and the population of Vientiane Capital is about 740,000 in 2008, according to Statistical Yearbook 2008. The annual average growth rate of the national population has been recorded at 2.2% from 1985 to 2005. On the other hand, Vientiane Capital has a growth rate of 3.1% according to the existing census reports in 1985, 1995 and 2005. As a result, the share of the population in Vientiane Capital to the national population has increased from 10.5% to 12.4%.

Table 2.1.1: Population Growth in the Lao PDR and Vientiane Capital

	Population (1,000 persons)		Share of Vientiane Capital (%)
	Lao PDR	Vientiane Capital	
1985	3,618	381	10.5
1995	4,605	532	11.5
2005	5,622	698	12.4
2006	5,748	712	12.4
2007	5,874	726	12.4
2008	6,000	740	12.3

Note: Census was carried out in 1985, 1995 and 2005.
Source: Statistical Yearbook 1975-2005 and annual issues

The total and urban populations of nine districts in Vientiane Capital are indicated in Table 2.1.2. The urban population in seven districts, excluding Sangthong District in the western part and Pakguem District in the eastern part, is increasing. Moreover, the urban population in Hatsayfong, which has the lowest urban population ratio among the seven districts, has accounted for 78% in 2005.

The annual growth rate of population in the whole area of Vientiane Capital has been recorded at 2.8% from 1995 to 2005. Xaythany District (4.4%; which is located northeast of the downtown along National Road No. 13), Sangthong District (3.8%) and Sikottabong District (3.0%; which is located west of the downtown to the Wattay International Airport) have recorded high growth rates. During the same period, the annual growth rate of urban population has been 5.6% wherein Xaythany District (12.5%), Naxaythong District (11.3%; which is located west of the downtown along National Road No. 13), Xaysattha District (5.8%; which is located east of the downtown) have shown high growth rates.

Table 2.1.2: Change of Population and Urban Population by Districts

	Population		Urban Population		Percentages of Urban Population (%)		Percentages of Urban Villages (%)	
	1995	2005	1995	2005	1995	2005	1995	2005
Chantabouly	58,855	68,858	57,740	68,858	98	100	97	100
Sikottabong	74,251	99,908	64,639	84,598	87	85	78	80
Xaysattha	75,255	97,514	55,333	97,514	74	100	57	100
Sysattanak	58,178	68,686	55,724	68,686	96	100	95	100
Naxaythong	44,104	58,368	19,312	56,204	44	96	36	90
Xaythany	97,829	150,793	38,429	125,195	39	83	26	63
Hatsayfong	64,962	78,338	32,961	60,949	51	78	42	67
Sangthong	16,728	24,215	1,771	1,787	11	7	3	3
Pakguem	33,945	45,041	4,889	5,938	14	13	9	8
Vientiane Capital	524,107	691,721	330,798	569,729	63	82	46	68

Source: Census in 1995 and 2005

The percentages of urban villages in Table 2.1.2 show that the increase of urban population in Vientiane Capital came from the increase of urban villages. However, it is expected that the increase of urban population in Vientiane Capital will soon be caused by the transmigration from rural to urban areas. Such changes are observed through the recent industrial development in Vientiane Capital together with the acceleration of economic activity and settlement of younger generations to have higher education in Vientiane Capital. Once younger people come to Vientiane, they find jobs and have families in Vientiane.

2.1.2 Economy

(1) GRDP Growth and Composition of Industry

According to the Department of Planning and Investment (DPI), Vientiane Capital has an annual average gross regional domestic product (GRDP) growth rate of 9.8% and its industry consists of 23% primary, 52% secondary and 25% tertiary. However, these figures are prepared by the DPI of Vientiane Capital without coordinating with the Department of Statistics of MPI, and are therefore not consistent with national-level GDP statistics.

Since provincial GRDP data are not prepared and published, the JICA Survey Team (hereinafter referred to as "JST") estimated the GRDP from the Lao Expenditure and Consumption Survey 2003 (LECS3) and business establishment census in 2006. The result was that the GRDP of Vientiane Capital was LAK10.5 trillion accounting for 23% of GDP (LAK46.2 trillion) in 2008. Moreover, GRDP per capita in Vientiane Capital was USD1,585, which was 1.7 times higher than the national average (USD891) in the same year.

(2) Agriculture

Vientiane Capital has high levels of production volume of not only industrial products but also agricultural products. As indicated in Table 2.1.3, Vientiane Capital shares around 10% of rice production, ranking third in the Lao PDR after Savannakhet and Champasak.

In addition, Vientiane Capital has a share of 23% in irrigated rice production and ranks second after Savannakhet in 2008. Vientiane Capital has advanced agriculture with high land productivity in the Lao PDR.

Table 2.1.3: Rice Production in Vientiane Capital

Unit: ton

		1997	2002	2007	2008
Vientiane Capital	Season Rice	134,100	192,600	219,695	161,315
	Irrigated Rice	49,900	106,500	96,000	99,825
	Upland Rice	3,200		8,425	2,145
	Total	187,200	299,100	324,120	263,285
Total of the Lao PDR	Season Rice	1,303,500	1,801,200	2,193,400	2,321,110
	Irrigated Rice	113,500	375,000	329,200	439,200
	Upland Rice	243,000	240,300	187,450	209,600
	Total	1,660,000	2,416,500	2,710,050	2,969,910

Source: Statistical Yearbook Annual Issues

Due to high-income levels, the production of agricultural crops other than rice is increasing in Vientiane Capital. In particular, vegetable production has significant share in the country. As indicated in Table 2.1.4, vegetable production in Vientiane Capital has a share of 15% to 20% of the national production in recent years. Now, Vientiane Capital ranks third in the production of cash crop after Champasak and Luang Prabang.

Table 2.1.4: Vegetable Production in Vientiane Capital

Unit: ton

	1997	2002	2007	2008
Vientiane Capital	26,500	88,365	114,040	97,825
Total of Lao PDR	100,000	633,141	734,395	521,495

Source: Statistical Yearbook Annual Issues

(3) Industry

In general, large-scale companies and factories tend to be located in Vientiane Capital in the Lao PDR. As indicated in Table 2.1.5, 66% of Level 1 business establishments (which have more than 200 employees) and 21% of Level 2 business establishments (which have 50 to 199 employees) are located in Vientiane Capital. In addition, more than half of foreign direct investment (FDI) projects of all business levels are in Vientiane Capital as indicated in Table 2.1.6.

Table 2.1.5: Location of Business Establishment in the Secondary Industry

	Level 1	Level 2	Level 3	Total
Vientiane Capital	566	103	1,503	2,172
Northern Region	82	198	7,296	7,576
Central Region	151	145	10,991	11,287
Southern Region	58	46	3,027	3,131
Total	857	492	22,817	24,166

Source: Ministry of Industry and Commerce

Table 2.1.6: FDI in Vientiane Capital and the Lao PDR

	Level 1	Level 2	Level 3
Vientiane Capital	49	44	41
Total	83	82	80

Source: Ministry of Industry and Commerce

In the case of the garment industry, which produces the second largest exported goods for the Lao PDR, 53 out of 54 companies are located in Vientiane Capital. This is attributed to the easy procedures for obtaining Generalized System of Preferences-related documents and easy acquisition of workers.

In Vientiane Capital, labor-intensive industry shows some signs of sophistication. For instance, there is a transfer of a part of the production process for electrical equipment and wood products in some industries such as garment and wood processing from Thailand to the Lao PDR. Such sophistication of

labor-intensive industry is introduced at first in Vientiane Capital and it then spreads to other major cities like Savannakhet and Pakse.

(4) Service

Vientiane Capital is a center of tertiary industries such as commercial activities and tourism. As indicated in Table 2.1.7, international visitors in 2006 and 2007 numbered around 200,000, which is almost the same level as Luang Prabang (240,000) in 2008. Vientiane is a gateway for international visitors as well as a center of business tourism in the Lao PDR. The number of accommodation rooms, which is around 6,300 in 2007, is much higher than Luang Prabang (2,700 in 2008).

Table 2.1.7: Tourism-Related Statistics

	2006	2007
Number of Visitors	761,702	523,051
International visitors	203,340	194,262
Border Pass Holders	558,042	328,789
Number of Hotel	79	98
Number of Hotel Rooms	3,002	3,773
Number of Guesthouse	169	172
Number of Guesthouse Rooms	2,474	2,594

Source: Basic Statistics on Socio-economic Development 2007/2008 of Vientiane Capital

(5) Public Investment

Table 2.1.8 indicates public investment in Vientiane Capital. Public investment in FY2007-2008 has amounted to LAK174 billion, which is 2.7 times that of Savannakhet and Champasak Province. About 80% to 90% of the total amount has been used for the transportation sector in FY2006-2007 and FY2007-2008. Like in other provinces, around 80% of public investment has been financed through foreign resources such as grant aid and loan.

Table 2.1.8: Public Investment in Vientiane Capital

Unit: million LAK

	FY2006-2007			FY2007-2008		
	Domestic	Foreign	Total	Domestic	Foreign	Total
Agriculture	9,432.2	691.0	10,123.2	8,633.51	691.0	9,324.5
Industry & Commerce	1691.0	0.0	1,691.0	1,905.3	0.0	1,905.3
Public Works and Transport	29,847.9	174,337.1	204,185.0	22,167.4	120,606.5	142,773.9
Energy & Mining	0.0	0.0	0.0	585.6	0.0	585.6
Education	625.5	0.0	625.5	4,098.3	11,410.7	15,509.0
Public Health	458.0	3,704.3	4,162.3	1,516.4	2,500.0	4,016.4
Total	42,054.6	178,732.4	220,787.0	38,906.5	135,208.2	174,114.7

Source: Statistical Yearbook Vientiane Capital 2008

Table 2.1.9 indicates the revenue and expenditure of Vientiane Capital Provincial Office. The total revenues in FY2007-2008 have significantly dropped due to the transfer of two revenue items (tax and land and houses) to the central government. On the other hand, total expenses have increased from LAK158 billion to LAK223 billion over the same period due to the increase of salary and policy support.

Vientiane Capital has its own public investment budget. The amount in FY2007-2008 is LAK48 billion, which is 28% of the public investment of the central government. The proportion of public investment of the central government in Vientiane Capital to those in Savannakhet and Champasak is more than 70%. Clearly, Vientiane Capital has a significant level of public investment.

Table 2.1.9: Revenue and Expenditure of Vientiane Capital

Unit: million LAK

	FY2006/07	FY2007/08
Total Revenue	***1,112,297.4***	***360,800.0***
Duty	304,757.0	336,066.0
Tax	771,706.9	-
Land and Houses	11,356.5	-
Public Properties	24,477.1	24,733.46
Total Expenses	***158,229.0***	***223,065.0***
Salary	62,792.2	102,903.0
Policy Support	26,964.1	36,235.5
Administration	18,493.3	24,260.4
Adjustment and Promotion	8,996.7	8,999.5
Other Coincidental Expenses	3,407.4	999.6
Buy & Rent Fixed Assets	1,396.5	1,694.9
Public Investment	36,178.9	47,972.2

Source: Statistical Yearbook Vientiane Capital 2008

2.2 Urban Development Trend in Vientiane Capital

In this section, the recent urban development trend and future potentials in Vientiane Capital is discussed from not only domestic but also international geographical and socioeconomic viewpoints.

2.2.1 Greater Mekong Economic Corridors and Vientiane

The economic corridors for the Greater Mekong Subregion (GMS) were initiated by ADB and supported by various multilateral and bilateral donors including Japan. The primary focuses were on the following: 1) East-West Corridor from the central part of Vietnam through the central part of the Lao PDR and northern Thailand to Myanmar; 2) Southern Corridor (or the Second East-West Corridor) from southern Vietnam through Cambodia to the capital area of Thailand; and 3) North-South Corridor from the Yunnan Province of the People's Republic of China (PRC) through the western tip of the Lao PDR to the capital area of Thailand. With these focuses, the economic corridors in GMS may not be so much of crucial value to the Lao PDR as the initial economic corridors did not touch upon the capital area of the Lao PDR.

In recent years, however, more detailed regional considerations have been made and some additional regional corridors were added to eradicate some of the regional imbalances in the initial corridor ideas. In relation to the Lao PDR, there are two new important economic corridors that were added, namely:

- Central Economic Corridor: Bifurcating in the Lao PDR from the North-South Corridor at Luang Namtha, then connecting to Vientiane, Savannakhet and Pakse, and further reaching Phnom Penh of Cambodia and Ho Chi Minh City of Vietnam

- Northeastern Corridor: Starting from Bangkok, connecting to Luang Prabang of the Lao PDR, and further connecting to Hanoi of Vietnam

The addition of these two new corridors will have substantial positive implication to the Lao PDR as these will provide the missing link in the initial corridor network to the capital area of the Lao PDR and beyond.

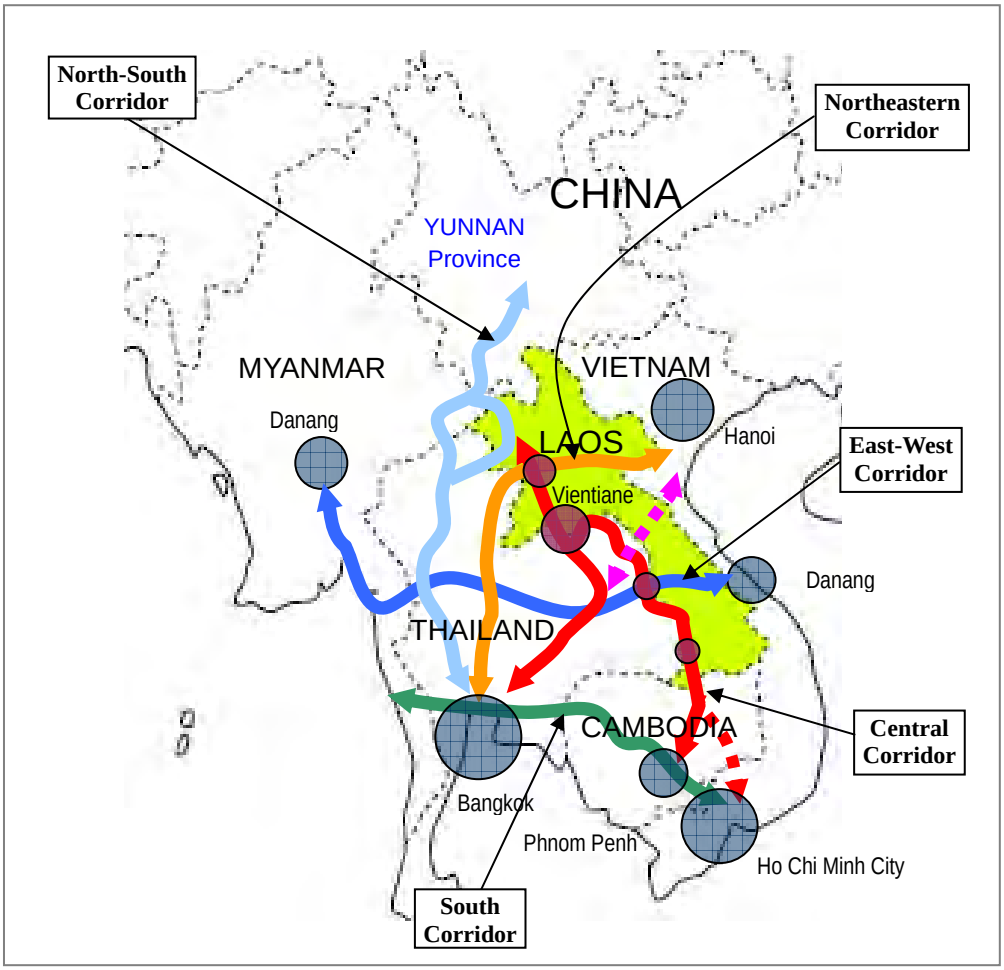
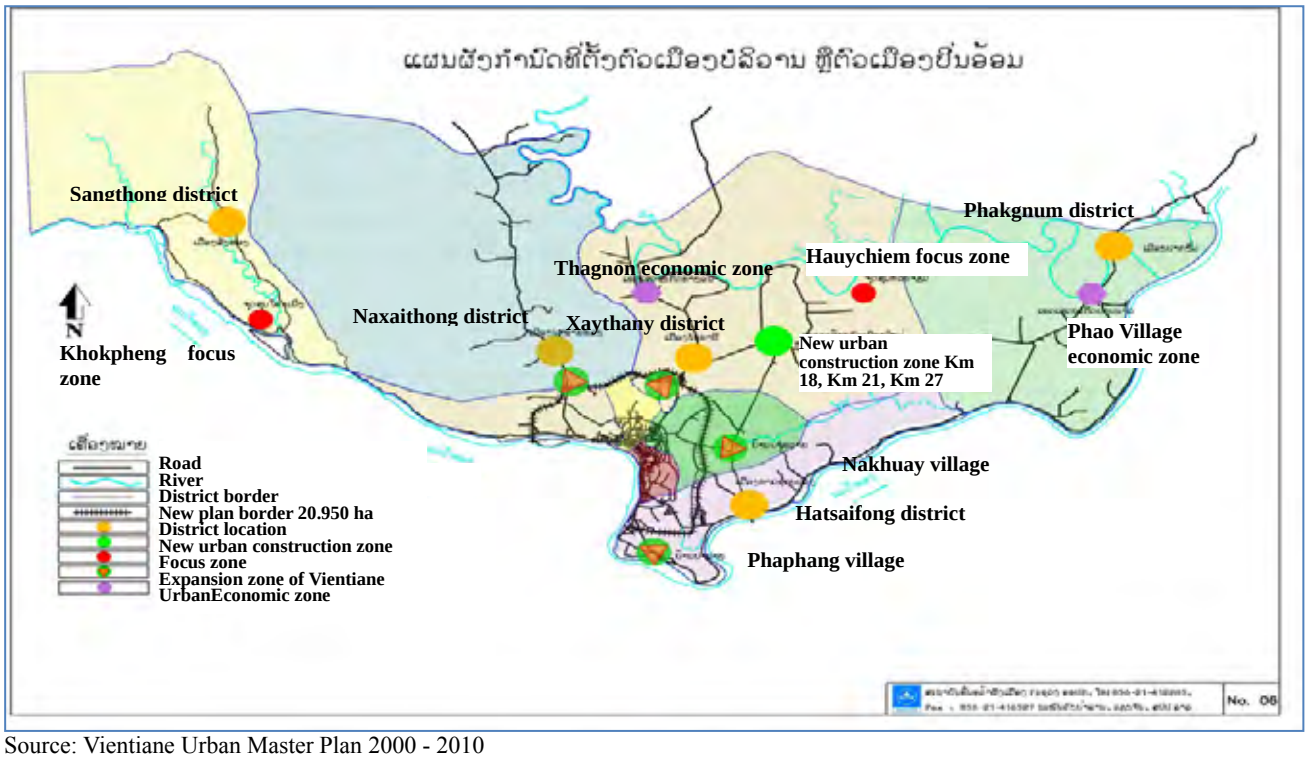


Figure 2.2.1: Recent Modifications in GMS Economic Corridor Network

2.2.2 Planning Context for Vientiane Capital

Vientiane Capital has a large area of about 3,920 km^2. In the Vientiane 2010 plan, formulated in 2000, functional distributions within Vientiane Capital have been proposed. Figure 2.2.2 shows the location and distribution of different urban centers while Figure 2.2.3 shows the location of national activities within Vientiane Capital.

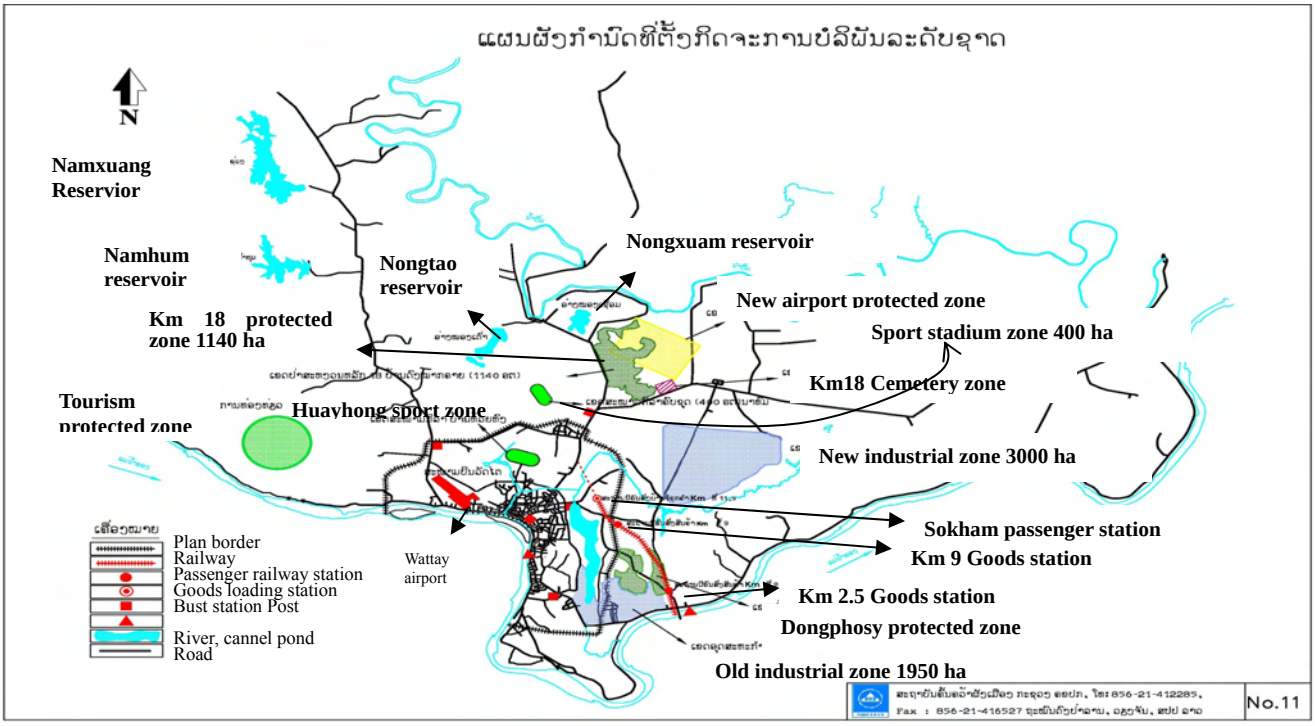
Both figures show the clear need for deconcentrating the urban functions from the city center towards the district centers, as well as the need for industrial development in the suburbs of Vientiane Capital.



Source: Vientiane Urban Master Plan 2000 - 2010

Source: Vientiane Urban Master Plan 2000 – 2010

Figure 2.2.2: Location and Function of Urban Centers in Vientiane



Source: Vientiane Urban Master Plan 2000 – 2010

Figure 2.2.3: Plan for Location of National Activities

2.2.3 Planning Context for Vientiane City Center

In the Vientiane 2010 plan, three boundaries are proposed for the existing urban area (100 villages); new urban area (150 villages); and future urban areas (189 villages). The total urban areas for the three categories will be 20,950 ha (or 209 km^2). Since the future urban population of Vientiane is projected to be 1,515,000 in 2030, the total urban area of 209 km^2 would be able to accommodate the urban population at a density of 7,250 persons/km^2.

Figure 2.2.4 shows the planned areas for the existing, new and future urban areas, with arrows indicating the direction of urbanization.

Figure 2.2.5 shows the proposed zoning scheme for Vientiane in 2010. There are 17 zoning categories established that would apply to the proposed urban planning area for 2010. The basic scheme for the zoning seems to be straightforward and rational.

Source: Vientiane 2000 – 2010 modified.

Figure 2.2.4: Existing, New and Future Urban Areas for Vientiane, 2010

Figure 2.2.5: Land Use Zoning Plan for Vientiane, 2010

2.3 Existing Infrastructure

2.3.1 Road Network and Transportation

(1) Road Network

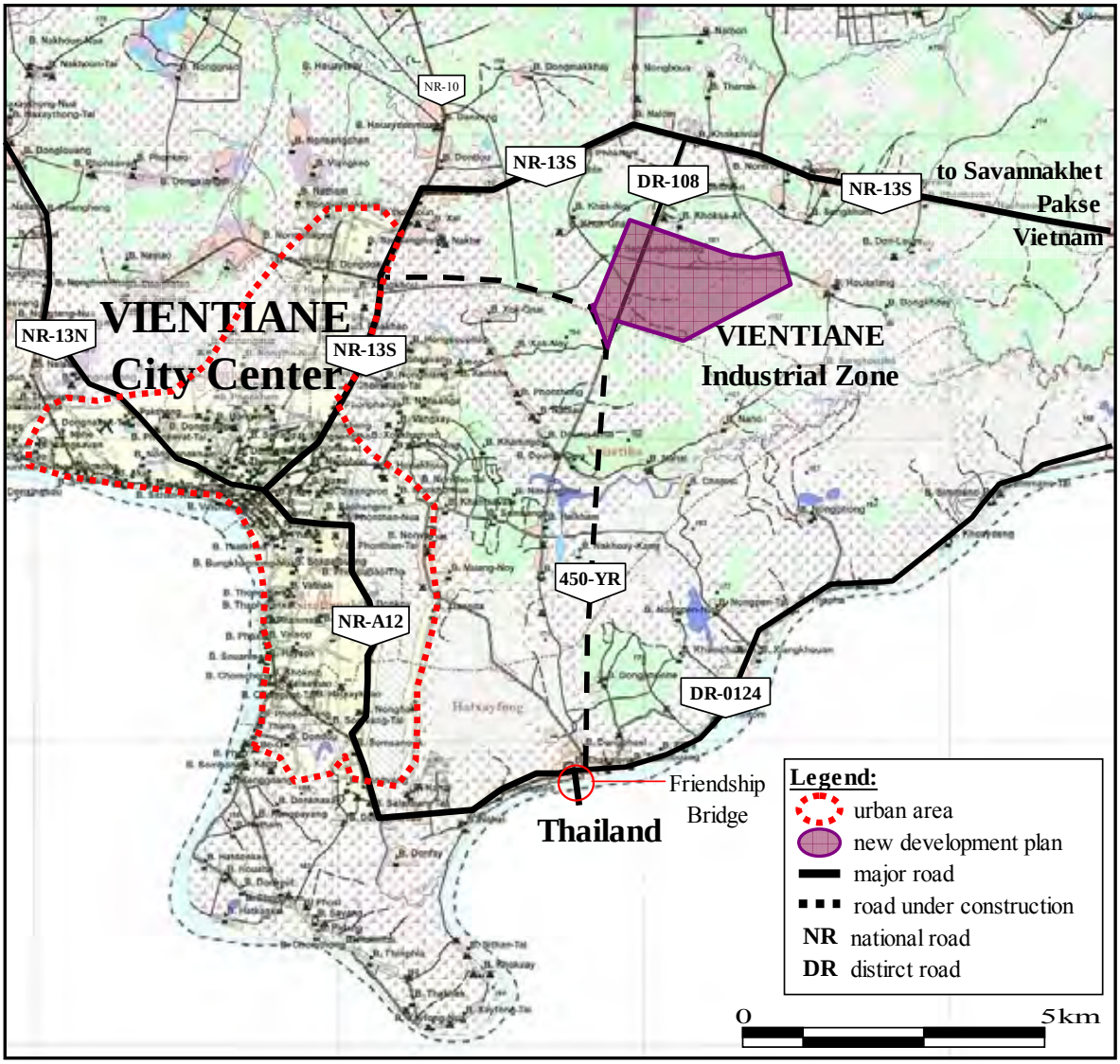
The total road length in Vientiane Capital is about 1,866 km in 2007. It consists of the road types listed in Table 2.3.1.

Table 2.3.1: Road Length by Type of Pavement (2007) (km)

Road Type		Paved	Gravel	Earth	TOTAL
1.	National Road	170.2	62.5	15.0	247.7
2.	Provincial Road	47.6	95.2	3.6	146.4
3.	District Road	34.7	353.6	27.2	415.5
4.	Urban Road	182.5	213.8	109.4	505.7
5.	Rural Road	5.6	330.8	160.3	496.7
6.	Special Road	3.9	40.6	9.5	54.0
TOTAL		**444.5**	**1,096.5**	**325.0**	**1,866.0**

Source: The Study of Master Plan on Comprehensive Urban Transport in Vientiane (JICA, 2008)

The Friendship Bridge connects Vientiane to Thailand and promotes trade and investment between the two regions. The major road network of the Capital is shown in Figure 2.3.1 below.



Source: JICA Survey Team

Figure 2.3.1: Major Road Network

There are public ferries crossing the Mekong River about 5 km downstream from the Friendship Bridge connecting the Lao PDR and Thailand.

Gate at Thailand Border | National Road No.1 | National Road No.13S

Source: JICA Survey Team

Figure 2.3.2: Country Border Gate and Major Road

(2) Public Transportation

There are three bus stations in Vientiane Capital as listed in Table 2.3.2 below.

Table 2.3.2: Bus Stations in Vientiane

Bus Station		Operator	Destinations
1.	Vientiane (central) bus station	Government	mainly local
2.	Northern bus station	Private	long distance and local
3.	Southern bus station	Private	long distance and local

Source: JICA Survey Team

Minibus (intra-city bus), *songtheo* (Lao local bus) and *tuk-tuk* (auto rickshaw or three-wheeler) are major public transportation in Vientiane. Songtheo and bike taxis are mainly operating in the rural areas.

Central Bus Station | Long Distance Bus | Mini Bus

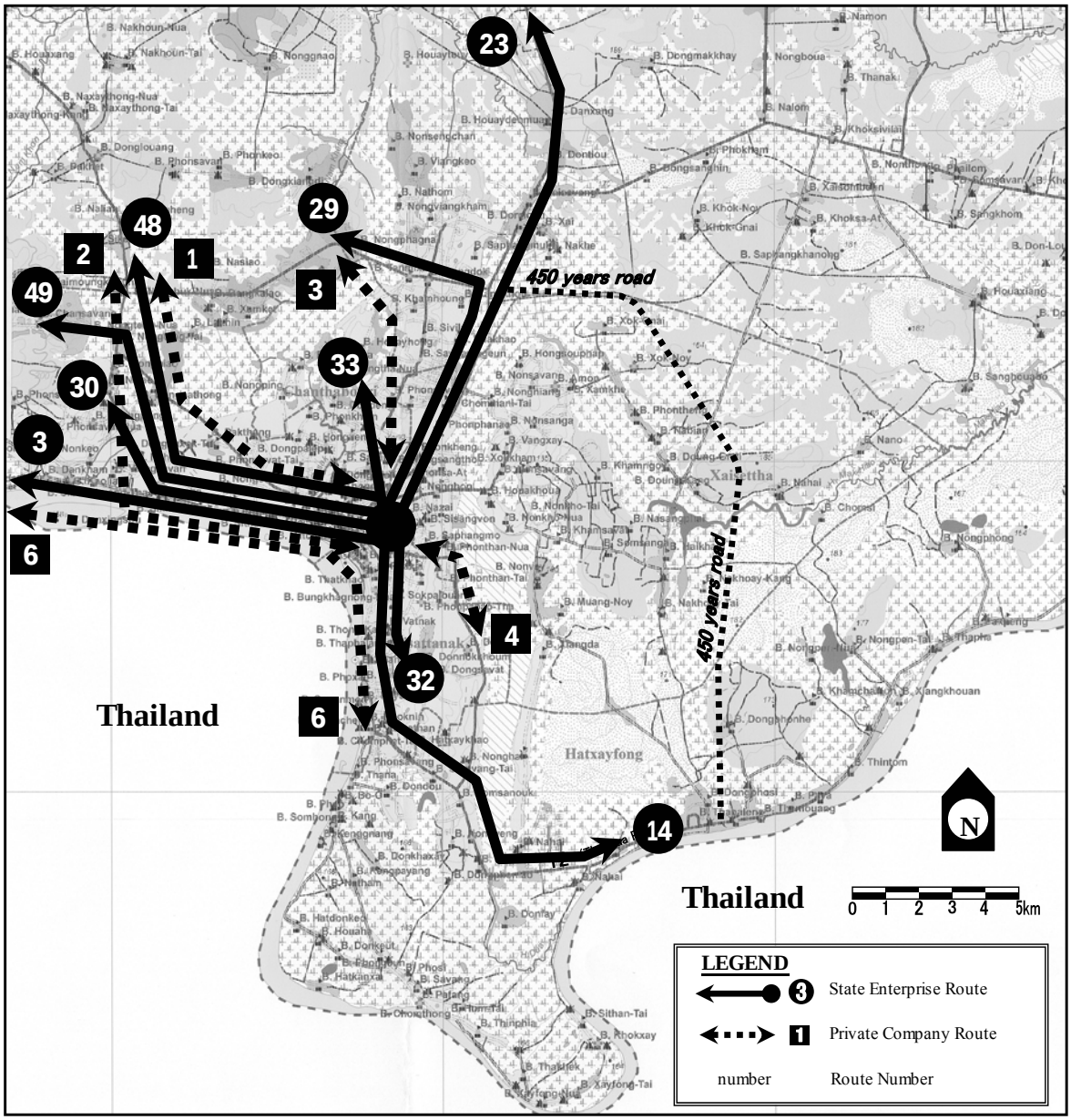
Songtheo | Tuk-Tuk | Jumbo

Source: JICA Survey Team

Figure 2.3.3: Types of Public Transportation

Public bus transportation services are operated by a state enterprise and a private company. The private company was funded by a Chinese enterprise (Tong Li – Pasi) and its operation has started since October 2007. The state enterprise owns 13 small buses (10 seats) including some electric buses, 52 middle buses (25-28 seats) and 2 large buses (45 seats).

Bus transportation does not cover the entire city area. Therefore, it is not convenient for residents who are living far from the bus route. The operation route and schedule of bus transportation are respectively shown in Figure 2.3.4 and Table 2.3.3.



Source: JICA Survey Team

Figure 2.3.4: Major Public Bus Transportation Routes (as of October 2009)

Table 2.3.3: Public Bus Transportation Schedule (as of October 2009)

Route		Bus Type	No. of Buses	No. of round trips per vehicle day	Operation Time	Fee (kip)	Remarks
No.	Name						
State Enterprise							
3	Tad Thong	Large/Middle	4	5-6	6:00-18:20	4,000	
14	Tha Deua	Large/Middle	10	4-5	5:35-16:45	5,000	
23	Tha Ngon	Large/Middle	6	5	5:50-18:55	5,000	
29	Dong Dok	Large/Middle	3	8	6:30-18:00	2,000	
30	Thong Pong	Large/Middle	5	3-6	6:00-18:10	4,000	
32	Don Pa Mai	Large/Middle	3	9-10	6:10-17:00	2,000	
33	Nong Tha	Large/Middle	3	6	6:10-18:00	2,000	
48	Si Kert	Large/Middle	3	5-6	6:15-18:15	5,000	
49	Nong Teng	Large/Middle	3	5-6	6:15-18:25	4,000	
-	Dong Dok(University)	Small	10	3	6:40-18:10	1,500	Since July 2009
-	Don Pa Mai	Small	3	3	6:20-17:10	1,500	Since August 2009
Private Company (Tong Li – Pasi)							
1	Dong Dok - Nong Bouk	Middle	11	—	6:00-20:00	1,500 – 5,000 (based on distance)	
2	Nong Bouk - Dong Dok	Middle	11	—	6:00-18:00		
3	Dong Dok	Middle	11	—	6:00-20:00		
4	Xai Sed Tha Hospital	Middle	7	—	6:00-18:00		
6	Kao Liew Market	Middle	9	—	6:00-22:00		

Source: JICA Survey Team

(3) Air Transportation

Wattay International Airport is the only airport in Vientiane Capital. The outline of the airport is shown in Table 2.3.4.

Table 2.3.4: Outline of Wattay International Airport

1.	Direction and distance from the City	Northwest 4 km
2.	Type of traffic permitted	IFR/VFR
3.	Hangar space/repair facilities for visiting ACFT	NIL
4.	Runway	3,000 m x 45 m
5.	Helicopter landing area	NIL

Source: The Lao PDR Aeronautical Information Publication

Current flight schedule is shown in Table 2.3.5.

Table 2.3.5: Flight Schedule (2009)

Destination		Type	Frequency
1.	Pakse	domestic	4 days/week 2 or 4 flights/day
2.	Savannakhet	domestic	3 days/week 2 flights/day
3.	Luang Prabang	domestic	7 days/week 2 to 4 flights/day
4.	Xieng Khuang	domestic	4 days/week 2 flights/day
5.	Ou Dom Xay	domestic	3 days/week 2 flights/day
6.	Houei Say	domestic	3 days/week 2 flights/day
7.	Luang Namtha	domestic	3 days/week 2 flights/day
8.	Bangkok (Thailand)	international	7 days/week 4 flights/day
9.	Hanoi (Vietnam)	international	7 days/week 2 or 4 flights/day
10.	Phnom Penh (Cambodia)	international	7 days/week 2 flights/day
11.	Siem Reap (Cambodia)	international	4 days/week 2 flights/day
12.	Kun Ming (China)	international	4 days/week 2 flights/day

Source: LAO Airways

(4) Rail Transportation

Vientiane has a railway which links the Thanaleng Station to Nongkai (Thailand) with a distance of 6 km. Currently, it only operates two trips per day.

Nongkai	Thanaleng	Nongkai
10:00	10:15	-
-	10:45	11:00
16:00	16:15	-
-	17:00	17:15

Figure 2.3.5: Thanaleng Station

Fares per trip are THB50 for 1st Class (with air-condition), THB30 for 2nd Class (fan) and THB20 for 3rd Class (fan).

(5) On-going Road Project

Currently, a big road project is under construction in Vientiane Capital named 450 Year Road. This new road will connect the southern part (near Friendship Bridge) and northern part (National Road No. 13S) of the city with a total length of 20.3 km and two vehicle lanes in each direction. The outline of the project is shown in Figure 2.3.7.

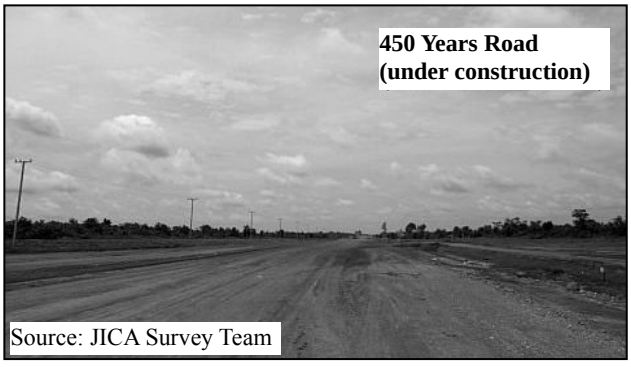
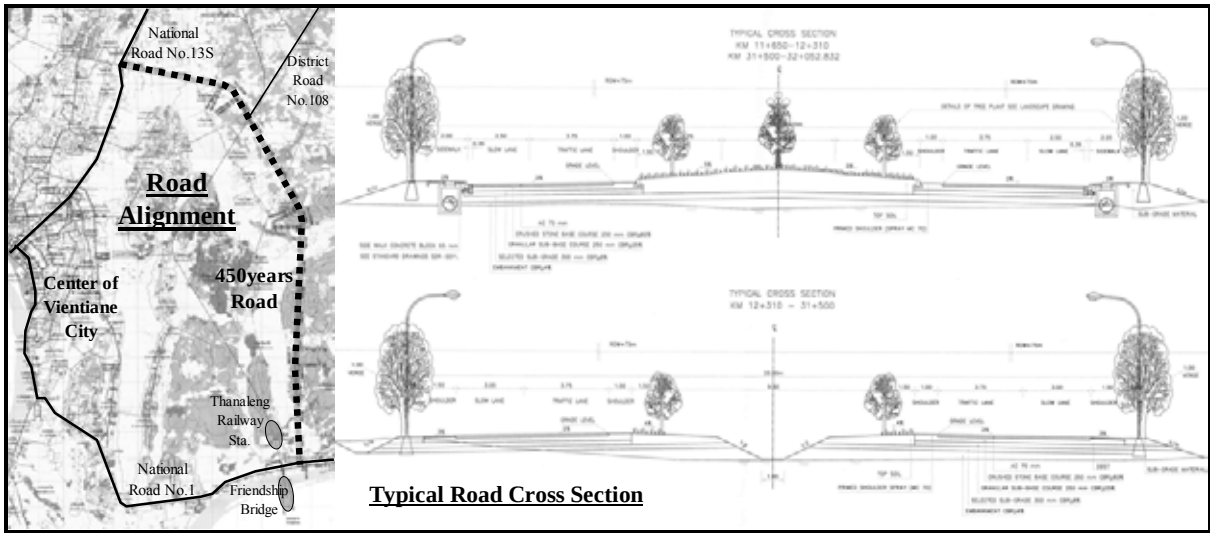


Figure 2.3.6: 450 Year Road

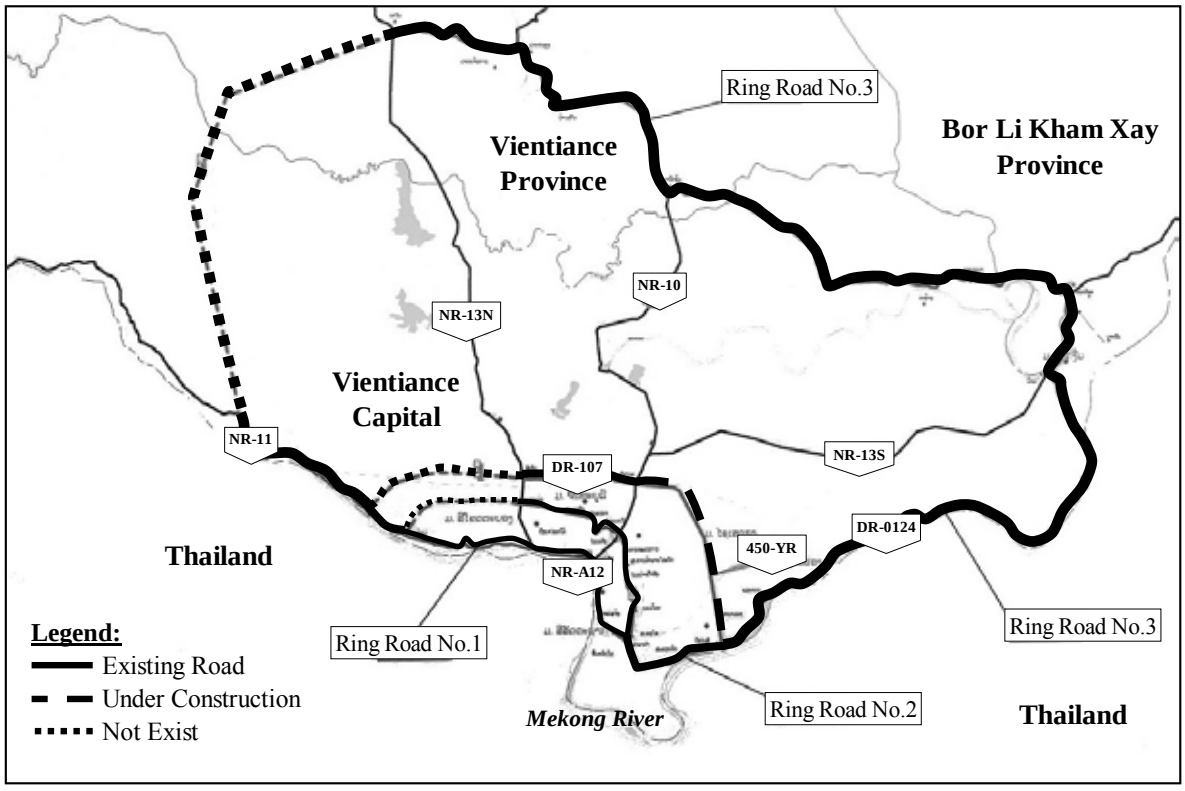


Source: Vientiane Capital

Figure 2.3.7: Outline of the 450 Year Road Construction Project

The project is implemented by the local government and planned to be finished by October 2010.

In addition, the future ring road of Vientiane is planned as shown in Figure 2.3.8.



Source: MPWT

Figure 2.3.8: Ring Road Plan for Vientiane

2.3.2 Telecommunication

(1) Telecommunication Company in the Lao PDR

The telecommunication company and internet provider in the Lao PDR are shown in Table 2.3.6. The services of ETL and Lao Telecom cover the whole country.

Table 2.3.6: List of Telecommunication Company and Internet Provider

No.	Name of Carrier and Provider	Service Area	Service Description
1.	Enterprise of Telecommunications Lao (ETL)	Whole county	- Development of Trunk Line - Cell Phone - Internet (Fixed line, Wireless LAN)
2.	Lao Telecommunications (Lao Telecom)	Whole county	- Development of Trunk Line - Fixed telephone - Cell Phone - Internet (Fixed line, Wireless LAN)
3.	TIGO	Vientiane	- Cell Phone
4.	Sky Telecom	Vientiane	- Internet (Fixed line, Wireless LAN)
5.	Planet	Vientiane	- Internet (Wireless LAN)

Source: JICA Survey Team

(2) Trunk Line Network System

As for the communication method of the trunk line, synchronous digital hierarchy (SDH) is used in the Lao PDR, and the telecommunication line is multiplexed and transmitted.

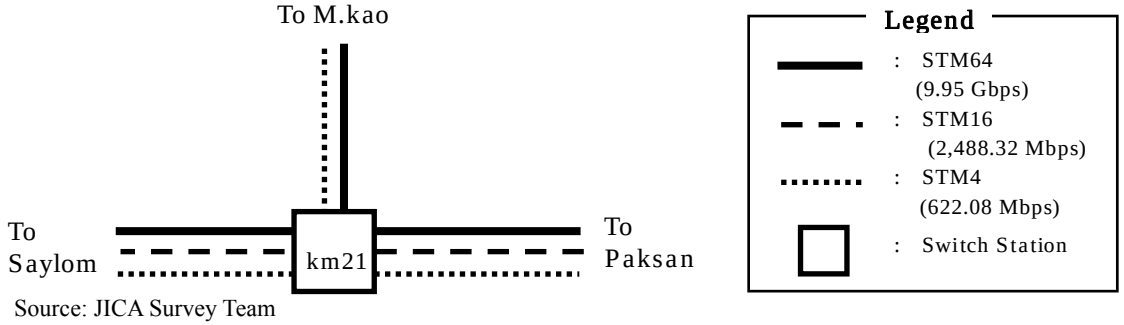
The unit of multiplexing is indicated by synchronous transport module (STM). Table 2.3.7 shows each unit of multiplexing together with its corresponding transmission capacity.

Table 2.3.7: Unit of Multiplexing and Transmission Capacity

Name	Transmission Capacity
STM - 1	155.52 Mbps
STM - 4	622.08 Mbps
STM -16	2488.32 Mbps
STM -64	9953.28 Mbps

Source: JICA Survey Team

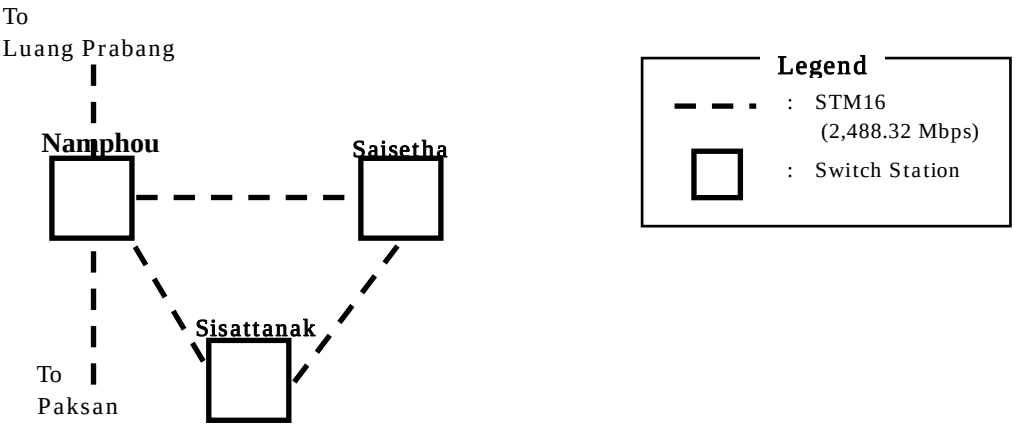
The trunk line diagram of ETL in Vientiane Capital is shown in Figure 2.3.9. The Km 21 Station is the main switch station located at the downtown of Vientiane Capital. The main trunk line of Km 21 Station is connected with STM-64 (9.95 Gbps) by means of optical fiber cable. In order to secure reliability, the trunk line network is a loop configuration.



Source: JICA Survey Team

Figure 2.3.9: Trunk Line Diagram of ETL in Vientiane Capital

The trunk line diagram of Lao Telecom in Vientiane Capital is shown in Figure 2.3.10. The Namphou Station is the main switch station located in the downtown of Vientiane Capital. The trunk line of Namphou Station is connected with STM-16 (2,488.32 Mbps) by means of optical fiber cable and microwave. As for the transmission scheme, the branch line is connected to Namphou, Sisattanak and Saisetha stations with star configuration as the connection method.



Source: JICA Survey Team

Figure 2.3.10: Trunk Line Diagram of Lao Telecom in Vientiane Capital

(3) Present Status of Telecommunication

Fixed phone uses metallic cable as the transmission channel between the switch station and customer.

Internet service uses metallic cable, optical fiber cable and wireless LAN as transmission channels between the switch station and customer. Internet service in Vientiane Capital is shown in Table 2.3.8. In case optical fiber cable is used, high-speed and high-reliability internet can be used. However, the cost of this internet service is very expensive.

As for the cell phone service, it can be used in most areas, except in mountain areas, since base stations are extensively maintained.

Table 2.3.8: Internet Service in Vientiane Capital

Item	Description			Remarks
1. ETL				
(1) ADSL	128/64 Kbps	:	LAK950,000 per month	Minimum Speed
	1,536/512 Kbps	:	LAK4,450,000 per month	Maximum Speed
(2) Leased Line	128 Kbps	:	LAK4,500,000 per month	Minimum Speed
(Optical Fiber)	2,048 Kbps	:	LAK21,400,000 per month	Maximum Speed
(3) Wireless LAN	64-256 Kbps	:	LAK450,000 per month	
2. Lao Telecom				
(1) ADSL	128/64 Kbps	:	LAK300,000 per month	Minimum Speed
	2 Mbps/512 Kbps	:	LAK3,000,000 per month	Maximum Speed
(2) Wireless LAN	11-54 Mbps	:	LAK5,000 per hour	
3. Sky Telecom				
(1) ADSL	128/64 Kbps	:	USD150 per month	Minimum Speed
	1,024/512 Kbps	:	USD500 per month	Maximum Speed
(2) FTTH	512 Kbps	:	USD650 per month	Minimum Speed
	1,024 Kbps	:	USD1,200 per month	Maximum Speed
(3) Wi-Max	128/64 Kbps	:	USD80 per month	Minimum Speed
	1,024/512 Kbps	:	USD320 per month	Maximum Speed

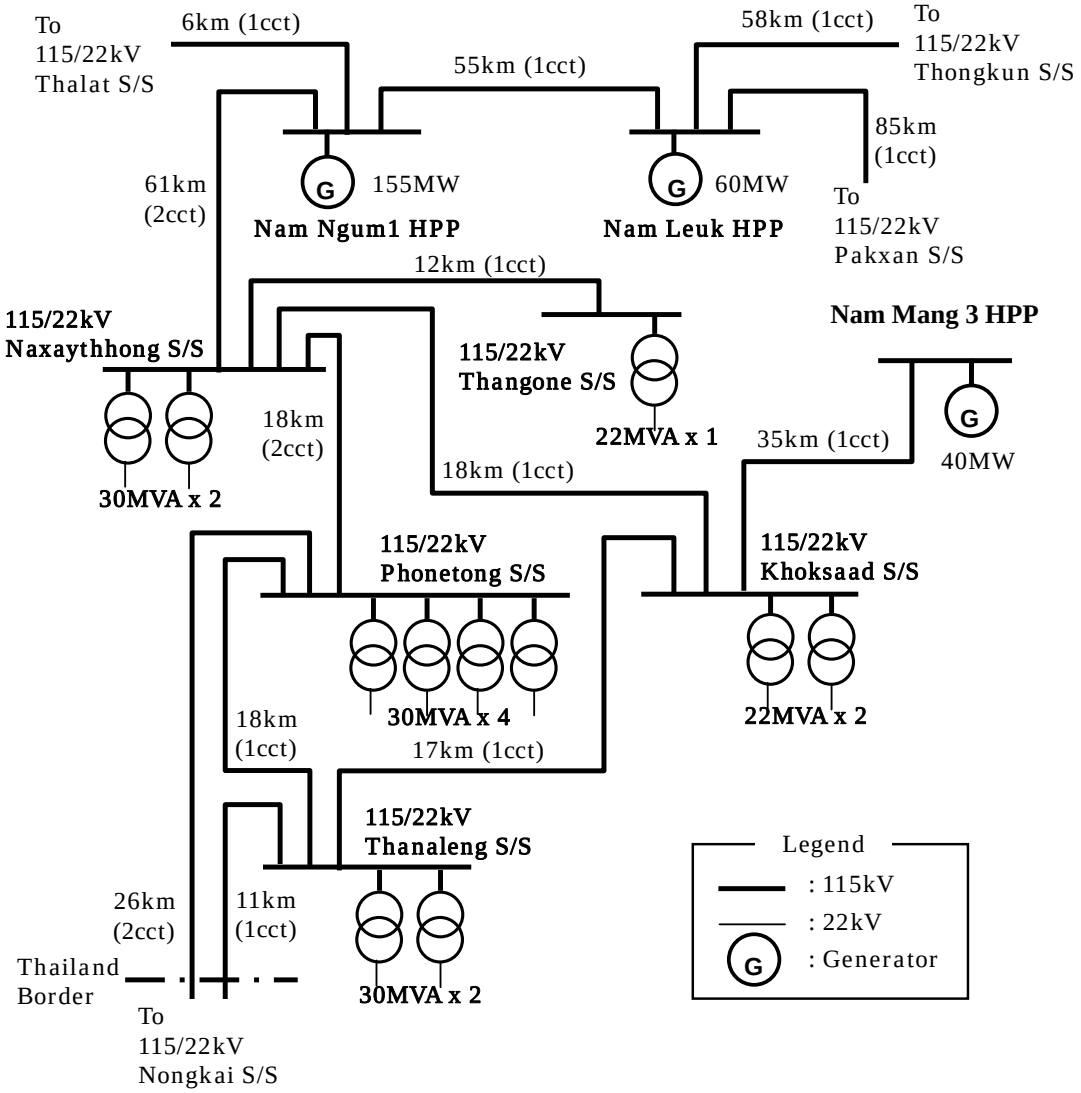
Item	Description			Remarks
4. Planet				
(1) Wireless LAN	256/128 Kbps	:	LAK500,000 per month	Minimum Speed
	2,048/1,024 Kbps	:	LAK8,000,000 per month	Maximum Speed
(2) Wireless LAN (Corporate Broadband)	256/64 Kbps	:	LAK1,500,000 per month	Minimum Speed
	1,024/512 Kbps	:	LAK4,500,000 per month	Maximum Speed

Source: ETL, Lao Telecom, Sky Telecom, Planet

2.3.3 Power Supply

(1) Power Grid System

The power grid system surrounding Vientiane Capital is shown in Figure 2.3.11. The central region has the Nam Ngum 1, Nam Leuk and Nam Mang 3 hydroelectric power plants which cover the power demand of Vientiane Capital and the northern region. Generally, the surplus electricity is exported to Thailand.



Source: JICA Survey Team

Figure 2.3.11: Power Grid System Surrounding Vientiane Capital

(2) Power Supply System

The existing 115/22 kV substation in Vientiane Capital is shown in Table 2.3.9. Power to Vientiane Capital is supplied using 22 kV distribution lines from five 115/22 kV substations.

As for the surroundings of the industrial zone, the 22 kV distribution lines are maintained. However, in case the number of tenants in the industrial park will increase significantly, the capacity of the existing 22 kV distribution lines will be reached in the near future. Also, the transformer capacity of existing substations will be insufficient in such situation.

Table 2.3.9: Existing 115/22 kV Substation in Vientiane Capital

Name of Substation	Description			Remarks
1. 115/22 kV Naxaythong Substation	Transformer Peak Demand	: :	30 MVA × 2 4.2 MW	
2. 115/22 kV Phonetong Substation	Transformer Peak Demand	: :	30 MVA × 4 86.0 MW	
3. 115/22 kV Khoksaad Substation	Transformer Peak Demand	: :	22 MVA × 2 15.0 MW	Surroundings of Site A area
4. 115/22 kV Thanaleng Substation	Transformer Peak Demand	: :	30 MVA × 2 37.7 MW	Surroundings of Site B area
5. 115/22 kV Thangone Substation	Transformer Peak Demand	: :	22 MVA ×1 12.4 MW	

Source: EDL

2.3.4 Water Supply

(1) Institutional Aspect Related to Water Sector

The water supply services in the Lao PDR are managed by 17 Nam Papa State-owned Enterprises (NPSEs) under the control of the Ministry of Public Works and Transport (MPWT). Main water sources for drinking water are surface water of the Mekong River system and underground water.

The Water Supply Authority (WASA) was reformed at the end of 2008 and divided into two organizations, namely, Water Supply Regulatory Committee (WSRC) and Water Supply Regulatory Office (WSRO). The WSRO, which is within the Department of Housing and Urban Planning (DHUP) under the MPWT, is designated as the secretariat of the WSRC and the urban water supply sector regulator responsible for monitoring technical and financial performance of water suppliers. The WSRC conducts quarterly meetings for directing, monitoring and supervising the activities of the WSRO. The Water Supply Division (WSD) of the DHUP is responsible for urban sector policy, planning and development.

Rural water supply is the responsibility of Nam Saat (National Center of Environmental Hygiene and Rural Water Supply), which is under the jurisdiction of the Ministry of Health (MoH). Rural water supply is defined as water service for areas with population of less than 2,000. As for the protection of the environment, the Water Resource and Environment Agency (WREA) and the Ministry of Agriculture and Forestry have direct responsibilities.

(2) Drinking Water Standard

Water quality standard is determined by the Department of Hygiene and Prevention under the MoH. According to the Decision on the Management of Quality Standard for Drinking Water and Household Water Supply No.1371/MoH, drinking water quality standards are categorized by the following parameters:

(i) Bacteriological Parameters

Table 2.3.10: Bacteriological Parameters

Organisms	Unit	Concentration
Fecal Coliform	Number/100 ml	0
Total Coliform	Number/100 ml	0

Source: Decision No. 1371/MoH

(ii) Physical-Chemical Parameters (Aesthetic Significance)

Table 2.3.11: Physical-Chemical Parameters

Parameters	**Minimum concentration**	**Maximum Concentration**	**Units**
Aluminum (Al)	0.1	0.2	mg/L
Ammonia (NH_3)	0.5	1.5	mg/L
Chorine (Cl)	200	250	mg/L
Copper (Cu)	1.0	2	mg/L
Iron (Fe)	0.3	<1	mg/L
Manganese (Mn)	0.1	0.5	mg/L
Sodium (Na)	200	250	mg/L
Sulfate (SO_4)	200	250	mg/L
Hydrogen Sulfide (H_2S)	0.05	0.1	mg/L
Conductivity 25-30 °		<1000	µS/cm
Total dissolved solids	500	600	mg/L
Salt (NaCl)	100	300-350	mg/L
Hardness	50	300	mg/L
Turbidity		<10	NTU
Color		5	TCU
Taste and Odor	Acceptable	Acceptable	Acceptable
pH	6.5	8.5	
Temperature	25	35	° C
Residual Chloride (If chlorine disinfection is used)		<0.2	mg/L

Source: Decision No. 1371/MoH

(iii) Health Significant Chemical Parameters

Table 2.3.12: Health Significant Chemical Parameters

Parameters	**Maximum concentration**	**Unit**
Antinomy (Sb)	0.005	mg/L
Arsenic (As)	0.05	mg/L
Barium (Ba)	0.7	mg/L
Boron (B)	0.5	mg/L
Cadmium (Cd)	0.003	mg/L
Chromium (Cr)	0.05	mg/L
Cyanide (CN)	0.07	mg/L
Fluoride (F)	1.5	mg/L
Lead (Pb)	0.01	mg/L
Mercury (Hg)	0.001	mg/L
Nitrate (NO_3)	50	mg/L
Nitrite (NO_2)	3	mg/L
Selenium (Se)	0.01	mg/L

Source: Decision No. 1371/MoH

(3) Present Condition of Water Supply in Vientiane Capital

Vientiane has an estimated population of 726,000 in 2007 and total area of 3,920 km^2. The population of Vientiane Capital has been growing with an annual growth rate of 2.9% (higher than the estimated national average of 2.1%).

Nam Papa Vientiane Capital (NPVC) has a responsibility to supply drinking water to the whole area of Vientiane Capital consisting of 9 districts. At present, however, NPVC supplies water to only 7 districts, namely: Sisattanak, Sayetha, Chanthabouly, Sikottabong, Hatsayfong, Xaythany and Naxaythong. Service coverage ratio (or ratio of population served with piped water supply to the total population in the service area) is 63% based on the average of 17 NPSEs. Meanwhile, Vientiane Capital has a service coverage ratio of 45% in 2007. The present condition of water supply in Vientiane Capital is summarized in Table 2.3.13 below.

Table 2.3.13: Present Water Service Levels in Vientiane

	Item	Unit	2003	2004	2005	2006	2007	Remark
1	Population in Vientiane Capital	Persons	650,600	669,467	698,318	718,569	725,820	9 Districts
	Growth Rate	%	2.8	2.9	4.3	2.9	1.0	
2	Population in Service Area	Persons	586,757	603,773	625,560	643,701	662,369	7 Districts
3	Population Served	Persons	277,884	285,678	286,935	308,347	328,895	
4	Service Ratio in Vientiane Capital	%	43	43	41	43	45	
	Service Ratio in Service Area	%	47	47	46	48	50	
5	Per Capita Consumption	lpcd	178	169	186	174	182	
6	Total Area of Vientiane Capital	km^2	3,920	3,920	3,920	3,920	3,920	
	Service Area	km^2	1,521	2,652	2,652	2,652	2,652	Naxaithong
7	Pipe Network Area	km^2	439	542	620	675	763	(Size ≥ 40 mm)

Source: Lao Water Supply Company, Corporate Planning & IT Section

The future water demand is projected for domestic and non-domestic purpose separately according to NPVC Water Supply Master Plan. Table 2.3.14 shows the summary of the future water demand projection.

Table 2.3.14: Water Demand Projection in Vientiane

	Item	Unit	2000	2005	2010	2015	2020
1	Population in Vientiane Capital	Persons	599,000	687,084	788,165	902,716	1,034,521
	Population in Service Area	Persons	297,575	380,342	499,737	586,710	662,441
2	Population Served	Persons	215,522	275,567	370,269	466,981	564,648
3	Service Ratio in Vientiane Capital	%	36	40	47	52	55
	Service Ratio in Service Area	%	72	72	74	80	85
4	Number of Domestic Connections	No	34,210	43,741	58,773	74,124	89,627
	Number of Non-Domestic Connect	No	5,095	6,340	7,889	9,817	12,215
	Total Number of Connections	No	39,305	50,081	66,662	83,941	101,842
5	Per Capita Consumption	lpcd	174	172	170	170	170
6	Total Domestic Water Demand	m^3/d	37,501	47,398	62,946	79,387	95,990
	Total Non-Domestic Water Deman	m^3/d	30,361	37,780	47,011	58,499	72,793
	Total Water Demand	m^3/d	67,862	85,178	109,957	137,886	168,783
7	UFW Ration	%	33	28	25	25	25
8	Day Average Water Demand	m^3/d	101,287	118,303	146,609	183,848	225,044
	Day Maximum Water Demand	m^3/d	111,415	130,133	161,270	202,233	247,548

Source: NPVC Master Plan, November 1999

The existing conditions of four water treatment plants (WTPs) and one borehole station operated by NPVC are summarized in Table 2.3.15 below.

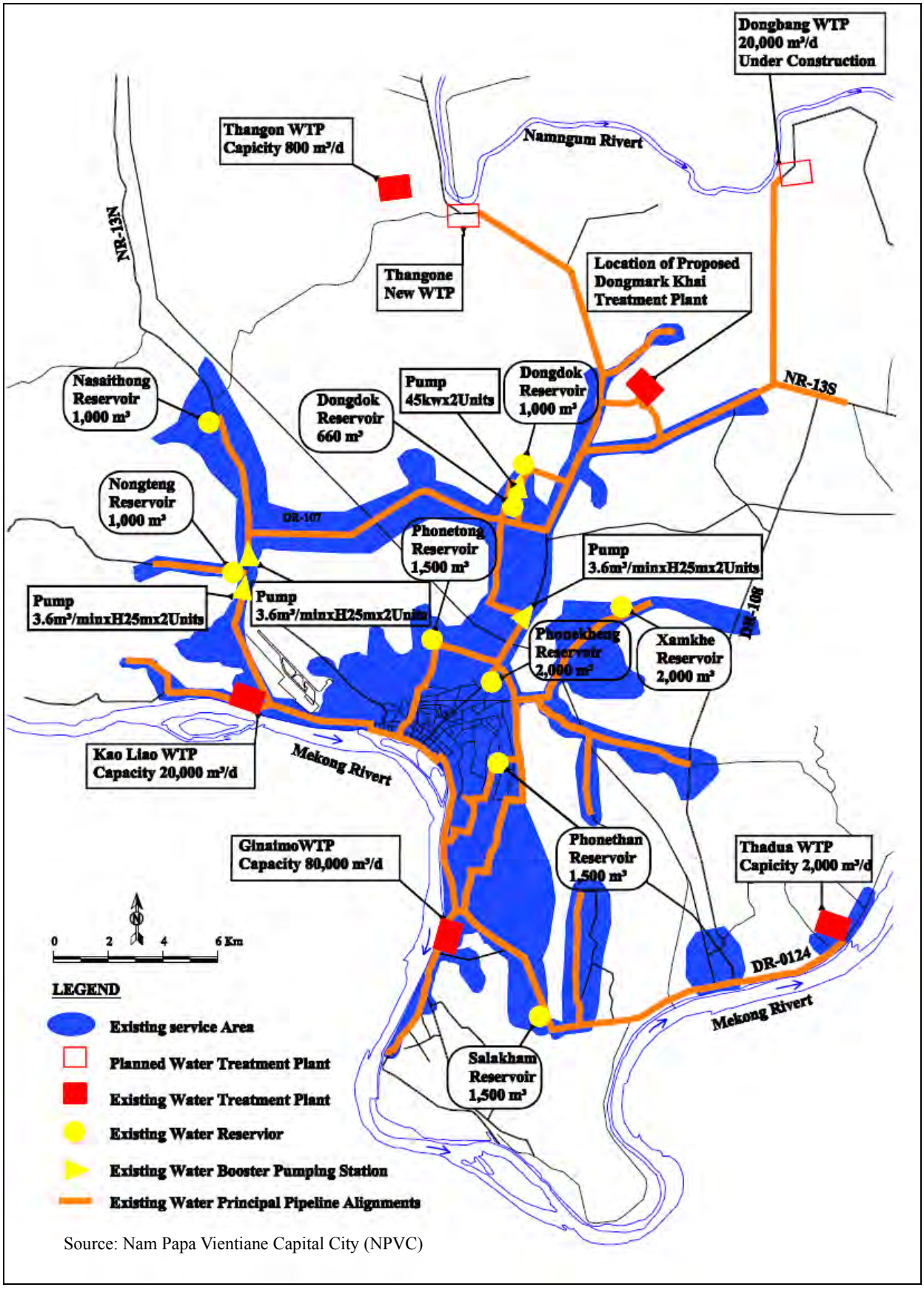
Table 2.3.15: Existing WTPs in Vientiane

WTP	Design Capacity (m^3/d)	Source
Kaolieo	40,000	Mekong River
Chinaimo	80,000	Mekong River
Thadua	400	1 Borehole (ground water)
Dongmakkhay	20,000	Dongmakkay Irrigation Canal from Nam Ngum River
Thangon	800	Tributary of Nam Ngum River
Total	141,200	

Source: Lao Water Supply Company, Corporate Planning & IT Section

Figure 2.3.12: Dongmakkhay WTP and Kaolieo WTP

The actual water demand of Vientiane in 2007 is estimated at 132,000 m^3/d while the present water production is estimated at only about 141,200 m^3/d. Although the water production of NPVC is able to sufficiently meet the present water demand, the rate of water service provision of NPVC is only about 45% at present since the present water supply and distribution development of NPVC are not satisfied due to the rapid expansion of the urban area and lack of funds for distribution network development. The present service area and location of main water supply facilities are presented in Figure 2.3.13.



Source: Nam Papa Vientiane Capital City (NPVC)

Figure 2.3.13: Existing Water Supply System in Vientiane Capital

NPVC has a future plan for the construction of two WTPs which will source water from the Nam Ngum River. Thangon New WTP with a capacity of 50,000 m^3/d is proposed as a long-term plan by the JICA Study on Vientiane Water Supply Development Project (January 2004) and Dongbang WTP with a capacity of 20,000 m^3/d is planned for supplying water to the northeast area of Urban Vientiane, which will be newly developed and will include the SEA-Game Stadium (Phase I), Vientiane Industrial Zone and new town (Phase II).

Figure 2.3.14: Nam Ngum River

The Dongbang WTP project has commenced through private finance initiative (PFI). An outline of the project is summarized below:

- Developer: Ha Dao Company jointly with NPVC with 20% share and Vietnamese Mai Dong Company with 80% share
- Investment cost for Phase I: LAK42 billion (equivalent to USD5 million) financed by Lao-Viet Bank
- Selling price of treated water: LAK1,350 per m^3
- Location of WTP: Dongbang Village
- Water Source: Nam Ngum River
- Capacity of Dongbang WTP: 20,000 m^3/d
- Pump Pressure: 6 bar
- Construction Stage: Phase I to be completed by December 2009, Phase II (unknown)
- Phase I: construction of Dongbang WTP, installation of distribution main with DN500 mm along the Thadindeang Road from WTB to National Road No.13 South and distribution main with DN 250mm along National Road No.13 South to the SEA-Game Stadium
- Phase II: installation of distribution main with DN400 mm along District Road No.108 Road from National Road No.13 South to the Xamkhe Reservoir and distribution main with DN300 mm along District Road No.108 to Doungkang Village

NPVC applied new water tariff for domestic and non domestic customers on May 11, 2009 as shown in Table 2.3.16 (refer to the Agreement of the Mayor of the NPVC Number 170/vco; dated 21 April, 2009).

Table 2.3.16: New Water Tariff for Domestic and Non-Domestic Customers

Water Consumption		Water Tariff
(i)	0 to 10 m^3	LAK500 per m^3
(ii)	11 to 30 m^3	LAK1,000 per m^3
(iii)	31 to 50 m^3	LAK2,500 per m^3
(iv)	> 50 m^3	LAK5,000 per m^3

Source: JICA Survey Team

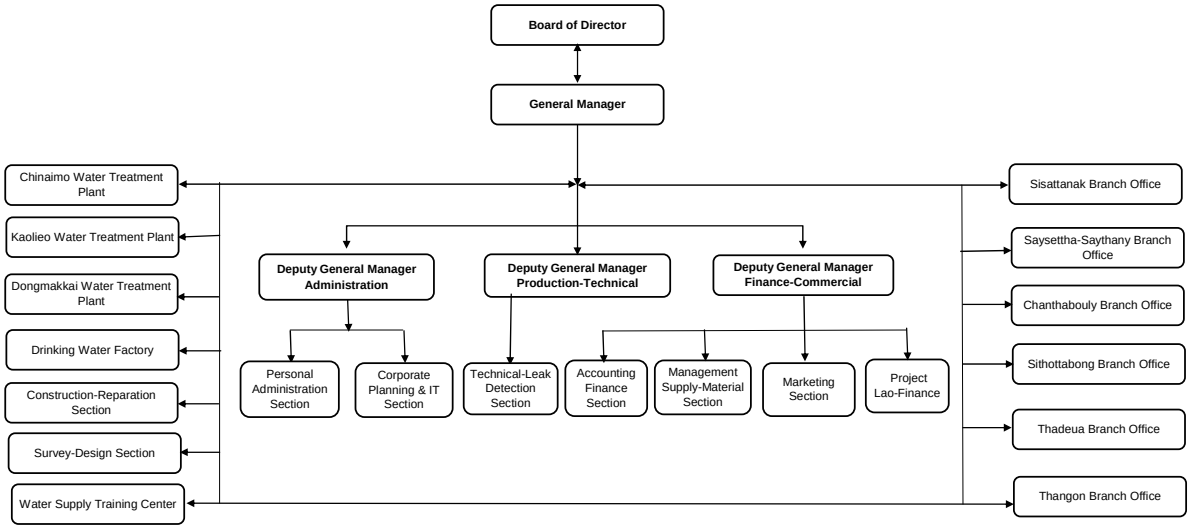
The service condition of the NPVC for the past five years using some indicators is shown in Table 2.3.17.

Table 2.3.17: Service Condition of NPVC

Indicators	Unit	2003	2004	2005	2006	2007
Turnover	million LAK	21,133	-	34,765	41,475	49,448
Operating Costs	million LAK	17,326	-	29,689	32,289	33,999
Net Operating Income	million LAK	3,807	-	5,075	9,186	15,449
Pipe Leakage	number	2,960	3,390	3,192	2,970	3,676
Ratio of Water Sales/Production	%	72	71	72	73	72
Ratio of Non-Revenue Water/Production	%	28	29	28	27	28
Number of Employees	person	406	413	416	483	471
Connections per Employee	connection	114	115	125	116	128

Source: Lao Water Supply Company, Corporate Planning & IT Section

NPVC consists of one head office and six branch offices as presented in Figure 2.3.15. It has a total of 471 employees in 2007.



Source: NPVC

Figure 2.3.15: Organization Chart of NPVC

2.3.5 Drainage and Sewerage Systems

MPWT is responsible for planning and implementing the drainage and sewerage systems in the Lao PDR. For collection of storm water and wastewater, combined sewer system is adopted since sewerage system is not fully established in the country even in urban areas such as Vientiane Capital, Savannakhet and Pakse.

(1) Drainage System

The total precipitation in Vientiane Capital is about 1,600 mm and drought and flood also occur almost every year. The southwest monsoon carries humidity from the Indian Ocean and brings rainfall. Most precipitation (86% of total) is concentrated during the rainy season from May to September. After the rainy season, the comparatively cold northeast monsoon blows in from Siberia or mainland of China until the middle of February. This period is called cool season and is comparatively dry and cool. Hot and dry season follows this period.

The biggest recorded flood happened in September 1966. The second was in August 1976. These were caused by heavy rain and flooding of the Mekong River. Although small-scale floods happen every year, large-scale floods have not happened recently due to the construction of banks and

drainage system in the lowland areas. At present, the top level of the dykes with MSL+170.8m at Chinaimo is above the 10-year flood level.

Mekong, Nam Ngum and Mak-Hiao are the main rivers in Vientiane Capital. Mekong River, which bounds the city area on the south and west, is the source for water supply and irrigation. The Nam Ngum River is a tributary of the Mekong River which discharges at the northern part of the Vientiane Plain. The Mak-Hiao River, a minor tributary of the Mekong River, drains to the lower areas between the Mekong and the Nam Ngum rivers. The Mak-Hiao River flows into the Mekong River near Ban Kak-Hiao Village. The confluence of the Mak-Hiao River with the Mekong River is located about 64 km downstream of Vientiane along the Mekong River. The main water courses in the city area, such as the Nam Pasak, Hong Ke and Hong Xeng, are tributaries of the Mak-Hiao River. The Mak-Hiao River has a drainage area of 441 km^2 at the outlet to the Mekong River.

The existing urban drainage system is illustrated in Figure 2.3.16. Storm water is collected through the road drainage consisting of culverts and canals constructed along the road network and flows into urban streams/channels. The urban streams/channels and rivers that function as main drainage, such as Hong Thong, Hong Khua Khao and Mak-Hiao River are designed using 10-year probability rainfall. The road drainages are designed with 2-year probability rainfall. That Luang Marsh with MSL of 166.0 m functions as retention pond for the city.

Figure 2.3.16: Existing Drainage System in Vientiane Capital

The flood water level (MSL) of the Mekong River and the probable rainfall corresponding to each return period are studied and proposed by the JICA Feasibility Study on Improvement of Drainage System in Vientiane 1990. The hydrological data are adopted for planning the drainage system in Vientiane Capital as shown in Table 2.3.18.

Table 2.3.18: Flood Water Level of Mekong and Probable Rainfall

Return Period	Probable Rainfall (mm/d)	Flood Water Level of Mekong (m)
2 years	104.0	MSL 169.0
5 years	132.1	MSL 170.0
10 years	150.6	MSL 170.7
20 years	168.4	MSL 171.3
25 years	174.0	-
50 years	191.4	MSL 172.1
100 years	208.7	MSL 172.1

Source: JICA F/S on Improvement of Drainage System in Vientiane, March 1990

The Mekong River Integrated Management Project has been conducted for Vientiane Capital with the assistance of Korea as shown in Figure 2.3.16. An outline of the project is summarized as follows:

i) Project contents: a) argumentation of dykes, b) bank protection, c) landscape, and d) access road
ii) Project Goal: augmenting top level of dykes from the present height of MSL 170.80 m (equivalent to 10-year flood protection) to MSL 172.58 m in order to meet 100-year flood protection
iii) Implementation Plan: divided into two phases
iv) Phase I
- Feasibility Study: conducted in 2006
- Implementation Schedule: January 2009 up to December 2013
- Top Level of Dyke: MSL 172.58 m; equivalent to 100-year flood protection
- Width of Dyke: 7.0 m
- Total Length of Dyke: 12.2 km (from Kaoliao Port up to Austria Clubhouse)
- Implementation Cost: USD37.2 million

v) Phase II
- Feasibility Study: commenced in 2009
- Implementation Schedule: after completion of Phase I
- Top Level of Dyke: MSL 172.58 m; equivalent to 100-year flood protection
- Width of Dyke: 7.0 m
- Total Length of Dyke: 10.0 km
- Implementation Cost: supposed to be USD30 million to USD40 million

(2) Sewerage System

Sewerage system is not yet established in the Lao PDR and even in Vientiane Capital. In Vientiane Capital, domestic and commercial wastewater from houses, restaurants and offices are disposed individually to existing open ditches. Raw sewerage from toilets is treated through individual septic tank or discharged directly to open ditches without proper treatment.

Industrial wastewater effluent standard (Decree No. 326/IH, 6th October 2005) shown in Table 2.3.19 is determined by the Ministry of Industry and Commerce (MoIC). Factories need to comply with the effluent standard in order to obtain certificate allowing them to discharge sewage and process waste water.

Table 2.3.19: Industrial Wastewater Effluent Standard

Parameter \ Type	Unit	General Factories	Electrical metal coating	Battery production	Processing Industry Factories					Factories with organic substances					
					Sugar	Textile/garment	Pulp	Paper	Slaughterhouse	Canned fish	Beer	Tapioca flour	Tannery	Paint	Pharmaceutical
BOD_5	mg/l	30			60	40	90	30	40	40	30	70	40	40	40
Ammonia Nitrogen	mg/l	4					7		4						
Total Suspended Solid (TSS)	mg/l	30	30		100	40	60	30	40	50	30	80	40	40	40
pH	mg/l	6-9.5	6-9.5	6-9.5	6-9.5	6-9.5	6-9.5	6-9.5	6-9.5	6-9.5	6-9.5	6-9.5	6-9.5	6-9.5	6-9.5
Total dissolved solid	mg/l	3,500													
Phenols	mg/l	0.3				1	1								
Phosphorus	mg/l	1													
Silver	mg/l	0.1													
Zinc	mg/l	1	5	1											
Sulphide	mg/l	1													
Free chlorine	mg/l	1													
Chloride	mg/l	500													
Iron	mg/l	2													
Fluoride	mg/l	15													
Cyanide	mg/l	0.1	0.2												
Copper	mg/l	0.5	1	0.5											
Lead	mg/l	0.2		0.2											
Oil and grease	mg/l	5	30												
Nickel	mg/l	0.2	0.2	1											
Mercury	mg/l	0.005		0.005											
Manganese	mg/l	1													
Arsenic	mg/l	0.25													
Barium	mg/l	1													
Cadmium	mg/l	0.03		0.03											
Chromium (+6)	mg/l	0.1	0.3												
Total Chromium	mg/l	0.5	2	0.5											
Total metals	mg/l		6												
Antimony (Sb)	mg/l			1											

Source: Decree No.326/IH, MoIC

The Science, Technology and Environmental Authority (STEA) also determines the wastewater effluent standard for categorized building types and wastewater treatment plant as presented in the tables below.

1) Wastewater Effluent Standard for Categorized Building Types

Table 2.3.20: Wastewater Effluent Standard Parameters

	Parameters	Allowable Pollutant Load (mg/L): Not more than				
		A	B	C	D	E
1	Biochemical oxygen demand (BOD)	20	30	40	50	200
2	Suspended solids	30	40	50	50	60
3	Settable solids	0.5	0.5	0.5	0.5	-
4	Total dissolved solids (TDS)	3000	2300	2000	1500	
5	Chemical oxygen demand (COD)	120	130	150	350	400
6	Sulfide	1.0	1.0	3.0	4.0	
7	Total Kjeldahl Nitrogen (TKN)	35	35	40	40	
8	Fat oil and grease	20	20	20	20	100
9	Temperature (Celsius)	40	40	40	40	40
10	pH-value	6-9.5	6-9.5	6-9.5	6-9.5	6-9.5

Source: STEA, 1998

Table 2.3.21: Wastewater Effluent Standard Categories

Categories	A	B	C	D	E
Buildings: Number of Rooms	> 501	500 -101	< 100		
Hotels: Number of Rooms	> 201	200 - 61	< 60		
Dormitories: Number of Rooms	> 251		250 - 51	50 - 10	
Swimming pool/Massage Center: Service Area (m^2)	> 5000			5000 - 1000	
Hospital/Medical Center: Number of Beds	> 31	30 - 10			
Buildings, Hotels, Educational, Institutes, Universities: Service Area (m^2)	> 25001	25000 - 5000			
State, state enterprises, foreign and private buildings: Service Area (m^2)		> 55001	55000 - 10000		
Commercial Centers/Supermarkets: Service Area (m^2)	> 25001	25000 - 5000			
Markets: Service Area (m^2)	> 2501	2500 - 1501	1500 - 1001	1000 - 500	
Restraints: Service Area (m^2)	> 2501	2500 - 501	500 - 251	250 - 101	< 100

Source: STEA, 1998

2) Wastewater Effluent Standard for Wastewater Treatment Plant

Table 2.3.22: Wastewater Effluent Standard for Wastewater Treatment Plant

Parameters		Standard Unit (mg/L)
1	Biochemical oxygen demand (BOD)	No more than 30
2	Suspended solids	No more than 30
3	Settable solids	0.5
4	Total dissolved solids (TDS)	1500
5	Chemical oxygen demand (COD)	No more than 120
6	Sulfide	1.0
7	Total Kjeldahl Nitrogen (TKN)	No more than 100
8	Fat oil and grease	No more than 5
9	Temperature (degree Celsius)	No more than 40
10	pH-value	6-9.5

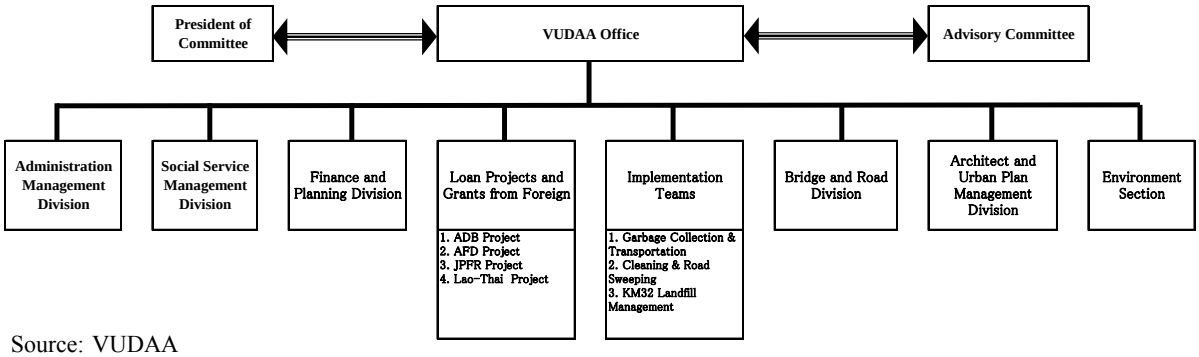
Source: STEA, 1998

2.3.6 Urban Sanitation

MPWT is responsible for the policy, strategy and planning of solid waste management in the Lao PDR. Meanwhile, the Urban Development and Administration Authority (UDAA) is responsible for the collection and disposal of solid waste and operation and maintenance (O&M) of individual septic tank. Laws and regulations for solid waste management are not available in the Lao PDR. There is a need to provide regulations for harmful waste materials.

(1) UDAA

Vientiane Urban Development and Administration Authority (VUDAA) collects solid waste from seven districts in Vientiane Capital and transport it to a landfill site. An implementation team of VUDAA is responsible for the collection and transport of garbage, cleaning and sweeping of roads, and management of the Km 32 Landfill as presented in Figure 2.3.17.



Source: VUDAA

Figure 2.3.17: Organization of VUDAA

VUDAA dose not operate any incinerator for reducing the weight of solid waste. Only one incinerator is located at the Sethathirath Hospital for medical waste and operated by the hospital. In 2010, there is a plan to construct incinerators for 3 hospitals with assistance from the Swedish International Development Cooperation Agency (SIDA).

Garbage collection/disposal fees of VUDAA are summarized below:

- Garbage Collection Fee: LAK6,000 per basket (25 kg) for domestic solid waste,
- Garbage Disposal Fee: LAK15,000 per ton at Km 32 Landfill site.

The following five private companies are officially registered to collect and transport garbage under a contract with VUDAA. The service area of VUDAA consists of seven districts as shown in Table 2.3.23. The service ratio of customers in the seven districts is less than 40%.

Table 2.3.23: Solid Waste Collection in Vientiane

	Name of Company	Number of Households		Market	Embassy	Office	Factory	School	Hospital	Hotel/ Guesthouse	Served District (Area or Villages)
		Total	Customers								
1	VUDAA (Cleansing Section)	32,345	10,020	20	8	52	44	19	8	36	Chanthabuly (1/2), Sikhottabong (1/2), Hadsayfong (15 villages), Sisattanak (6 villages) and Sathany
2	Waste Transport Company	12,808	5,835	5	4	12	2	19	1	7	Saysetha (1/2)
3	Cleaning and Waste Transport Company	5,082	3,404	3	12	23	10	13	1	10	Sisattanak (1/2)
4	Lao Garbage Co, Ltd.	3,388	801	3		4	4				Sisattanak (1/2)
5	Chanthabuly Cleaning Co., Ltd	3,084	2,490	6	1	113		12		60	Chanthabuly (1/2)
6	Saysetha District Service Center Enterprise	6,605	955	1		7	4			5	Sikhottabong (1/2)
	Total	63,312	23,505	38	25	211	64	63	10	118	

Source: Environmental Section, VUDAA

VUDAA and the five registered companies possess the following equipment for collection of solid waste:

Table 2.3.24: Number of Equipment

(Unit: Number)

	Name of Company	Vehicle under operation	Compactor Truck	Small Truck with Attachment	Big Truck with Attachment	Dump Truck	Container Carry Truck	Container
1	VUDAA (Cleansing Section)	20	9	1	4		4	60
2	Waste Transport Company	6				6		
3	Cleaning and Waste Transport Company	6				6	1	4
4	Lao Garbage Co, Ltd.	4				4		
5	Chanthabuly Cleaning Co., Ltd	3				3		
6	Saysetha District Service Center Enterprise	2				2		
	Total	41	9	1	4	21	5	64

Source: Environmental Section, VUDAA

VUDAA owns a total of 20 vehicles for the collection and transport of solid waste. For collection of night soil/fecal sludge, there are 17 tank trucks with vacuum device in Vientiane Capital. VUDAA has the existing Km 7 maintenance workshop for the O&M of vehicles.

(2) Km 32 Landfill

The previous Km 18 Landfill is fully occupied and closed at present. As shown in Figure 2.3.18, the Km 32 Landfill, which is located at Naphasouk Village, is newly developed in 2008 through the Lao government's fund. An outline of the Km 32 Landfill is summarized below (refer to Photographs in Figure 2.3.18):

- Construction cost: estimated at about USD3 million
- Distance from Sea-Games Stadium to Km 32 Landfill: 15 km along National Road 13S and 2 km of local road
- Total area: 750 ha for landfill (area of 100 ha is under operation)
- Km 32 Landfill has an office, 1 unit of truck scale (see Photo-1) and workshop (see Photo-2)
- Method of landfill: sanitary landfill with 3 m depth of filling (see Photo-3)
- Km 32 Landfill has a leachate pond for night soil/fecal sludge disposal with size of 150 m^L x 100 m^B x 3 m^D (see Photo-4)

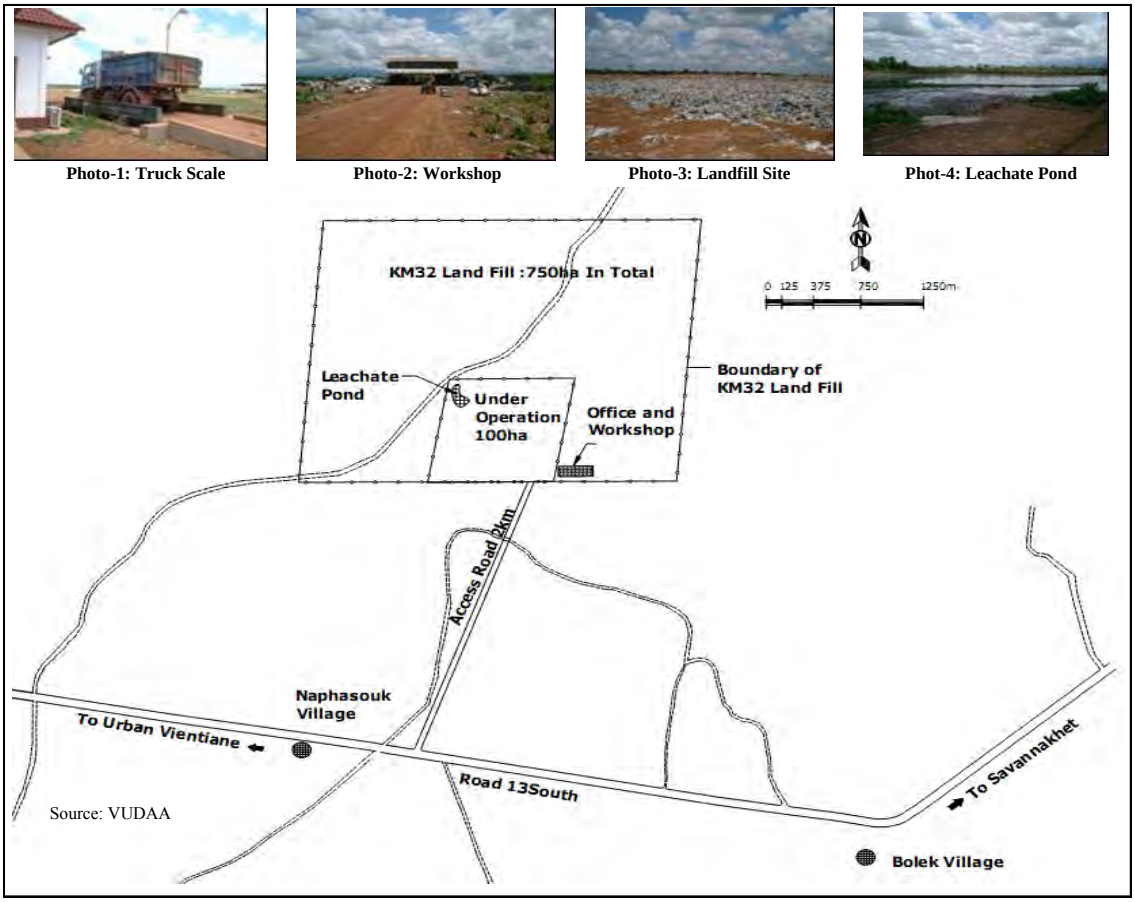


Figure 2.3.18: Location of Km 32 Landfill

The solid waste to be disposed at the Km 32 Landfill is summarized in Table 2.3.25.

Table 2.3.25: Volume of Solid Waste

	Name of Company	Jan. 2009		Feb. 2009		Mar. 2009		Apr. 2009		Total	
		Trip	Volume (ton)	Trip	Volume (ton)	Trip	Volume (ton)	Trip	Volume (ton)	Trip	Volume (ton)
1	VUDAA (Cleansing Section)	620	2,108	600	2,063	675	2,293	644	2,283	2,539	8,747
2	Waste Transport Company	172	796	170	766	176	809	177	809	695	3,180
3	Cleaning and Waste Transport Company	137	646	125	595	132	656	124	649	518	2,546
4	Lao Garbage Co, Ltd.	54	227	44	200	41	192	42	185	181	804
5	Chanthabuly Cleaning Co., Ltd	108	694	94	600	106	695	103	654	411	2,643
6	Saysetha District Service Center Enterprise	44	201	38	188	37	198	38	194	157	781
7	VUDAA (Cleaning & Sweeping Section)	10	35	5	17	8	42	9	38	32	132
8	Others (Australian Laboratory Service, etc.)	1,278	4,998	1,143	4,497	1,278	5,057	1,214	4,868	4,913	19,420
	・Beer Brewage Processing Waste	22	84			27	103			49	187
	・Night Soil/Fecal Sludge	33	116			8	28	3	11	44	155
	・Domestic Waste	78	90	67	68	68	41	74	45	287	244
	・Commercial Waste	1,145	4,708	1,076	4,429	1,175	4,885	1,137	4,812	4,533	18,834
9	Medical Waste (from Hospitals)	8	13	8	14	8	12			24	39
	Total	2,431	9,718	2,227	8,940	2,461	9,954	2,351	9,680	9,470	38,292
	Monthly Average									2,368	9,573

Source: Environmental Section, VUDAA

Monthly average volume of solid waste treated by the Km 32 Landfill is estimated at 9,573 tons in weight. VUDAA with the five registered companies collect and transport 49% of the total volume of solid waste while the other private companies including Australian Laboratory Service treat 51% of the waste under private contract basis.

At present, separate collection method is not adopted by VUDAA. However, plastics and PET bottles are recycled by

Figure 2.3.19: Recycling Company

scavengers at the Km 32 Landfill. The scavengers hand over selected waste to private recycling companies. There are two Chinese recycling companies along the Thadindeang Road as shown in Figure 2.3.19.

2.4 Industrial Location

2.4.1 Existing Industrial Location

(1) Existing Factories by Industrial Category

Factories are divided into large-scale factories (Level-1), medium-scale factories (Level-2) and small-scale factories (Level-3). There are 566 Level-1 factories located in Vientiane Capital, accounting for 66% of all Level-1 factories in the country.

Of the 566 Level-1 factories, 530 factories are manufacturers of wearing apparel. Besides these factories, 10 Level-1 factories are manufacturers of textile. There are eight manufacturers of wood and wood products that utilize the forest resource in the country. There are six food and beverage manufacturers, which include a beer brewery and a soft drink factory both located alongside the Thadeua Road.

Two Japanese-affiliated enterprises are manufacturing leather shoes for export with the aid of GSP. Two other Japanese-affiliated enterprises are manufacturing parts of electric apparatus in collaboration with their affiliates in Thailand.

Table 2.4.1: Existing Factories in Vientiane Capital

ISIC Rev.3	Activity	No. of Factory			
		Level-1	Level-2	Level-3	Total
15	Manufacture of food products & beverages	6	33	975	1,014
16	Manufacture of tobacco products	1	1	1	3
17	Manufacture of textiles	10	7	11	28
18	Manufacture of wearing apparel; dressing and dyeing of fur	530	30	149	709
19	Tanning & dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	2	1	2	5
20	Manufacture of wood and of products of wood & cork, except furniture; of articles of straw and plaiting materials	8		19	27
21	Manufacture of paper & paper products		5	2	7
24	Manufacture of chemicals and chemical products	3	3	24	30
25	Manufacture of rubber & plastics products	3	1	19	23
26	Manufacture of other non-metallic mineral products	1	1	42	44
31	Manufacture of electrical machinery and apparatus n.e.c.	2		121	123
	Others	-	21	138	159
	Total	566	103	1,503	2,172

Remark: This is the latest of data of year 2008

Note: Level-1: "more than 200 labors" or "more than 200 horsepower of machine" or "high environmental impact"
Level-2: "51-200 labors" or "51-200 horsepower of machine" or "medium environmental impact"
Level-3: "10-50 labors" or "5-50 horsepower of machine" or "low environmental impact"

Source: MoIC

(2) Existing Foreign Factories

FDI serves as the backbone of the growth of the manufacturing sector in the Lao PDR. In terms of the number of FDI, more than half (about 55%) has been invested in Vientiane Capital. In fact, 98% of foreign apparel factories and 70% of foreign machine and vehicle factories are located in Vientiane Capital. This concentration of factories is attributed to the comparative advantages of Vientiane Capital over other areas in the country. It is expected that this trend will continue in the future.

(3) Distribution of Apparel Factories

The Association of the Lao Garment Industry is organized as an industrial association in the Lao PDR. According to the data compiled by the association, export value of garments from the Lao PDR was USD153 million in 2007 which corresponds to 16.5% of the total value of exports of the country for the period from October 2006 to September 2007. Garments were exported mainly to EU, which accounted for 79% of the exports, with the aid of GSP.

The members of the association include 54 large-scale factories and 56 small-scale factories. According to the 2009 directory of the association, 53 of the 54 large-scale factories are located in Vientiane Capital. The 53 large-scale factories in Vientiane Capital are listed in Table 2.4.3 and their locations are illustrated in Figure 2.4.1.

These 53 large-scale factories are scattered throughout Vientiane Capital, except in the easternmost Pakngum District and westernmost Sangthong District. The JST observed the following when going around these garment factories:

Table 2.4.2: Observation of Site of Garment Factories

Location	Garment Factories	Ambient Surrounding	Potential Problems
Sisattanak and Xaysetha districts in the east of downtown	Sisattanak: 15 factories Xaysetha: 9 factories	In many cases in these districts, garment factories are located in the residential area, where only narrow roads are passing through.	It is difficult to economically transport raw materials and finished products by large trucks or container cars.
Xaythany District in the north of downtown	Xaythany: 8 factories	Some factories are located in farm land alongside unpaved small roads. Such location of factories causes bad drainage and muddy roads during the rainy season.	It is difficult to transport raw materials or finished products by large trucks or container cars. Besides, such location of factories may cause annoyance to the residents living in the vicinity of factories.
Chanthabuly District in the center of downtown	Chanthabuly: 5 factories	Factories are located alongside well developed roads. It seems that these factories are convenient for transportation.	There are traffic jams in the morning and evening in the center of downtown.
Sikhottabong District in the west of downtown	Sikhottabong: 10 factories	On the north side of Wattay International Airport, some factories are scattered throughout paddy fields. Meanwhile, on the south side of the airport, some factories are located in the vicinity of Luang Prabang Road and mixed with residential area.	On the south of the airport, it is difficult to expand factory area because factories are mixed with the residential area.
North alongside NR13N in Naxaithong District	One Japanese factory	This factory site is good for employment; and faces the Road 13 North.	It takes long time to transport raw materials and finished products to /from the First Friendship Bridge.

Source: JICA Survey Team

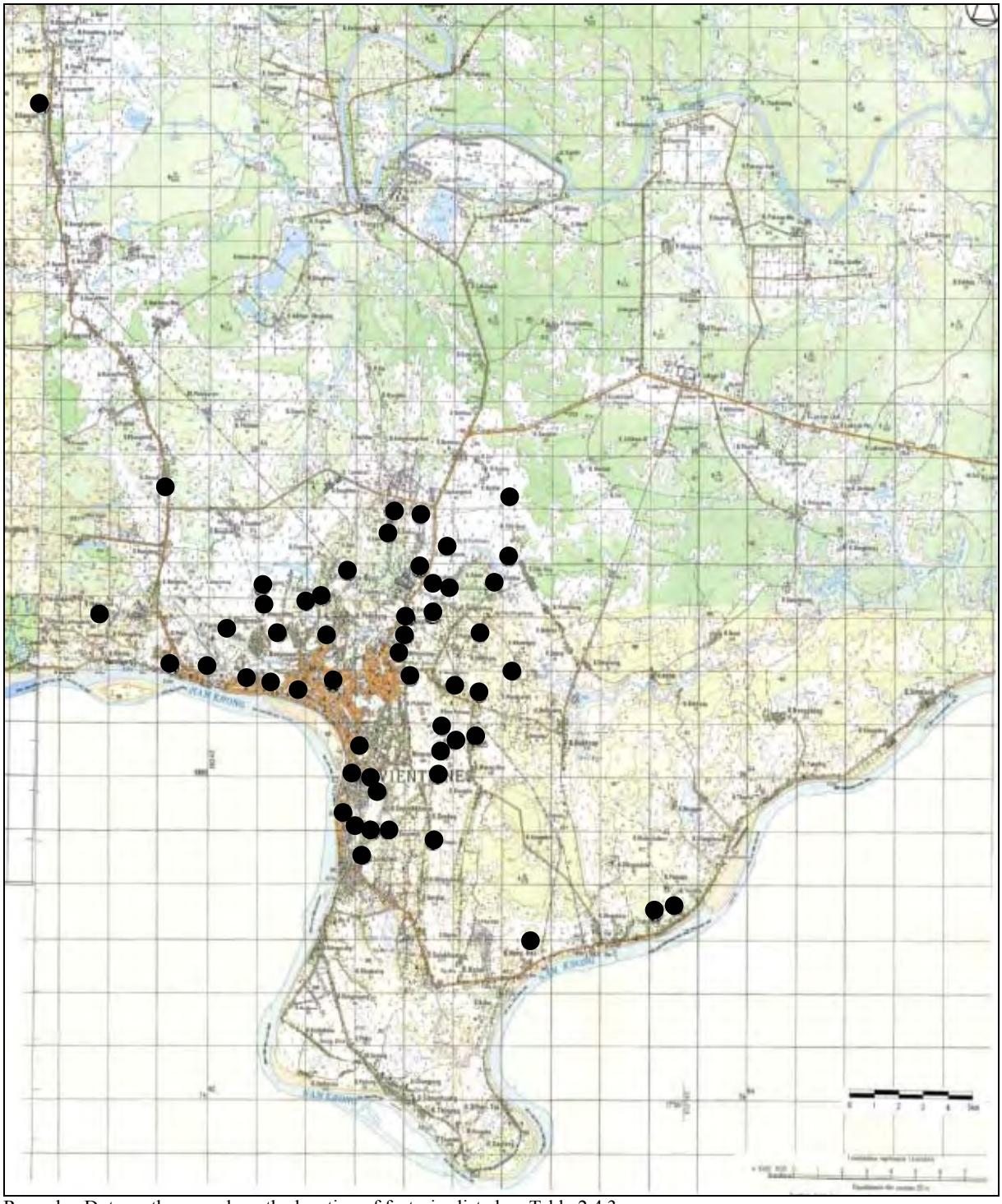
As described in the above Table 2.4.2, factories are randomly scattered. Consequently, factory sites are mixed with farm land or residential area. They sometimes face problems of inefficient transportation and may also disturb or annoy residents living in the vicinity.

Conditions for living, farming, manufacturing and transportation will be worse unless the government takes adequate industrial location measures.

Table 2.4.3: Members of the Association of the Lao Garment Industry in Vientiane Capital

	Name of Factory	District	Investment	No. of Workers
1	Alpilao International	Sikhottabong	FDI	961
2	A One Garment	Chanthabuly	FDI	122
3	Alpilao Garment(Ⅱ)	Sikhottabong	FDI	453
4	Anjum Garment	Xaysetha	Lao	76
5	Asiatic Garment	Sisattanak	JV	75
6	Bangkok Phaisam Clothing	Xaysetha	FDI	377
7	B.J Garment Co.,Ltd	Sikhottabong	JV	97
8	B.V.S.S.F Co.,Ltd	Xaythany	Lao	145
9	Creative Business Corp Co.,Ltd	Xaythany	FDI	134
10	Crane Enterprise Co.,Ltd	Sisattanak	FDI	30
11	Done Garment Factory	Xaythany	Lao	280
12	Done Garment Factory(Ⅱ)	Xaythany	Lao	120
13	Export Garment	Chanthabuly	JV	1,234
14	Export Garment(Ⅱ)	Xaysetha	JV	405
15	Fancy Garment Co.,Ltd	Sikhottabong	Lao	282
16	Fair Vien Cartex	Hadxaifong	FDI	31
17	General Wear	Sisattanak	FDI	176
18	Great Lao MFG	Sisattanak	FDI	762
19	Sayadeth Aporn Garment	Sisattanak	Lao	80
20	Inter Garment	Xaysetha	Lao	328
21	New Keen Basic Garment Co.,Ltd	Chanthabuly	FDI	164
22	Kianvilay Garment	Sisattanak	Lao	570
23	K.M.S Garment	Xaysetha	Lao	780
24	K.B garment	Xaythany	JV	50
25	Leo Garment	Hadxaifong	JV	202
26	Libo Garment	Hadxaifong	Lao	52
27	Lao Cotton State Enterprises	Sikhottabong	Lao	98
28	Lao Enterprises Co.,Ltd	Sisattanak	JV	166
29	Lao Euro-Asia Garment	Chanthabuly	FDI	221
30	Hi-Tech Laos Apparel Co.,Ltd	Sisattanak	JV	1,100
31	Lao Fu Van Garment Co.,ltd	Sikhottabong	FDI	182
32	Lao Univers Garment Co.,Ltd	Sisattanak	JV	291
33	Lanxang Aporn MFG	Sisattanak	FDI	1,168
34	Lao Yamaki Co.,Ltd	Naxaithong	FDI	291
35	Mega-Lao Co.,Ltd	Xaysetha	JV	315
36	No 2 Garment Factory Co.,Ltd	Xaythany	L	279
37	P.V Garment	Sisattanak	L	299
38	Pro Corperate Co.,Ltd	Xaysetha	FDI	229
39	Ricardo Garment Co.,Ltd	Sisattanak	JV	285
40	Sahasin Garment	Xaythany	L	325
41	Shinawatra Garment	Chanthabuly	FDI	262
42	Scavi-Lao Garment	Sikhottabong	FDI	1,300
43	Santei-Lao Co.,Ltd	Chanthabuly	JV	198
44	Trimax Co.,Ltd	Sikhottabong	FDI	821
45	Trio Lao Export Co.,Ltd	Naxaithong	FDI	1,474
46	T.K Garment	Sikhottabong	FDI	179
47	Union Yagi Lao Co.,Ltd	Sisattanak	FDI	329
48	V.L Garment	Sisattanak	L	317
49	V.M Inter(Lao) Garment Co.,Ltd	Hadxaifong	JV	296
50	Vision Manufacturing	Sisattanak	FDI	528
51	Venture International	Xaysetha	FDI	903
52	V.L Lao Hometex	Xaysetha	FDI	335
53	Wonderful Garment	Xaythany	FDI	811
	Total			20,988

Remarks: Only large factories in Vientiane Capital are listed.
Source: Membership Directory 2009 prepared by Association of the Lao Garment Industry



Remarks: Dots on the map show the location of factories listed on Table 2.4.3.
Source: JICA Survey Team

Figure 2.4.1: Distribution of Apparel Factories in Vientiane Capital

2.4.2 Potential Industrial Location

The apparel industry, which currently dominates in the city, has still high potential for foreign investment. However, it is not absolutely strong compared with foreign countries in terms of wage levels, labor supply, transportation costs, procedures, etc.

It is recommended that the manufacturing sector focusing on apparel should diversify into manufacturing various kinds of goods including parts of electrical and electronic machines, metalworking and miscellaneous daily goods, which are labor-intensive industries.

In the long-term, the government should make efforts to introduce potential manufacturers, particularly electrical, electronic-mechanical and metalworking factories, in Vientiane Capital. It is expected that these efforts will expand the manufacturing sector and give opportunities to new businesses.

Table 2.4.4 provides examples of potential industries to be invited to Vientiane Capital.

Table 2.4.4: Potential Industries in Vientiane Capital

Category	Product	Market	Location Factor	Potential
Apparel	Working wear, uniform, and dress shirt (apparels with little design changes)	Medium & low grade market (USA, EU, Japan)	• Labor-intensive, export-oriented, GSP • Sewing technique • Auxiliary materials (button and fastener)	High
	Lace: dress, underwear, table cloth, curtain	Medium & low grade market (USA, EU, Japan)	• Labor-intensive • Enhancing mechanization • Knitting and sewing technique	High
	Bed linen	Japan	• Labor-intensive • Sewing technique	High
	Rubber-coated glove	Japan	• Mechanized in Japan	High
Transport Machine	Wire harness	Automobile industry in Thailand and motorbike industry	• Labor-intensive • Access to assembly factories • Parts manufacturing and assembling	High
	Connector			Medium
Electrical Machine	Wire harness	Electric appliances, office equipment, etc. mainly in Thailand and Vietnam	• Labor-intensive • Parts manufacturing and assembling	High
	Connector, transformer, coil, wiring accessories			Med
	Printed-circuit board		• Footloose industry	Medium
Steel products	Nail, bolt & nut	Thailand and neighboring countries	• International standard goods	High
	Bar steel production and processing	Mainly domestic market	• Electric furnace • Close to market	High
	Steel plate processing		• Shirring and slitting of steel plate • Pressing • Close to market	Medium
Non-ferrous metal products	Electric cable	Domestic market, Thailand and neighboring countries	• Close to a copper smelter • Power consuming • Male workers • Various kinds of product • Growing demand for power line	Medium
	Silicon smelting	Japan and other export market	• Adjacent to a silica rock mine • Power consuming • Growing demand	Medium

Category	Product	Market	Location Factor	Potential
Agriculture -related	Beverage: beer and other alcoholic beverage, soft drink	Mainly for domestic market	• Agricultural products • Large amount of quality water	Medium
	Sugar, coffee, dry vegetable, frozen foods (vegetable, fruits, cooked food, etc.)	Export	• Stable supply and large amount of agriculture products • Homogeneous agriculture products • Freezing and cold storage facilities will give business opportunities and contribute to price stabilization • Power consuming for freezing and cold storage	Medium
	Containers, glass bottle, etc.	Containers for beverage for domestic market	• Close to market • Reusable bottle, recycle • Power consuming	High
Agriculture -related	Bio-diesel	Alternative automobile fuel	• Bottleneck is acquisition of cultivation land for oil-plant	Medium
Miscellaneous daily products	Mass-produced umbrella	Japan, South Korea, Taiwan, etc.	• Labor-intensive	Medium
	Flypaper	Mainly for China	• Bangkok-based Japanese enterprises	Medium
	Wig, stuffed doll	Japan, South Korea,	• Handsuwen wig for Japan	Medium
Others	Bicycle	USA, EU, Japan, etc.	• Transport cost is critical • Assembly of imported parts • If GSP is applicable, high possibility	Medium
	Cement	Domestic and export	• Close to raw materials • Close to market	Medium
	Construction materials	Domestic and export	• Close to raw materials such as gypsum • Electric power	Medium
	Molded plastic products	Domestic	• Import plastic resin (pellet) • Sheet, jumbo bag for vegetable, feedstuff, etc., container	Medium
	Leather shoes	USA, EU, Japan, etc.	• Labor-intensive • Imported materials	High
	Knockdown furniture, woodworking, etc.	USA, EU, Japan, etc.	• Presence of raw materials	Medium
	Printing and bookbinding	Thailand, etc.	• Except periodical publication	High

Source: JICA Survey Team

2.5 Conceptual Plan for Industrial Estate

2.5.1 Future Prospects

At present, public infrastructure are quite insufficient for inviting foreign investors. Therefore, it is necessary to promote foreign investment by establishing an industrial estate that conforms to international standards through sufficient infrastructure, services and incentives. This kind of industrial estate would create a good investment climate to most foreign manufacturers who wish to invest in Vientiane Capital.

2.5.2 Development Framework

The bases of the development framework are listed below:

1) Target year is 2015 for short-term and 2025 for mid-long term.

2) Required industrial estate area is based on the macroeconomic framework, especially on the number of employment, with confirmation by the result of the demand survey.

3) Japanese Guideline for Industrial Estate Planning (JGIEP).

(1) Required Industrial Estate Area based on the Macroeconomic Framework.

Based on the national working population forecast published by the MPI (Socio-Economic Development Report 2006-2007), the JST estimates the employed population for the extension year of 2015 and 2025 as follows:

Table 2.5.1: Forecasted Employed Population

(1,000 persons)

Working Population		2005 (real)	2010	2015	2025
1.	Agriculture	1,810	2,063	2,154	2,190
2.	Industry	210	312	424	730
3.	Services	170	329	481	730
	TOTAL	**2,190**	**2,704**	**3,059**	**3,650**

Source: JICA Survey Team

To distribute the above working population under the industry sector by region, the 2008 MoIC database of registered industries will be adopted where Vientiane Capital, Savannakhet and Champasak respectively share 26%, 9% and 7% of the country's total. Moreover, share of Vientiane Capital will be adjusted and balanced to consider the urbanization growth of other regions.

As a result, the industrial working population (employment) is estimated in Table 2.5.2 below.

Table 2.5.2: Industrial Employment

(1,000 persons)

2010	2015		2025	
80	115	(+35)	179	(+64)

Source: JICA Survey Team

Following the JGIEP, the average required employee per hectare is 81.7 persons. As a result, the additional industrial land required is estimated as shown in Table 2.5.3 below.

Table 2.5.3: Required Additional Industrial Area

(ha; rounded figure)

2015	2025	
430	1,210	(+780)

Source: JICA Survey Team

Considering the current progress on the industrial estate development, the entry to industrial estate ratio was estimated at 20% for the year 2015 and 50% after 2015 to 2025. Considering a factory lot (industrial area) efficiency of 70%, the required industrial estate area is estimated as shown in Table 2.5.4. However, the entry ratio will increase in case the private industrial estate development will be completed before the target year.

Table 2.5.4: Required Additional Industrial Estate Area

(ha)

Industrial Area		2015	2025	
1.	Industrial Area for Industrial Estate (Net)	86	476	(+390)
2.	Area of Industrial Estate(Gross)	123	680	(+557)

Source: JICA Survey Team

(2) Required Industrial Estate Area based on the Result of Demand Survey.

Required industrial estate area based on the result of the demand survey is shown in Table 2.5.5.

Table 2.5.5: Estimated Industrial Park Development Demand

1.	Investment Demand of Japanese Enterprise (based on the survey result)	
	a) No. of surveyed Japanese enterprise	1,248 companies
	b) No. of enterprise interested to invest	34 companies
	c) Ratio of enterprise interested to invest [b/a]	2.7%
	d) Average factory lot based on industrial category from the survey result and JGIEP	1.4 ha
	e) Estimated required factory lot [b x d]	47.6 ha
2.	Estimated Investment Demand for un-surveyed Japanese enterprises	
	f) No. of Japanese enterprise operating abroad Source: Tokyo Keizai, list of overseas invested enterprise	2,640 companies
	g) Estimated ratio of enterprise interested to invest [c x 50%]	1.5%
	h) Estimated no. of enterprise interested to invest [f x g]	40 companies
	i) Estimated required factory lot [h x d]	56 ha
3.	Total estimated required factory lot for Japanese enterprises [e + i]	103.6 ha
4.	Investment Demand of Enterprises Operating in Thailand (based on the survey result)	
	j) No. of enterprise interested to invest	18 companies
	k) Average factory lot based on the industrial category from the survey result and JGIEP	1.3 ha
	l) Estimated required factory lot [j x k]	23.4 ha
5.	Investment Demand of Enterprises Operating in Vietnam (based on the survey result)	
	m) No. of enterprise interested to invest	23 companies
	n) Average factory lot based on the industrial category from the survey result and JGIEP	1.4 ha
	o) Estimated required factory lot [m x n]	32.2 ha
6.	Grand total of estimated required factory lot [3 + l + o]	159.2 ha
7.	Preference of locating in Industrial Park (IP)	
	p) No. of enterprises at least showing their interest in locating in IP based on survey result	58%
	q) Required factory lot for IP [6 x p]	92.3 ha
8.	Estimated Required Industrial Park	
	r) Effective ratio of Factory Lot for Industrial Park Area	70%
	s) Required factory lot for IP [q/r]	131.9 ha

Source: JICA Survey Team

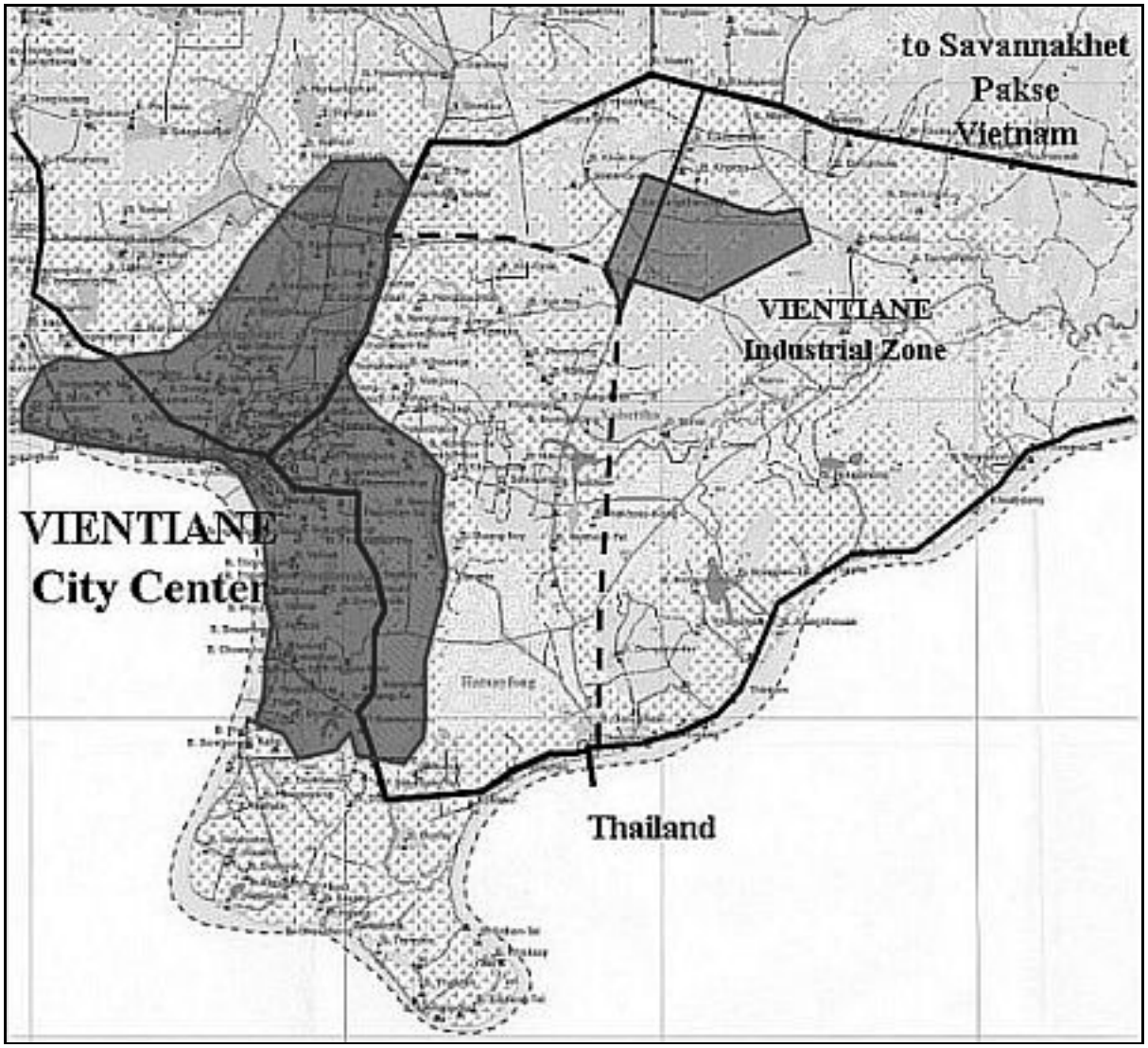
(3) Industrial Estate Development Target

The industrial estate development target by 2015 will be set based on the larger figure estimated from the two methods above. As a result, the rounded target required industrial estate area to be developed is as follows:

2015	2025	
130 ha	690 ha	(+560 ha)

2.5.3 Site Alternative

The site alternative for the Vientiane Industrial Zone development is shown in Figure 2.5.1.



Source: JICA Survey Team

Figure 2.5.1: Site Alternative for Vientiane Industrial Zone Development

The current condition of the alternative is summarized in Table 2.5.6.

Table 2.5.6: Site Alternative for Vientiane Industrial Zone Development

Site Alternative	Vientiane Industrial Zone
1. Location	Located at the junction between 450 Year Road (under construction) and District Road No. 108.
2. Elevation at Entrance	Around 170 m
3. Available Land Area	2,000 ha
4. Current Condition	Mainly forest/green area, agriculture land, water bodies, few residential and some factories.
5. Land Owner	Private
a) Road	Beside 450 Year Road
b) Water Supply	Water supply pipeline is only available at the location of the Sea Game Stadium, which is around 5 km northward from the site.
c) Sewerage	Not available.
d) Solid Waste	Domestic wastewater collection and dumping services were provided by VUDAA. Final treatment plant (dumping site) is located at Km 37 on National Road No.13S, 20 km away from the site.
e) Power Supply	110 kV transmission line and 110/22 kV substation are available inside the site area.
f) Communication	Telecommunication switching station and antenna tower (for mobile phone) are available inside the site area.
6. Development Progress	Around 17 companies already operate inside the site area, without any basic infrastructure provided by the zone developer. The investors just build the factories as they like and without any order. They get the power supply and telecommunication services from supplier/provider. Water supply and wastewater treatment are provided by themselves. The adjoining 450 Year Road will be finished by 2010.

Source: JICA Survey Team

2.5.4 Planned Industrial Estate Development

A Taiwanese developer plans to build an industrial estate in Nonthong Village at Xaythany District, just east side of Vientiane Industrial Zone. A joint agreement on the development was signed between the Ministry of Planning and Investment (MPI) and Nam Wei Development Co. Ltd. on 30th October 2009.

The industrial estate, with total area of 110 ha, will consist of factories, shopping center, trade buildings, vocational institutions, schools, hospital and hotel. The project named "Vientiane Capital Industrial and Trade Area (VITA) Park" will be targeted as a "model industrial and trade area" in the Lao PDR.

Details of the project, including exact development area, are not clear yet. The feasibility study will be conducted in the next stage.

2.5.5 Infrastructure Development Plan

Public infrastructure demands for the industrial zone development in Vientiane are estimated based on the determined development framework (required industrial zone area) and interested industrial sector (investment demand survey result). The preliminary estimation results are summarized below.

Table 2.5.7: Demand Estimation for Vientiane Industrial Zone Development

Demands		2015	2025
Industrial Zone Development Area		130 ha	690 ha
1.	Water Supply (m^3/d)	7,000	58,000
2.	Wastewater (m^3/d)	5,600	46,400
3.	Solid Waste (ton/d)	175	1,500
4.	Power Supply (MW)	28	148
5.	Communication (Mbps)	72	1,010

Source: JICA Survey Team

The infrastructure development concepts to satisfy the above demands are proposed as follows:

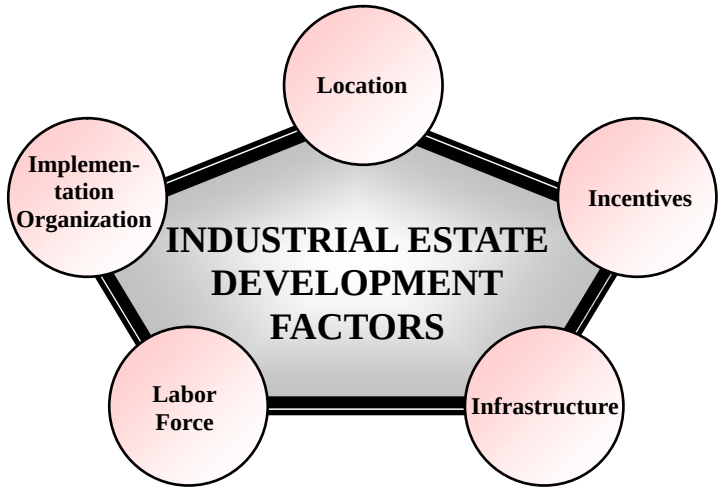
Table 2.5.8: Infrastructure Development Concepts

Sector		2015	2025
1.	Water Supply	Demand of 7,000 m^3/d will be supplied by new treatment plant of Nam Papa. However, it is necessary to expand the pipeline from Sea Game Stadium for about 12 km.	Necessary to construct new treatment plant to supply additional 51,000 m^3/d demand. Vietnamese developer looking forward to expand their business based on the actual consumption demand.
2.	Wastewater	Considering the cost impact and O&M experience, it is currently proposed to be treated by each factory.	In case public wastewater system is established, it is recommended to connect the sewer line of further development area to the public system.
3.	Solid Waste	Effluence of 175 ton/d of solid waste can be treated by UDAA at current disposal site. Each factory should individually conduct preliminary treatment of toxic waste.	Additional 1,325 ton/d of solid waste can also be treated by UDAA at current disposal site. In case the UDAA develop a toxic waste treatment plant, the factory can discuss and make a contract directly.
4.	Power Supply	Initial demand of 28 MW can be supplied from external substation located within Vientiane Industrial Zone by installing additional transformer. However, considering the reliability of the power quantity and quality for the investor, it is recommended to construct own substation.	It is recommended to install internal substation to be operated and managed by EDL which will only supply to Vientiane Industrial Zone.
5.	Communication	The factory/investor will make a contract directly with own favorite service provider. Communication switching station already exists within Vientiane Industrial Zone.	

Source: JICA Survey Team

2.5.6 Evaluation of Investment Climate

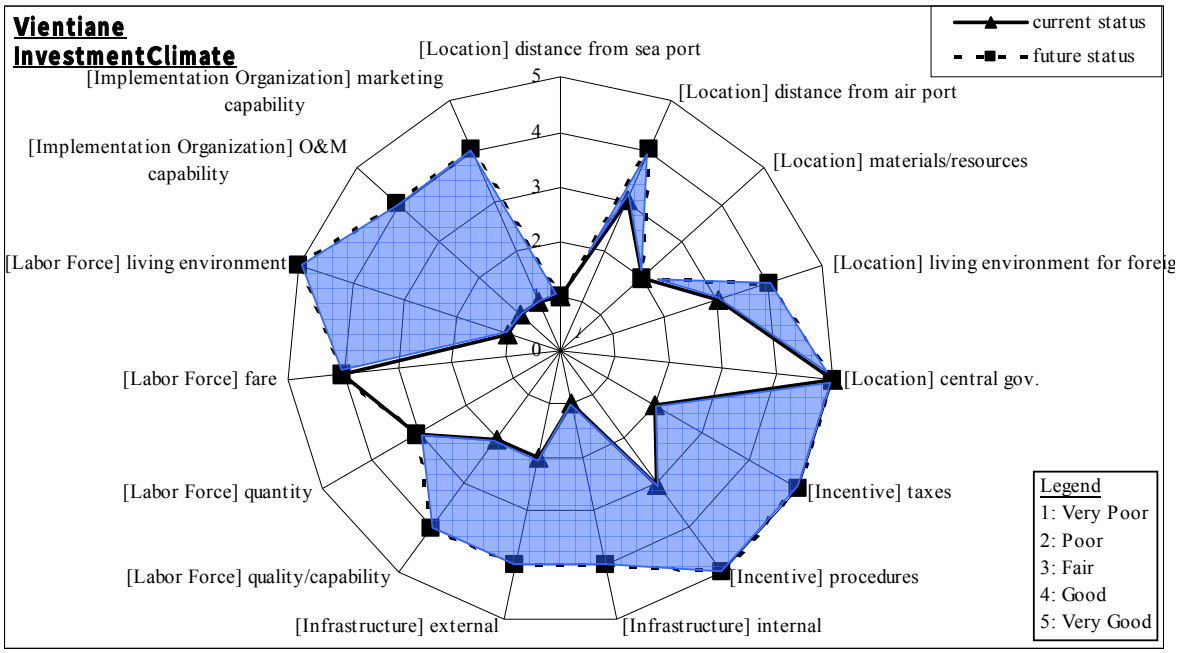
For the prosperity of industrial estate development, there are five factors shown in Figure 2.5.2 which should be considered to create sufficient investment climate to attract investors.



Source: JICA Survey Team

Figure 2.5.2: Industrial Estate Development Factors

The investment climate of Vientiane was evaluated based on the above factors and the result is shown in the following Figure 2.5.3 and Table 2.5.9:



Source: JICA Survey Team

Figure 2.5.3: Evaluation Summary of Investment Climate

Table 2.5.9: Examination Result of Investment Climate

Development Factors		Score		Examination	
		Current	Future	Current	Future
Location	Distance from Seaport	1	1	Currently, cargo volume to Bangkok, Thailand (about 750 km) is larger than to Hai Phong, Vietnam (about 850 km).	No changes
	Distance from Airport	3	4	Most frequent international and domestic flights.	The flight frequency may increase in line with the expansion of the city.
	Materials/ Resources	2	2	Wood and agriculture.	No changes
	Living env. for foreigner	3	4	The best in the Lao PDR.	Many FDI projects, such as city and commercial centers.
	Central Gov. for procedures	5	5	Close access to any government agencies.	No changes.
Incentives	Taxes	2	5	Can enjoy incentive stated in the investment promotion decree. However, it is not very advantageous compared with the neighboring countries such as Thailand and Vietnam.	Vientiane Industrial Zone (VIZ) will have competitive incentives similar or better than the current SEZ decree.
	Procedures	3	5	There is no special procedure for industrial estate. All factories are required to have same procedures.	The procedure can be simplified or shortened based on the proposal by the JICA Study.

Development Factors		Score		Examination	
		Current	Future	Current	Future
Infrastructure	Internal	1	4	15 factories already invest and start operation at VIZ with minimum infrastructure as listed below: Road: unpaved Drainage: nil Water Supply: own Sewerage: own Solid Waste: VUDAA or own Power Supply: EDL Telecommunication: provider	JICA Survey Team proposes sufficient internal infrastructure development plan for the factories/ investors.
	External	2	4	The suppliers will respond based on the request or real (contract) demand. Power Substation and Telecom Switching Station are located within VIZ.	Now and in the future, basic infrastructure in Vientiane will be the best in the nation. No specific infrastructure will be developed especially for VIZ.
Labor Force	Quality/ Capability	2	4	Many vocational centers exist but not many graduates are willing to work for the industrial sector. Turnover ratio is very high compared with neighboring countries.	JICA Survey Team proposes specific Technical Training Center for VIZ/VIP to educate about basic skill and work discipline; the training program will be based on the needs of the factories/investors.
	Quantity	3	3	Almost all of the employees come from the countryside.	The total number of employees including from outskirt area is enough as long as housing and living environment can be provided within or near the work place.
	Fare	1	4	Labor fare is low compared to Thailand.	No reason that labor fare in the Lao PDR will exceed that of Thailand.
	Living env.	1	5	Existing village is bit far from VIZ. Development of housing and living environment is required for sustainable employment and better living standards.	JICA Survey Team proposes to develop VIZ including housing and any supporting function for living, such as commercial, entertainment, health and education.
Implementation Organization	O&M capability	1	4	Current VIZ is under the management of MoIC; however, actual operation is not properly carried out.	JICA Survey Team proposes an implementation institution with better performance.
	Marketing capability	1	4	Not much sales promotion activities.	JICA Survey Team has suggestion for capacity building.

Source: JICA Survey Team

2.5.7 Development Roadmap

(1) Key Success Factor

Based on the observation of present conditions, the following key factors are identified for the successful implementation of the industrial estate development of Vientiane.

(a) Establishment of the Project Management Organization

Specific organization or department for the implementation and management, including sales marketing, of the VIZ should be established under the MoIC to accelerate its development.

(b) Prompt Implementation of the Industrial Estate Development

Development plan, feasibility study, land acquisition, detailed design and construction works shall be conducted for the implementation of the industrial estate.

Selection of strategic location for the stage-wise development of VIZ is also a major factor for its successful launching. Trend of urban development, relevant infrastructure projects and land acquisition issues are necessary to be considered during the selection.

(c) Determination and Recognition by the LAO PDR of VIP as a National Project

To accelerate the implementation and provide the best incentives to the investors, the project is suggested to be determined and recognized as a National Project. Moreover, the development target of VIP should also be determined and differentiated from that of private projects.

(d) Secure Sufficient Labor Force for the Investors

To promote foreign investment, adequate and qualified labor should be secured by providing training facility or service and pleasant housing/living environment for workers.

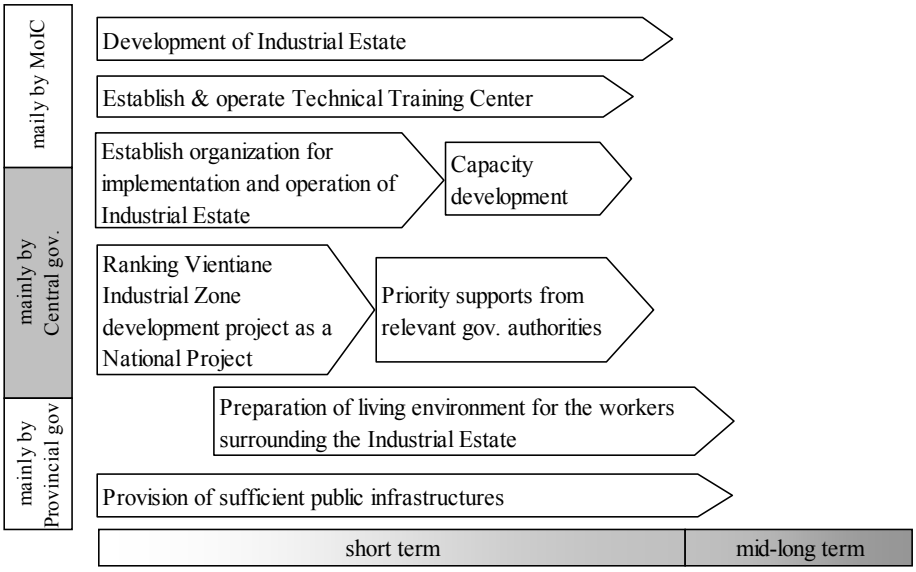
Currently, the working age population in Vientiane Capital and its surroundings is enough for the planned industrialization. However, it is necessary to provide education to cope up with industrialization needs in order to change their lifestyle from agricultural/nature-based to industrial/organizational-based, e.g., keeping time schedule.

(e) Provide the Best Public Infrastructure Services in the Country

In order to create attractive investment environment, excellent services, competitive land prices, and public services such as water supply and sewerage treatment, should be provided with higher priority by the relevant government authorities.

(2) Roadmap

The roadmap to achieve the successful implementation of the Vientiane Industrial Zone development as well as attraction of its investors is summarized in Figure 2.5.4 below.



Source: JICA Survey Team

Figure 2.5.4: Roadmap for Successful Implementation (Vientiane)

CHAPTER 3 INDUSTRIAL ESTATE DEVELOPMENT IN SAVANNAKHET

3.1 General Socioeconomic Conditions

3.1.1 Demography

Table 3.1.1 indicates district population in Savannakhet Province, which occupies 14.6 to 14.7% of the national population, and is the most populous province in the Lao PDR. Population growth rates recorded were 2.1% from 1995 to 2005, and 1.9% from 2005 to 2007. The growth rate from 1995 to 2005 is equivalent to the national rate but from 2005 to 2007 the rate decreased.

Table 3.1.1: Change of District Population in Savannakhet Province

	Population			Percentage Share (%)		
	1995	2005	2007	1995	2005	2007
Savannakhet Province	671,758	825,902	857,581	14.7*	14.7*	14.6*
Kayson Phomvihane	124,896	112,915	115,852	18.6	13.7	13.5
Outthoumphon	69,025	80,516	83,151	10.3	9.7	9.7
Atsaphanghtong	48,743	39,102	40,237	7.3	4.7	4.7
Phin	40,994	50,784	53,276	6.1	6.1	6.2
Sepon	35,731	43,046	44,745	5.3	5.2	5.2
Nong	16,723	21,106	22,157	2.5	2.6	2.6
Thapangthong	24,011	31,497	33,037	3.6	3.8	3.9
Songkhon	81,864	82,461	87,944	12.2	10.0	10.3
Champhon	86,550	101,559	105,774	12.9	12.3	12.3
Xonbouri	34,602	51,472	52,894	5.2	6.2	6.2
Xaibouri	42,936	54,441	55,667	6.4	6.6	6.5
Vilabouri	24,560	30,264	31,822	3.7	3.7	3.7
Atsaphon	41,123	50,448	51,883	6.1	6.1	6.0
Xaiphouthong	-	44,557	46,266	-	5.4	5.4
Phalanxai	-	31,734	32,876	-	3.8	3.8
National Population	4,574,858	5,621,982	5,873,616	-	-	-

Note: Percentage share in national population
Source: Census Report 1995 and 2005, Statistical Yearbook of Savannakhet Province 2008

In 1995, about 18.6% of the provincial population was in Kaisone Phomvihane District. However, in 2005, the percentage dropped to 13.7% because a part of it was divided to Xaiphouthong District. The percentage dropped 0.2% from 2005 to 2007. As a result, percentage share increased in Phin (along National Road No.9) and Songkhon (along National Road No.13).

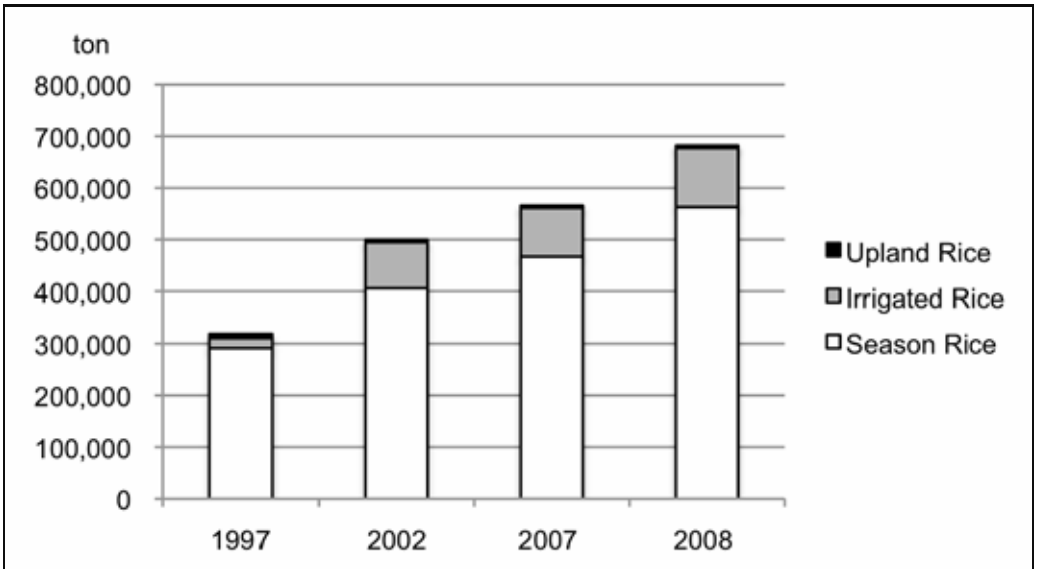
3.1.2 Economy

(1) Industrial Composition

According to provincial statistics, GRDP of Savannakhet Province was estimated to be LAK4.79 trillion in 2007. It accounted for about 10% of GDP. On the other hand, JICA Survey Team (JST) estimated that the province covers 12% of GDP in the same year. Also, the provincial statistics in 2007 reported that percentage shares of industries were 48% for the primary industry, 27% for the secondary industry, and 25% for the tertiary industry.

(2) Agriculture

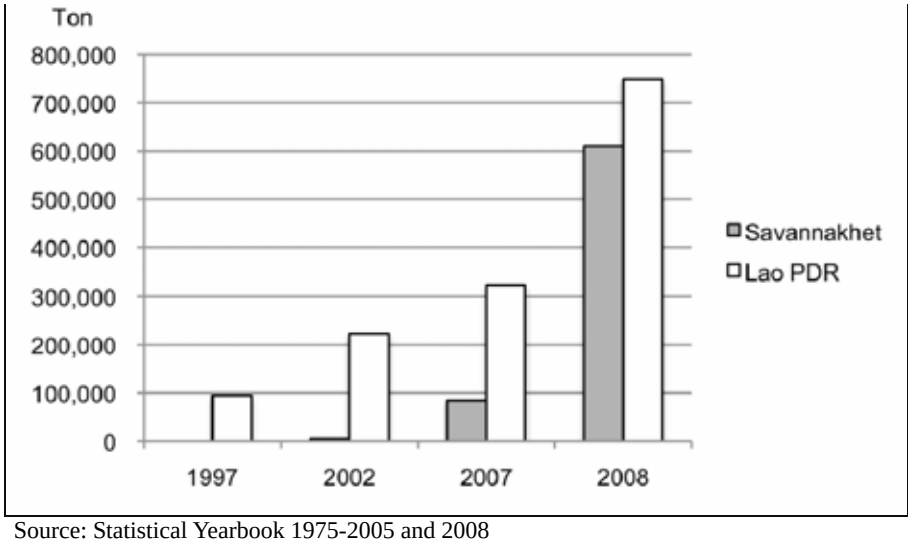
Rice is the most prominent product in the primary industry of Savannakhet Province. Its production covers about 20% of the national production since the 1990s. Since it has wide flatlands all over the province, it has been the primary location for rice production. As indicated in Figure 3.1.1, rice production has increased twice from 1997 to 2008. About 80% of the total rice production comes from season rice, which is harvested once a year during the wet season.



Source: Statistical Yearbook 1975-2005 and 2008

Figure 3.1.1: Change of Rice Production

Another major agricultural product of Savannakhet Province is sugarcane. It accounts for 80% of the total sugarcane production in the Lao PDR. As indicated in Figure 3.1.2, the production has increased rapidly due to a Thai-invested sugar factory along National Road No.13, which started in 2008. Sugarcane production is expected to increase as another sugar factory located along National Road No.9 will start operation soon.



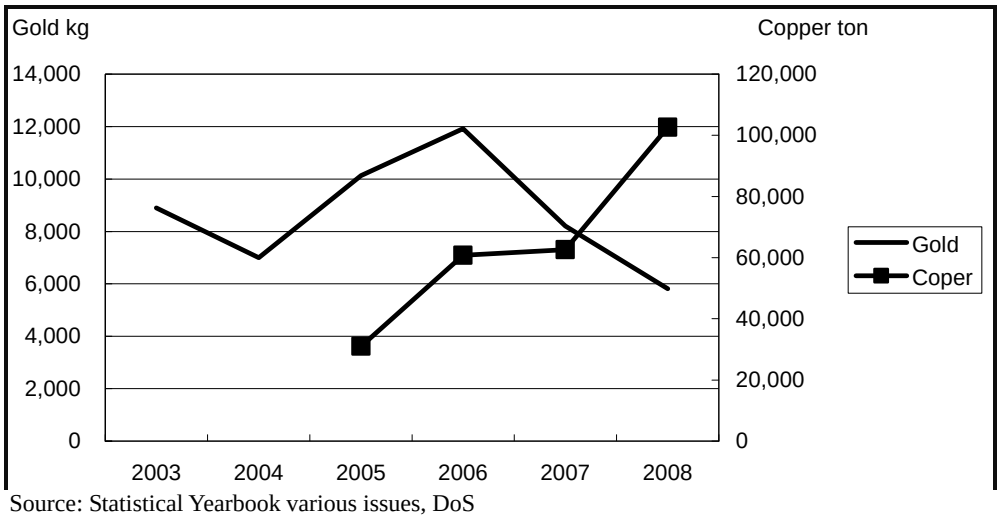
Source: Statistical Yearbook 1975-2005 and 2008

Figure 3.1.2: Production of Sugarcane

(3) Manufacturing and Mining

The most notable secondary industries in the province are gold and copper mining at Sepon Mine, which has contributed to the recent economic development. Production of gold and copper had started in 2003 and 2005, respectively. Figure 3.1.3 indicates production volume of gold and copper from 2003 onwards. Gold production, which started to be included in the Statistical Yearbook in 2003, was recorded to be between 6 to 12 tonnes per year. Since the estimated deposit amount of gold is 46.7 tonnes, these mines will continue to produce the same volume of gold for more than 10 years.

Production of copper at Sepon Mine started in 2005, and the production amount has doubled in 2008 due to the operation at Phu Bia Mine. As well as for gold, copper production in the two mines has been contributing to the rapid economic growth in recent years. Since the deposit amount of copper is 1.7 million tons at Sepon Mine, it will continue to produce the same volume of copper for the subsequent 30 years.

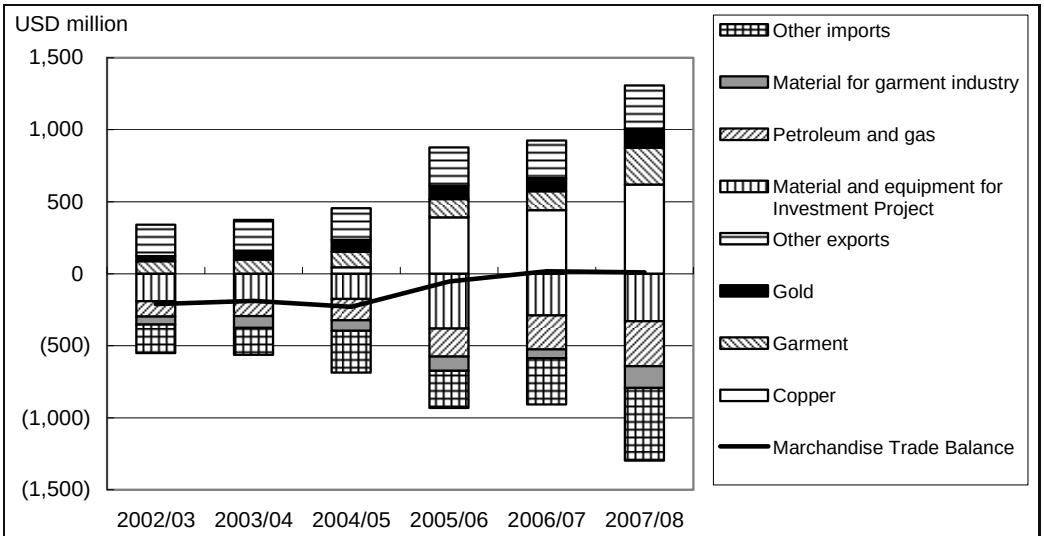


Source: Statistical Yearbook various issues, DoS

Figure 3.1.3: Production of Gold and Copper

Figure 3.1.4 illustrates change in merchandise trade in recent years. The Lao PDR has recorded merchandise trade deficit until FY 2005-2006, but turned to surplus in FY 2006-2007 due to rapid

growth of copper export. Copper production in Sepon Mine contributes to the improvement of trade balance and economic growth.



Source: MoIC

Figure 3.1.4: Merchandise Trade and Its Major Items

Compared with the mining industry, the development for manufacturing is still limited. Table 3.1.2 indicates the number of business enterprises in the secondary industry of Savannakhet Province. Small (Level-3) and medium (Level-2) scale enterprises each comprise 10% of the national total, while the share of large (Level-1) scale enterprise is only 5%. Major industries, where Level-1 and Level-2 enterprises belong, are manufacturers of non-metallic products (ISIC 26, 30 enterprises), fabricated metal products, excluding machinery & equipment (ISIC 28, 8 enterprises), and food and beverages (ISIC 15, 7 enterprises).

Table 3.1.2: Business Enterprises in Savannakhet Province

	Level-1	Level-2	Level-3
Savannakhet Province	19	48	2,474
Lao PDR	380	467	22,817
Share of Savanakhet (%)	5.0	10.3	10.8

Note: Numbers of employee are more than 200 for Level-1, 50 to 199 for Level-2 and 10 to 49 for Level-3.
Source: MoIC

Table 3.1.3: Foreign Direct Investment in Secondary Industry

	Level-1	Level-2	Level-3
Savannakhet Province	5	5	1
Lao PDR	83	82	80
Share of Savanakhet (%)	6.0	6.1	1.3

Note: Numbers of employee are more than 200 for Level-1, 50 to 199 for Level-2 and 10 to 49 for Level-3.
Source: MoIC

Table 3.1.3 indicates Foreign Direct Investment (FDI) in the secondary industry in Savannakhet Province. Percentage shares are 6% each for Level-1 and Level-2, and 1% for Level-3 enterprises. Major industries are the manufactures of wood and cork products, except furniture (ISIC 20, 2 projects). and chemicals and chemical products (ISIC 24, 1 project).

(4) Savan-Seno Special Economic Zone (SEZ)

The Savan-Seno SEZ is set by the Decrees of the Prime Minister (Ref. No. 148/PM, dated 29th September 2003) to promote economic development by use of the East-West Economic Corridor (EWEC). According to the Savan-Seno Special Economic Zone Authority (SEZA), 5.0 km on both sides of NR-9 shall be designated as SEZ if investors propose development plan and is approved. At present, four development sites (Site A, Site B, Site C and Site D) are designated between the Second Friendship Bridge and Seno District by the SEZA. Sites A, C and D, which are included in Kaisone Phomvihane District, are expected to serve as centers for economic activities in the district in the future. As of August 2009, development situations of each site are summarized below.

Site A (270 ha): A Thai investor had a concession contract to develop Site A. The investor will develop Site D as resettlement for residents in Site A, which wil be developed as a commercial activity base. Therefore, construction works have not yet started at Site A. The investor prepares a concept of development plan, consisting of duty-free shops, amusement park, shopping malls, theme parks and medical facilities for medical tourism. Investors for duty-free shops and amusement park are invited, although those for the rest have not yet been found. Hence, Site A will be developed starting from duty-free shops and amusement park.

Site B (20 ha): Site B is managed by SEZA. A joint venture between the Lao PDR, Japan and Thai companies will handle logistics for companies that will invest in Site C.

Site C (230 ha): A Malaysian investor had a concession agreement to develop Site C. The site will be developed for industrial purposes. The Malaysian investor will develop the site into four phases: phase 1 (50 ha), phase 2 (70 ha), phase 3 (60 ha) and phase 4 (50 ha). Land development of phase 1 has already started, and minutes of understanding to start a study for water supply service will be agreed between SEZA and a private company. According to SEZA, some private companies have already decided to enter site C.

Site D (120 ha): In Site D, settlement area for sale, international bus terminals, colleges offering agricultural, business and accounting courses, and a public market will be developed. Construction of 60 houses at resettlement area for the residents in Site A has already started.

Figure 3.1.5, Figure 3.1.6 and Figure 3.1.7 illustrate site development plan of Site A, C and D.

Source: Concessionaire of Site A and D

Figure 3.1.5: Site Development Plan: Site A

Source: Concessionaire of Site C

Figure 3.1.6: Site Development Plan: Site C

Source: Concessionaire of Site A and D

Figure 3.1.7: Site Development Plan: Site D

(4) Service Industry

After the completion of the Second Friendship Bridge in December 2006, many Thai tourists visit Hue and Danang, which are tourist spots in Vietnam, through National Road No.9. As indicated in Table 3.1.4, the number of tourists increased after 2006. However, Kaisone Phomvihane District and Savannakhet Province have not yet developed enough to be distinguished as tourist destinations.

Another commercial activity is wholesale and retail trades. Kaisone Phomvihane works as the center for such commercial activities, and provide service over the entire province.

Table 3.1.4: Major Tourism Statistics of Savannakhet Province in Recent Years

	Unit	2005	2006	2007	2008
Number of Hotels	Units	10	10	13	15
Number of Hotel Rooms	Rooms	380	372	487	1,249
Number of Guesthouse	Units	55	62	68	84
Number of Guesthouse Rooms	Rooms	667	914	1,060	1,508
Number of tourists	Persons	192,560	192,437	323,700	420,809

Source: Statistical Yearbook Savannakhet 2008

(4) Public Finance

Table 3.1.5 indicates Public Investment Program in Savannakhet Province in FY 2006-2007 and FY 2007-2008. Total investment amounts increased from LAK48 billion in FY 2006-2007 to LAK65 billion in FY 2007-2008. Foreign financial source (grant aid and loan) covered only agriculture, public works transport, education, and public health, while the other areas were covered by domestic financial source. However, two-thirds of the total public investment program was financed by foreign source both in FY 2006-2007 and in FY 2007-2008.

Table 3.1.5: Public Investment Program in Savannakhet Province

Unit: LAK million

	2006/07			2007/08		
	Domestic	Foreign	Total	Domestic	Foreign	Total
Agriculture	1,575.2	19,612.2	21,187.4	2,697.1	6,000.0	8,697.1
Industry	1,312.1	0.0	1,312.1	3,104.8	0.0	3,104.8
Public Works and Transport	3,790.5	5,331.8	9,122.3	3,022.5	9,791.9	12,814.4
Education	2,400.6	3,986.5	6,387.1	2,726.5	8,727.1	11,453.6
Public Health	342.1	2,528.6	2,870.7	1,239.3	19,477.5	20,716.8
Culture	1,010.0	0.0	1,010.0	530.0	0.0	530.0
Social Welfare	0.0	0.0	0.0	200.0	0.0	200.0
Dwelling	5,559.9	0.0	5,559.9	6,364.1	0.0	6,364.1
Trade & tourism	10.0	0.0	10.0	415.7	0.0	415.7
Sports	1,000.0	0.0	1,000.0	700.0	0.0	700.0
	17,000.5	31,459.1	48,459.5	21,000.0	43,996.5	64,996.5

Source: Statistical Yearbook Savannakhet Province 2008

3.2 Urban Development Policy in Savannakhet Province

3.2.1 Future Vision

According to the draft final report prepared by JST for "Preparatory Survey on Formulation of Basic Strategies for Regional Core Cities Development in the Lao PDR", Savannakhet Province is envisioned to be:

- An international and regional core city with active exchange of people, goods, and information.
- The crossroad of the EWEC and National Road No.13.
- An attractive place with green, French colonial towns and a sunset view over the Mekong.

In accordance with this vision, the following urban development strategies were also elaborated:

1) Initial Phase (2010-2020)

- Prioritizing industrial promotion in SEZ as a national policy.
- Improving overall image of EWEC with Thailand and Vietnam and promote FDI to SEZ sites.

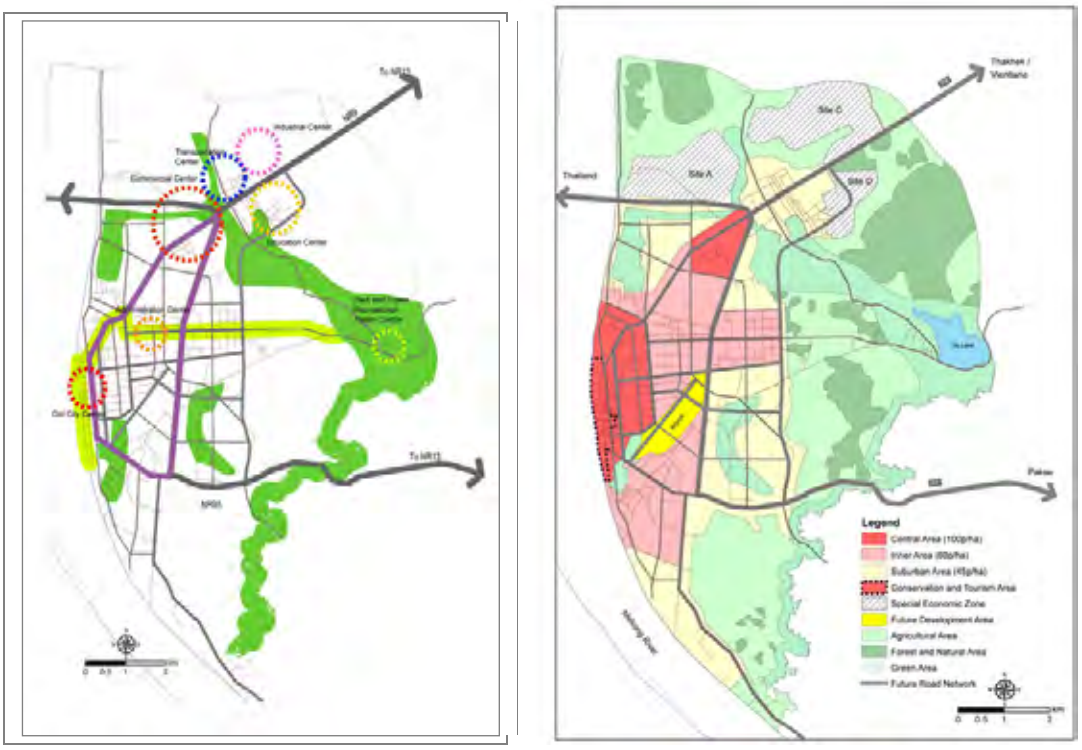
- Upgrading urban function and services (infrastructure, environment, and residences) to cope with socioeconomic issues such as the rapid increase in population and the growing need for infrastructure, logistics service and different public services.

2) Second Phase (Over 2020)

- Expanding support trade to serve industries in SEZ.
- Diversifying economic activities promoting the tertiary industry, particularly tourism.

3.2.2 Urban Development Policy for Land Use in the Future

According to the draft final report prepared by JST for "Preparatory Survey on Formulation of Basic Strategies for Regional Core Cities Development in the Lao PDR", the urban structure and land use concept plans are as shown in Figure 3.2.1.



Source: JICA Survey Team for "Preparatory Survey on Formulation of Basic Strategies for Regional Core Cities Development in the Lao PDR", Draft Final Report

Figure 3.2.1: Proposed Urban Structure and Land Use Concept Plan (Savannakhet Province)

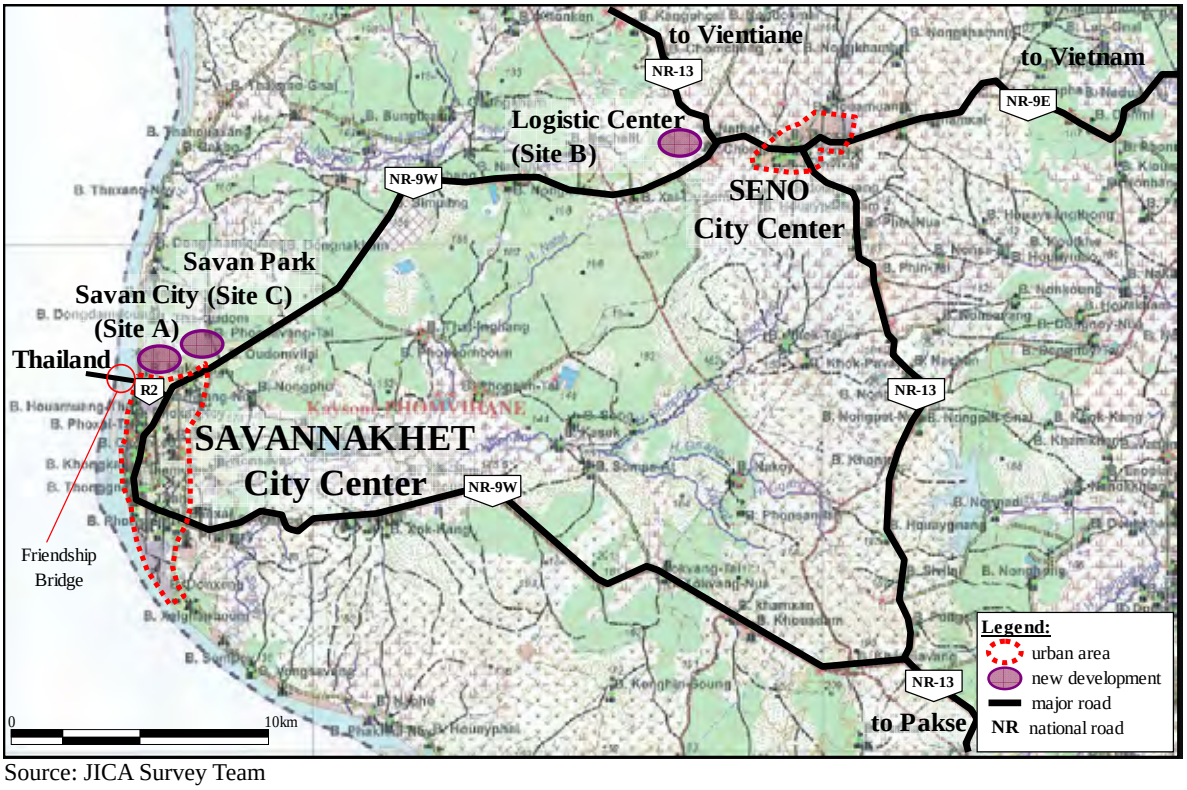
Out of the SEZ sites in Savannakhet Province, Site A, Site D and the greater part of Site C are located in the urban planned area limited by JST for Regional Core Cities Development. SEZ Site C is envisioned to be the main industrial center in Savannakhet Province.

3.3 Existing Infrastructure

3.3.1 Road Network and Transportation

(1) Road Network

Savannakhet Province is located on the west side of National Road No.13 South, which goes through the whole country and connects the cities of Vientiane and Pakse. Going to Savannakhet Province, it is necessary to pass 30 km section of National Road No.9 West . In Savannakhet Province, which is located near the Thailand border and connected by the Mekong- Friendship Bridge as part of EWEC, currently trade and investment attractions have improved gradually.



Source: JICA Survey Team

Figure 3.3.1: Major Road Network

Source: JICA Survey Team

Figure 3.3.2: Current Road Condition of National Road No.13 South (left), National Road No.9 West (center) and National Road No.9 West in City Center (right)

In 2006, the total road length in the province is about 19,970 km, which consists of different road types as listed in Table 3.3.1 below.

Table 3.3.1: Road Length by Type of Pavement (2006)

Road Type		Length	Coverage Ratio
1.	Concrete Road	41 km	0.2 %
2.	Tar Road	1,840 km	9.2 %
3.	Gravel Road	4,805 km	24.1 %
4.	Earth Road	13,064 km	65.4 %
5.	Asphalt Road	218 km	1.1 %
TOTAL		19,968 km	100.0 %

Source: DPI Savannakhet

(2) Public Transportation

Bus is the common public transportation within the province and most people are using tuk-tuk (auto rickshaw) for short distance transportation especially within the urban area.

Savannakhet Province has its main bus station located in Kaisone Phomvihane for long distance transport, and no city bus terminals. Interregional and international bus transportation is available every hour.

(3) Airways Transportation

Outline of the Savannakhet Airport is shown Table 3.3.2.

Table 3.3.2: Outline of Savannakhet Airport

1.	Direction and distance from the city	Northeast 1.5 km
2.	Type of traffic permitted	IFR/VFR
3.	Hangar space/repair facilities for visiting ACFT	NIL
4.	Runway	1,633 m x 38 m
5.	Helicopter landing area	NIL

Source: JICA Survey Team

Current flight schedule is shown in the Table 3.3.3.

Table 3.3.3: Flight Schedule (2009)

Destination		Type	Frequency
1.	Vientiane	domestic	3 days/week 2 flights/day
2.	Pakse	domestic	3 days/week 2 flights/day
3.	Bangkok (Thailand)	international	3 days/week 2 flights/day

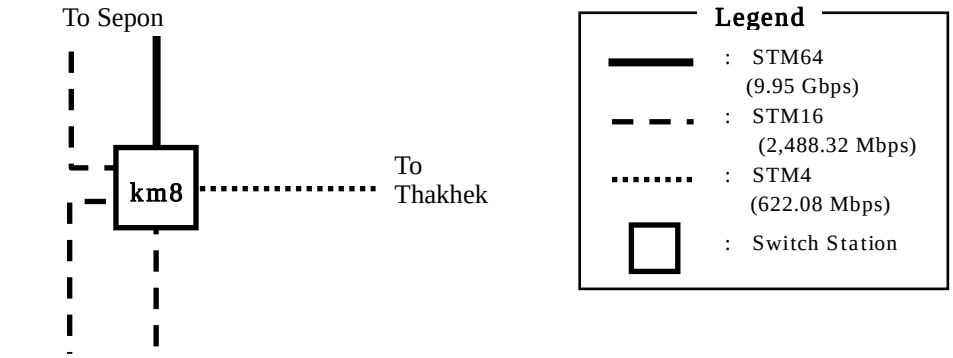
Source: LAO Airways

In 2007, Savannakhet and Mukdahan agreed to renovate their airports into international airports, and the study for runway expansion for serving medium flights was undertaken supported by the Government of Japan.

3.3.2 Telecommunication

(1) Trunk Line Network System

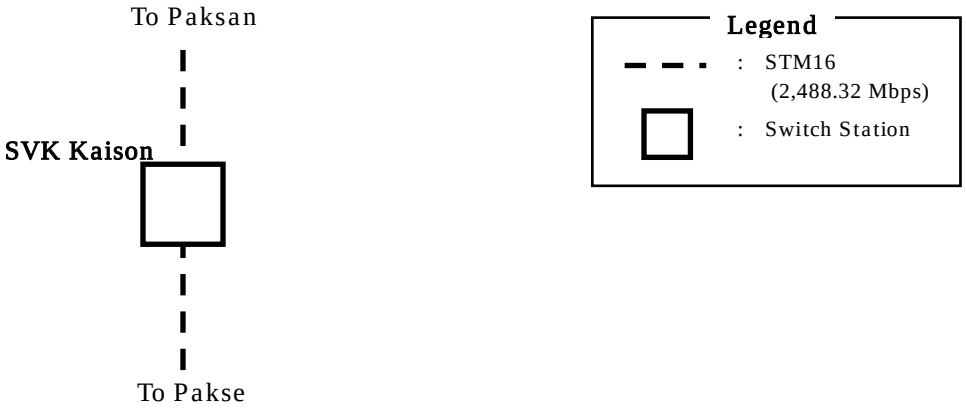
Trunk line diagram of ETL surrounding Savannakhet District is shown in Figure 3.3.3. Km 8 is the main switch station located in downtown Savannakhet District. The main trunk line of Km 8 station is connected with STM 64 (9.95 Gbps) from Vientiane by means of optical fiber cable.



Source: JICA Survey Team

Figure 3.3.3: Trunk Line Diagram of ETL in the Surrounding Area of Savannakhet District

Trunk line diagram of Lao Telecom surrounding Savannakhet District is shown in Figure 3.3.4. SVK Kaison is the main switch station located in downtown Savannakhet District. The trunk line of SVK Kaison station is connected with STM16 (2.49 Gbps) by means of optical fiber cables and microwave system. The branch line is connected to SVK Kaison station via star configuration.



Source: JICA Survey Team

Figure 3.3.4: Trunk Line Diagram of Lao Telecom in the Surrounding Area of Savannakhet District

(2) Present Status of Telecommunication

Transmission in fixed phone lines between the switch station and customers channels through metallic cables. Internet service between switch station and customers is transmitted through metallic cable, optical fiber cable, and wireless LAN.

The existing internet service in the surrounding area of Savannakhet District is shown in Table 3.3.4. Optical fiber cables provide faster and more reliable internet connection. However, cost for internet connection is very expensive.

As for cell phone services, since base stations are maintained extensively, mobile phones can be used in most low-land sites.

Table 3.3.4: Internet Service in the Surrounding Area of Savannakhet District

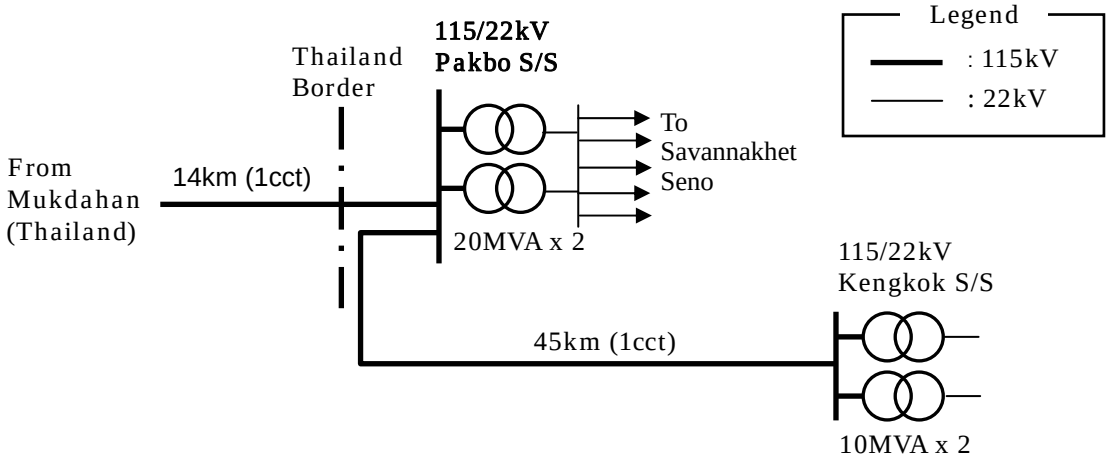
Item	Description			Remarks
1. ETL				
(1) ADSL	128/64 Kbps	:	LAK950,000 per month	Minimum Speed
	1,536/512 Kbps	:	LAK4,450,000 per month	Maximum Speed
(2) Leased Line	128 Kbps	:	LAK4,500,000 per month	Minimum Speed
(Optical Fiber)	2,048 Kbps	:	LAK21,400,000 per month	Maximum Speed
(3) Wireless LAN	64-256 Kbps	:	LAK450,000 per month	
2. Lao Telecom				
(1) ADSL	128/64 Kbps	:	LAK300,000 per month	Minimum Speed
	2 Mbps/512 Kbps	:	LAK3,000,000 per month	Maximum Speed
(2) Wireless LAN	11-54 Mbps	:	LAK5,000 per hour	

Source: ETL, Lao Telecom

3.3.3 Power Supply

(1) Power Grid System

Power grid system in Savannakhet Province is shown in Figure 3.3.5. Savannakhet Province has no power plant and also the 115 kV national power grid from northern and southern regions are not connected at present. Power transmission in the province is imported from Thailand through a 115 kV power grid. Construction of the 115 kV national power grid between Thakhek and Savannakhet has started and will be completed by 2011.



Source: JICA Survey Team

Figure 3.3.5: Power Grid System in Savannakhet Province

(2) Power Supply System

The existing 115/22 kV substation for the surrounding area of Savannakhet District is shown in Table 3.3.5. The power to said surrounding area is supplied by means of 22 kV distribution lines from 115/22 kV Pakbo Substation. As for the surrounding area of industrial zones, the 22 kV distribution lines are connected.

However, since the number of tenants will be increased favorably, the existing 22 kV distribution lines will not meet the load demands in the near future. Also, the transformer capacity of existing substations will become insufficient.

Table 3.3.5: Existing 115/22kV Substation for the Surrounding Area of Savannakhet District

Name of Substation	Description	Remarks
1. 115/22 kV Pakbo Substation	Transformer : 20 MVA × 2 Peak Demand : 26.5 MW	Power source of all industrial zone

Source: EDL

3.3.4 Water Supply

(1) Water Supply

Nam Papa Savannakhet (NPS) is responsible for supplying drinking water to the 15 districts in Savannakhet Province. At present, NPS supplies water only to six districts, including Kaisone Phomvihan District with a service ratio of 58% and Outhoumphone District with 60%.

The present conditions and water demand forecast for Kaisone Phomvihan District, which is the provincial capital, are presented in Table 3.3.6 and Figure 3.3.6, respectively. The existing Nake WTP, which sources water from the Mekong River, has a capacity of 15,000 m^3/d as shown in Figure 3.3.6. The Nake WTP system covers only Savannakhet's urban areas in Kaisone Phomvihan District.

Table 3.3.6: Present Conditions and Water Demand Projection in Kaisone Phomvihan District

Item		Unit	2000*	2003*	2012
1	Population in Savannakhet Province	Persons	757,951	813,044	1,024,331
	Population in Khantabouly District	Persons	101,454	108,830	137,112
	Growth Rate	%	2.9	2.5	2.6
2	Population in Urban Savannakhet	Persons	58,061	61,541	76,931
3	Number of Connection	Households	9,109	9,964	14,164
4	Population Served	Persons	57,387	62,773	89,233
5	Service Ratio in the District	%	56.6	57.7	65.1
6	Ave. Daily Demand	m^3/d	12,124	15,070	21,751
	Max. Daily Demand	m^3/d	15,400	23,522	29,001
	Unit Water Demand	Lpcd	211	240	244
7	Ave. Daily Consumption	m^3/d	9,942	12,362	17,400
	Ave. Daily Consumption per Capita	Lpcd	173	197	195
8	Ratio of Accounted Water	%	82	82	80
9	Production Capacity	m^3/d	12,000	15,000	15,000
10	Max. Ratio of Operation	%	128	157	193

Source: WASA * Actual Data

Water source of Outhuomphone District, especially Seno's urban area, comes from groundwater. NPS supplies water with boreholes to Urban Seno. Water supply conditions in 2008 are summarized in Table 3.3.7.

Table 3.3.7: Present Water Supply Conditions in Outhoumphone District

Item		2008
1	Water Source	Groundwater
	Number of Boreholes	49 wells in total (30 wells in use)
	Water Quality	Good (well depth < 50 m), Salinity (well depth > 50 m)
	Ave. Daily Production	1,351 m^3/d
2	Population	
	Utumpone District	83,152 persons
	Urban Seno	20,219 persons
3	Service Indicators	
	Number of Meter Connection	1,690 in total (Industrial: 30, Commercial: 628, Institutional: 196)
	Service Area	7 villages with an area of 17 km^2
	Service Coverage Ratio	60%
	Ave. Daily Consumption per Capita	185 lpcd
	Ave. Water Tariff	LAK 1.377 per m^3
4	Efficiency Indicators	
	UFW Ratio	27.1%
	Unit Production Cost	LAK 1.101 per m^3
	Account Receivable	3 months
	Staff per 1000 Connections	10.2 persons

Source: Savannakhet Water Supply State-owned enterprise

Although the rate of water service pervasion of NPS was found to be 100% in the urban area, the present water supply and distribution development of Nam Papa is still insufficient due to the rapid growth of population surrounding the urban area. Especially, Kaisone Phomvihan District and Outhuomphone District has been faced chronically with lack of drinking water supply as compared with demand. NPS charges for water properly with a collection ratio of more than 90% and the ratio of accounted-for water to the total supply is estimated to be less than 30%.

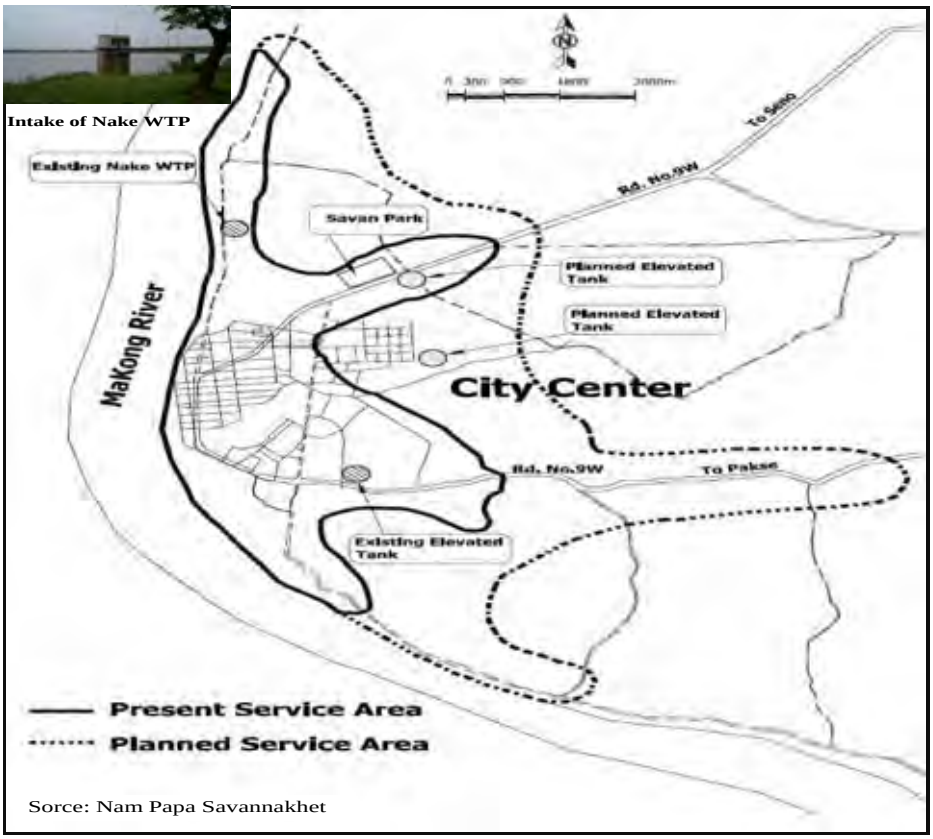


Figure 3.3.6: Present and Future Service Area in Savannakhet's Urban Area

Considering the aforementioned water supply conditions of NPS, SASEZ intends to develop a new water source and supply network for SASEZ using PFI. Petaling Jaya DKLS Industry Bhd. Company (Malaysia) was selected to implement the water supply improvement in Savannakhet's urban area. Consequently, an MOU was officially concluded between DKLS and Savannakhet Province on the 13th of July 2009. Water supply improvement in said urban area is planned as follows:

- Enlargement of capacity of Nake WTP from 15,000 m^3/d up to 22,000 m^3/d by 2011: supplied mainly to Phase I of Savan Park
- Construction of new WTP upstream of Nake WTP with a capacity of 30,000 m^3/d from 2011 to 2018: supplied to Phases II and III of Savan Park and NPS's service area (refer to Figure 3.3.6)
- Expansion of new WTP with a capacity of 60,000 m^3/d in the future, to supply Savan-Seno SEZ and the service area of NPS.

Privately funded water supply development project may not be able to set water charges freely since water tariff is determined by Savannakhet Province.

Water tariff for domestic use and non-domestic use is determined by NPS respectively as follows:

Table 3.3.8: Water Tariff

Category	Water Consumption (m^3)	Water Tariff (USD/m^3)
Domestic Use	0 to 30	0.10
	31 to 40	0.16
Non-Domestic Use	Institutions	0.25
	Business	0.30
	Ice Producing	0.35

Source: Lao Water Supply Enterprise (2006)

Revenue and expenditure of NPS for the past five years is shown in Table 3.3.9.

Table 3.3.9: Service Condition of NPS

Indicators	Unit	2003	2004	2005	2006	2007
Turnover	Million LAK	2,922	3,821	5,018	7,191	7,851
Operating Costs	Million LAK	2,765	3,164	4,358	5,041	5,727
Net Operating Income	Million LAK	157	657	660	2,150	2,124

Source: NPS and WASA

3.3.5 Drainage and Sewerage Systems

Storm water in Savannakhet's urban area and its surrounding is conveyed to the drainage system of National Road No.9 and the Mekong River ecosystem. The national road drainage system has more than two years return period of flood in principal. It is supposed that bank protection of the Mekong River is to be more than ten years return period of flood and its tributary rivers are to be five years return period of flood. Combined sewer system is adopted for collection of storm and wastewater.

Domestic and commercial wastewater excluding sewage are discharged directly to the Mekong River ecosystem through the existing road drainage system. Sewage is treated either in individual septic tanks or discharged directly to road drainage without proper treatment. Industrial wastewater is treated by individual on-site treatment plants in accordance with the Industrial Effluent Standard (Decree No.326/IH, October 6, 2005).

Savannakhet Urban Development and Administration Authority (UDAA) is responsible for the operation and maintenance (O&M) of individual wastewater treatment facilities. However, there are

still concerns that individual treatment facilities are not functioning accordingly due to lack of appropriate O&M and monitoring. It is recommended that a wastewater management system for O&M and monitoring be established properly and a public wastewater treatment system be planned and implemented in urban areas to preserve the Mekong River ecosystem living conditions.

Savan Park includes a plan requiring each factory to provide an individual wastewater treatment plant to meet the requirements for industrial wastewater quality and natural environment conservation.

3.3.6 Urban Sanitation

(1) Urban Development and Administration Authority (UDAA)

In Savannakhet Province, UDAA is responsible for the collection and disposal of solid waste and O&M of individual septic tanks under the tutelage of the Ministry of Public Works and Transport (MPWT).

UDAA owns two dump trucks, a compactor, and two containers for garbage collection and transport in Kaisone District. UDAA collects garbage usually eight times a month, and in schools and markets wastes are collected 15 times a month. However, only 62% of the total solid waste is generated in Kaisone and UDAA collects only 25 to 30 tons per day at present. Garbage collection fees of UDAA are summarized below:

Table 3.3.10: Garbage Collection Fee

Category	Fee
Domestic Solid Waste of Low Income Household	LAK6,000 – 10,000 per month
Domestic Solid Waste of High Income Household	LAK10,000 – 550,000 per month
Commercial/Industrial Solid Waste	LAK10,000 – 550,000 per month

Source: UDAA

Industrial waste generated in Savan Park is collected by Savannakhet UDAA and disposed in the sanitary landfill of said authority.

(2) Sanitary Landfill Savannakhet

The sanitary landfill for final disposal of solid waste, located at Ban Xok-Kang which is about 15 km southeast from Savannakhet's urban area, is managed by the Savannakhet UDAA as shown in Figure 3.3.7. Outline of the sanitary landfill site is summarized below:

- Location: located at Ban Xok-Kang Village
- Distance: about 15 km northward from Kaisone Urban Center along the National Road No.9
- Type of Final Disposal: Sanitary landfill with 30 cm of soil cover (established in 1997)
- Total Area: 16.0 ha (0.5 ha with depth of 2.0 m under operation)
- Workshop: one (1) unit without track scale (refer to Figure 3.3.7)

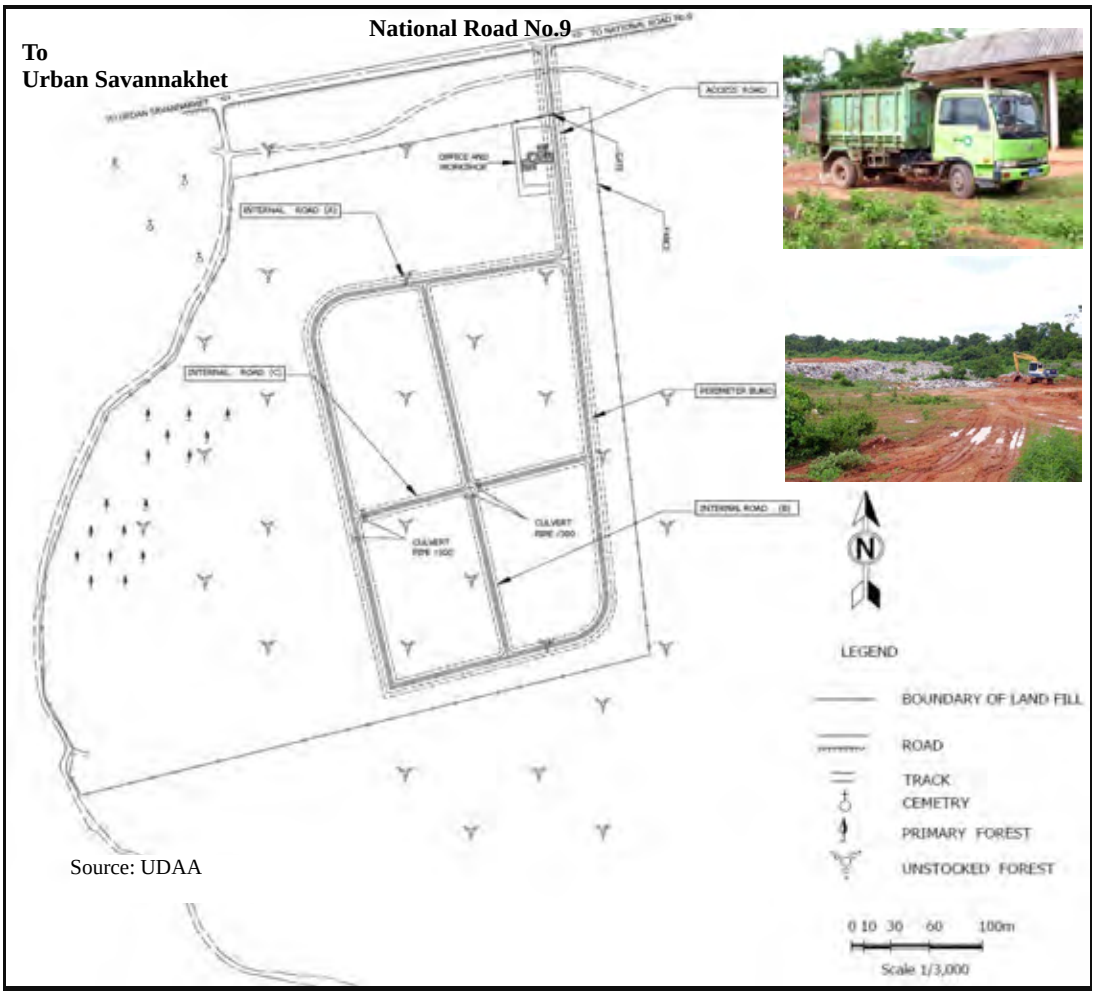


Figure 3.3.7: Layout of Sanitary Landfill

3.4 Industrial Location

3.4.1 Existing Industrial Location

Savannakhet Province has an industrial potential under the presence of rich mineral and agriculture resources as well as the access via EWEC. In fact, implementation of the Savan-Seno SEZ development project has started in this province. Rich mineral resources have initiated provision of copper smelting and cement manufacturing industries in the province. Two Thai sugar companies invested in the project of sugar cane plantation in large concession areas and sugar factories. In addition, clothing apparel and motorbike assembly industries are located in and around the urban area.

Factories are divided into large-scale factories (Level-1), medium-scale factories (Level-2) and small-scale factories (Level-3). There are 19 Level-1 factories in the province, accounting for 2% of the total Level-1 factories in the country.

Table 3.4.1: Existing Factories in Savannakhet

ISIC Rev.3	Activity	No. of Factory			
		Level-1	Level-2	Level-3	Total
15	Manufacture of food products & beverages	3	4	2,056	2,063
16	Manufacture of tobacco products	1		1	2
18	Manufacture of wearing apparel; dressing and dyeing of fur	1		23	24
20	Manufacture of wood and of products of wood & cork, except furniture; of articles of straw and plaiting materials	2	3	3	8
22	Publishing, printing, and reproduction of recorded media	1	1	1	3
24	Manufacture of chemicals and chemical products	1		5	6
25	Manufacture of rubber & plastics products	2	2		4
26	Manufacture of other non-metallic mineral products	3	27	77	107
27	Manufacture of basic metals	1			1
28	Manufacture of fabricated metal products, except machinery & equipment	2	6	18	26
32	Manufacture of raido, television and communication equipment & apparatus	1			1
34	Manufacture of motor vehicle, trailers and semi-trailers	1	1		2
	Others	-	4	290	294
	Total	19	48	2,474	2,541

Remark: This is the latest of data of year 2008

Note: Level-1: "more than 200 labors" or "more than 200 horsepower of machine" or "high environmental impact"
Level-2: "51-200 labors" or "51-200 horsepower of machine" or "medium environmental impact"
Level-3: "10-50 labors" or "5-50 horsepower of machine" or "low environmental impact"
Source: MoIC

3.4.2 Potential Industrial Location

In the future, it is expected that "*mineral resource-oriented industries"* be diversified into "*related industries"*. "*Mineral resource-oriented industries"*, like metal smelting, are required to be located those close to sources of mines. There is a potential for the development of "*related industries"*, such as manufacturing copper cable, glass, wire harness, connectors, transformers, agriculture machine, and construction materials.

Depending on the oil price trend, the following are the potentials of bio-industry for the aforementioned sugar factories:

- Bio-ethanol production from molasses, which is a byproduct of sugar refining
- Boiler and power generation from bagasse, which is extracted from sugar cane residue.
- Particle board made from bagasse and adhesive

Technology transfer is easy since Thai sugar companies, which invested in projects in Savannakhet Province, have already been manufacturing such products in Thailand. Because the projects of the aforementioned industries could decrease the rapid effect of global warming, they are recommended provided that there is economic efficiency.

The following table provides examples of potential industries to be invited to invest in Savannaket Province.

Table 3.4.2: Potential Industries in Savannakhet Province

Category	Product	Market	Location Factor	Potential
Apparel	Working wear, uniform, and dress shirt (apparels with little design changes)	Medium & low grade market (USA, EU, Japan)	• Labor-intensive, export-oriented, GSP • Sewing technique • Auxiliary materials (button, and fastener)	Medium
	Lice: dress, underwear, table cloth, certain	Medium & low grade market (USA, EU, Japan)	• Labor-intensive • Enhancing mechanization • Knitting and sewing technique	Medium
	Bed linen	Japan	• Labor-intensive • Sewing technique	Medium
	Rubber glove	Japan	• Mechanized in Japan	Medium
Transport Machine	Wire harness	Automobile industry in Thailand and motorbike industry	• Labor-intensive • Access to assembly factories • Parts manufacturing and assembling	Medium
	Connector			Medium
Electrical Machine	Wire harness	Electric appliances, office equipment, etc mainly in Thailand and Vietnam	• Labor-intensive • Parts manufacturing and assembling	Medium
	Connector, transformer, coil, wiring accessories			Medium
	Printed-circuit board		• Footloose industry	Medium
Steel products	Nail, bolt and nut	Thailand and neighboring countries	• International standard goods	Medium
Non-ferrous metal products	Electric cable	Domestic market, Thailand and neighboring countries	• Close to a copper smelter • Power consuming • Male workers • Various kinds of product • Growing demand for power-line	High
	Copper smelting	Export and local affiliated enterprises	• Adjacent to a copper mine • Power consuming	High
	Silicon smelting	Japan and other export market	• Adjacent to a silica rock mine • Power consuming • Growing demand	Medium
Agriculture -related	Beverage: beer and other alcoholic beverage, soft-drink	Mainly for domestic market	• Agricultural products • Large amount of quality water	Medium
	Sugar, coffee, dry vegetable, frozen foods (vegetable, fruits, cooked food, etc.)	Export	• Stable supply and large amount of agriculture products • Homogeneous agriculture products • Freezing and cold storage facilities will give business opportunities and contribute to price stabilization • Power consuming for freezing and cold storage	Medium
	Containers, glass bottle, etc.	Containers for beverage for domestic market	• Close to a market • Reusable bottle, recycle • Power consuming	High
	Bio-ethanol	Alternative automobile fuel	• High potential when byproduct of sugar factories is used as raw material • When cassava is used as raw material, consider the impact on feedstuff production • Potential of cane complex in sugar factories	High

Category	Product	Market	Location Factor	Potential
Agriculture -related	Bio-diesel	Alternative automobile fuel	• Bottleneck is acquisition of cultivation land for oil-plant	Medium
	Organic fertilizer	Domestic	• Presence of raw material such as agriculture waste, compost and leaf mold	Medium
	Latex processing	Export	• Cultivation of rubber	Medium
Miscellaneous daily products	Mass productive umbrella	Japan, South Korea, Taiwan, etc.	• Labor-intensive	Medium
	Flypaper	Mainly for China	• Bangkok based Japanese enterprises	Medium
	Wig, stuffed doll	Japan, South Korea,	• Hand-sewn wig for Japan	Medium
Others	Bicycle	USA, EU, Japan, etc.	• Transport cost is critical • Assembly of imported parts • If GSP is applicable, high possibility	Medium
	Cement	Domestic and export	• Close to raw materials • Close to a market	High
	Construction materials	Domestic and export	• Close to raw materials such as gypsum • Electric power	High
	Molded plastic products	Domestic	• Import plastic resin (pellet) • Sheet, jumbo bag for vegetable, feedstuff, etc., container	Medium
	Leather shoes	USA, EU, Japan, etc.	• Labor-intensive • Imported materials	Medium
	Knockdown furniture, woodworking, etc.	USA, EU, Japan, etc.	• Presence of raw materials	Medium

Source: JICA Survey Team

3.5 Conceptual Plan for Industrial Estate

3.5.1 Future Prospects

Infrastructure development is different for "*resource-oriented industries"* and "*related industries"*. Most factories in "*the resource-oriented industries"* are located independently. In contrast, most factories in "*the related industries"* can be located in industrial estates.

Therefore, the industrial estate development is effective in inviting foreign investors for "*the related industries"*. In particular, an industrial estate with various incentives seems to have a strong driving force to invite "*related industries"*. The Savan Park project is a good example for this kind of estate.

In this province, industrial development will increase its potential through links with the existing industry and ports in Thailand. However, there is a concern on the emergence of competing areas, such an industrial estate has been built at Lao Bao (Vietnam) close to the border with the Lao PDR; and the construction of the third friendship bridge project has started between Thakhek and Nakhon Phanom.

3.5.2 Development Framework

Basis of the development framework are listed below:

1) Target years of 2015 for short-term and 2025 for mid-long term.
2) Required area for industrial estate based on the macro economic framework, especially the employment number, with confirmation of the results of the demand survey.
3) Japanese Guideline for Industrial Estate Planning (JGIEP).

(1) Required Industrial Estate Area based on the Marco Economic Framework.

Based on the national working population forecast published by MPI (Socio-Economic Development Report 2006-2007), JST estimates the working population for years 2015 and 2025 as shown in Table 3.5.1.

Table 3.5.1: Forecasted Employed Population

(1,000 population)

Working Population		2005 (real)	2010	2015	2025
1.	Agriculture	1,810	2,063	2,154	2,190
2.	Industry	210	312	424	730
3.	Services	170	329	481	730
TOTAL		**2,190**	**2,704**	**3,059**	**3,650**

Source: JICA Survey Team

As a result, the estimated industrial working population is as shown in Table 3.5.2.

Table 3.5.2: Industrial Employment

(1,000 population)

2010	2015		2025	
28	38	(+10)	66	(+28)

Source: JICA Survey Team

Following JGIEP, the average required employee per hectare is 81.7 persons. As a result, the estimated additional industrial land required is defined in Table 3.5.3.

Table 3.5.3: Required Additional Industrial Area

(ha; rounded figure)

2015	2025	
120	460	(+340)

Source: JICA Survey Team

Considering the current progress on the industrial estate development, the ratio of those that will enter the industrial estate was estimated to be 60% for the year 2015 and 80% for the year 2025. Considering an industrial area efficiency of 70%, the required area for estates is estimated as shown in Table 3.5.4.

Table 3.5.4: Required Additional Industrial Estate Area

(ha)

Industrial Area		2015	2025	
1.	Industrial Area for Industrial Estate	72	344	(+272)
2.	Area of Industrial Estate	103	492	(+389)

Source: JICA Survey Team

(2) Required Industrial Estate Area based on the result of Demand Survey.

The required area for the industrial estate based on the result of demand survey is shown in Table 3.5.5.

Table 3.5.5: Estimated Industrial Park Development Demand

1.	Investment Demand of Japanese Enterprise (based on survey results)	
	a) Nos. of surveyed Japanese enterprises	1,248 companies
	b) Nos. of enterprise interested to invest	4 companies
	c) Ratio of enterprise interested to invest [b/a]	0.3%
	d) Average factory lot based on the industrial category as the survey result and JGIEP	3.0 ha
	e) Estimated required factory lot [b x d]	12.0 ha
2.	Estimated Investment Demand for Non-surveyed Japanese Enterprises	
	f) Nos. of Japanese enterprises operated abroad Source: Tokyo Keizai, list of overseas invested enterprise	2,640 companies
	g) Estimated ratio of enterprise interested to invest [c x50%]	0.2%
	h) Estimated no. of enterprise interested to invest [f x g]	5 companies
	i) Estimated required factory lot [h x d]	15.0 ha
3.	Total Estimated Required Factory Lot for Japanese Enterprises [e + i]	27.0 ha
4.	Investment Demand of Enterprises Operated in Thailand (based on survey results)	
	j) Nos. of enterprise interested to invest	14 companies
	k) Average factory lot based on the industrial category as the survey result and JGIEP	1.3 ha
	l) Estimated required factory lot [j x k]	18.2 ha
5.	Investment Demand of Enterprises Operated in Vietnam (based on survey results)	
	m) Nos. of enterprise interested to invest	2 companies
	n) Average factory lot based on the industrial category as the survey result and JGIEP	1.0 ha
	o) Estimated required factory lot [m x n]	2.0 ha
6.	Ground Total of Estimated Required Factory Lot [3 + l + o]	47.2 ha
7.	Preference for locating the Industrial Park (IP)	
	p) Nos. of enterprises at least showing their interest in locating in IP based on survey result	58%
	q) Required factory lot for IP [6 x p]	27.4 ha
8.	Estimated Required Industrial Park	
	r) Effective ratio for Industrial Park Area for Factory Lot	70%
	s) Required factory lot for IP [q/r]	39.1 ha

Source: JICA Survey Team

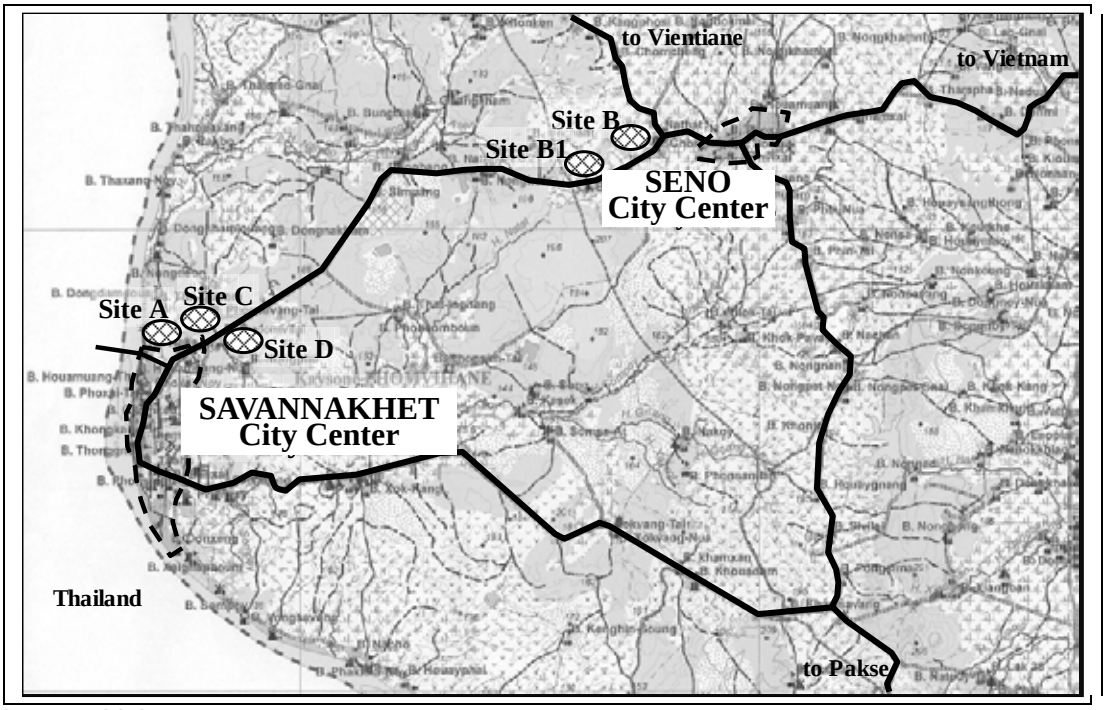
(3) Industrial Estate Development Target

Industrial estate development target by 2015 will be settled based on the larger figure estimated from the two said methods. As a result, the rounded required target area to be developed for the industrial estate is shown below.

2015	2025	
100 ha	490 ha	(+390 ha)

3.5.3 Site Alternatives

Site alternatives for Savannakhet Industrial Zone development are shown in Figure 3.5.1.



Source: JICA Survey Team

Figure 3.5.1: Site Alternatives for Savannakhet Industrial Zone Development

The current conditions of site alternatives are summarized in Table 3.5.6.

Table 3.5.6: Site Alternatives for Savannakhet Industrial Zone Development

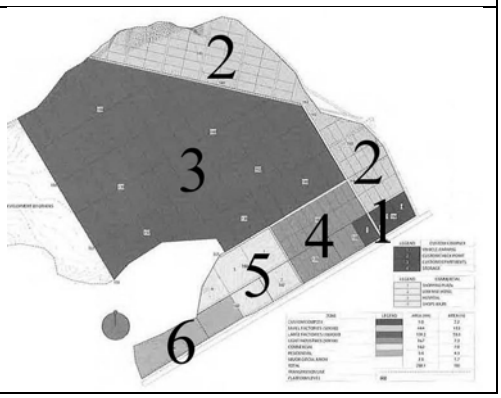
Alternative Site	Surrounding Savannakhet Urban Area			Surrounding Seno Urban Area	
	Site-A	Site-C	Site-D	Site-B	Site-B1
1. Location	Located in Kaisone District closed to 2nd Mekong Bridge.	Located in Kaisone District, 10 km north of Savannakhet urban area by NR-9. East side of Site-A	Located in Kaisone District, south-east side of Site-C.	Located in the west side of junction between NR-9 (to Seno) and NR-13 (to Vientiane). 25 km north-east of Savannakhet urban.	Located in Outhoumphon District, beside NR-9, west side of Site-B.
2. Elevation at Entrance	145 m	170 m	169 m	197 m	197m
3. Available Land Area	App. 300 ha	App. 210 ha	App. 120 ha	App. 20 ha	App. 350 ha
4. Current Condition	Agriculture land, agriculture school, and farmer's village. There are 119 houses with around 80 household are registered. Land acquisition is agreed and most of the resident plans to move to Site D. It is plan to be developed as "Savan City" by the joint venture between the Government of the Lao PDR and TAGS (Singapore), and part of land reclamation work is on-going.	Mainly forest. 65 households are registered. This site will be developed as "Savan Park" and phase-1 land reclamation work is on-going.	Forest, where 80ha already deforested and start land reclamation works. Some houses are under construction.	Already occupied, including foreign investor such as Logitem (logistic services; Japan).	Residential, agricultural, forest/ green area and water body.
5. Land Owner	Private	Government	Government	Private	Government

Alternative Site	Surrounding Savannakhet Urban Area			Surrounding Seno Urban Area	
	Site-A	Site-C	Site-D	Site-B	Site-B1
6. Public Infrastructure Condition					
a) Road	Beside approach road to 2nd Mekong Bridge	Beside NR-9.	Beside NR-9.	Beside NR-9.	Beside NR-9.
b) Water Supply	Water supply services are available for Savannakhet and Seno urban areas. No pipeline installed near every alternative site.				
c) Sewerage	Not available.				
d) Solid Waste	Domestic waste water collection and dumping services was provided by Urban Development and Administration Authority (UDAA). Final treatment plant (dumping site) is located in Ban Xok-Kang District, 15 km south-east from Savannakhet urban area by NR-9.				
e) Power Supply	Transmission Line installed along approach road to 2nd Mekong Bridge.	Transmission Line installed along NR-9.			
f) Communi-cation	Communication line and antenna tower (for mobile phone)is available at the site.				
7. Development Progress	Land reclamation work is on-going.	Land reclamation work is on-going.	Land reclamation work is on-going.	Finish land reclamation and start water supply piping work by SEZA.	No any plan as well as project site boundary.

3.5.4 Current Industrial Estate Development

In 2001, "The Study on Special Economic Zone Development in Border Area (Savannakhet Province)" was conducted by JICA and as a result, a plan for the Savan-Seno SEZ was made. Currently, the Savan Park project, as part of Savan-Seno SEZ, is being developed as commercial and industrial hubs, through the joint venture between the Government of Lao PDR and Pacifica Streams Development Company of Malaysia.

Table 3.5.7: Land Use Plan for Savan Park

Zone		Area (ha)	Area (%)	Lot Plan
1.	Custom Complex	5.0	2.1	
2.	Small Factories (50x100)	44.4	19.3	
3.	Large Factories (100x200)	134.2	58.3	
4.	Light Industries (50x100)	16.7	7.3	
5.	Commercial	16.0	7.0	
6.	Residential	9.9	4.3	
7.	Major Circulation	3.9	1.7	
TOTAL		**230.1**	**100**	

Source: Savan Park (brochure)

Table 3.5.8: Phasing Development

Zone		Phase-1 (to Feb 2011)	Phase-2 (to Feb 2013)	Phase-3 (to Feb 2015)	Phase-4 (to Feb 2017)	TOTAL
	total factory lot number	39 lots	58 lots	35 lots	14 lots	146 lots
1.	Custom Complex	2.78 ha	-	-	-	2.78 ha
2.	Industrial	40.26 ha	57.40 ha	43.45 ha	31.50 ha	172.61 ha
3.	Commercial & Residential	-	-	6.18 ha	17.44 ha	23.62 ha
4.	Major Circulation	6.31 ha	6.69 ha	12.50 ha	9.72 ha	35.22 ha
TOTAL AREA		**49.35 ha**	**64.09 ha**	**62.13 ha**	**58.66 ha**	**234.23 ha**

Source: Savan Park (brochure)

Source: Savan Park (brochure)

Figure 3.5.2: Development Phases

There is a discrepancy on the total area between information acquired from brochures and the developer. The collected data was collected in September 2009, and currently, the construction work for land reclamation is nearly finished.

Source: JICA Survey Team

Figure 3.5.3: Progress of Construction Works

3.5.5 Infrastructure Development Plan

Public infrastructure demands for the industrial zone development in Savannakhet Province are estimated based on the development framework (required industrial zone area) and the number of interested industrial sector (investment demand survey result). Preliminary estimates are summarized in Table 3.5.9.

Table 3.5.9: Estimated Demand for Savannakhet Industrial Zone Development

Demands		2015	2025
Industrial Zone Development Area		100 ha	490 ha
1.	Water Supply (m^3/d)	8,890	43,560
2.	Wastewater (m^3/d)	6,220	30,490
3.	Solid Waste (ton/d)	250	1,230
4.	Power Supply (MW)	21	103
5.	Communication (Mbps)	56	272

Source: JICA Survey Team

Estimated demand above was confirmed with Savan Park's developer.

Infrastructure development concepts to supply the above demands are proposed as shown in Table 3.5.10:

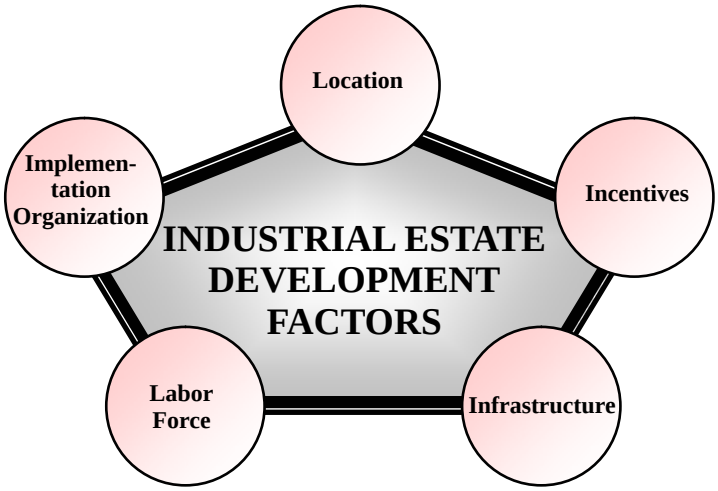
Table 3.5.10: Infrastructure Development Concepts

Sector		2015	2025
1.	Water Supply	Demand of 8,890 m^3/d will be supplied by upgrading the existing treatment plant of Nam Papa. Nam Papa already pledge to the developer to supply Phase-1 development.	Necessary to construct new treatment plant utilizing Mekong River water to supply additional 34,670 m^3/d demand. Currently private company offered to establish new company with Nam Papa to expand business of water supply.
2.	Wastewater	Considering the cost impact and O&M experience, currently proposed to be treated by each factory, SEZA is recommended to establish the effluent water monitoring system.	In case a public wastewater system is established, it is recommended to connect the sewer line for further development area to the public system.
3.	Solid Waste	About 250 ton/d solid waste can be treated by UDAA at its current disposal site. Toxic waste should be preliminary treated in-situ by factories.	Additional 1,230 ton/d solid waste also can be treated by UDAA at its current disposal site. In case UDAA develop a toxic waste treatment plant, factory owners can discuss and make contracts directly.
4.	Power Supply	Initial demand of 21MW planned to be supplied from external sub-station. EDL ready to make a contract with the factory individually. Power line installation space for EDL already secured by the developer.	It is recommended to install internal sub-station operated and managed by EDL, which only supplies power to Savan Park.
5.	Communication	The investor will make a contract directly with own favorite service provider. Communication line installation space already secured by the developer.	

Source: JICA Survey Team

3.5.6 Evaluation of Investment Climate

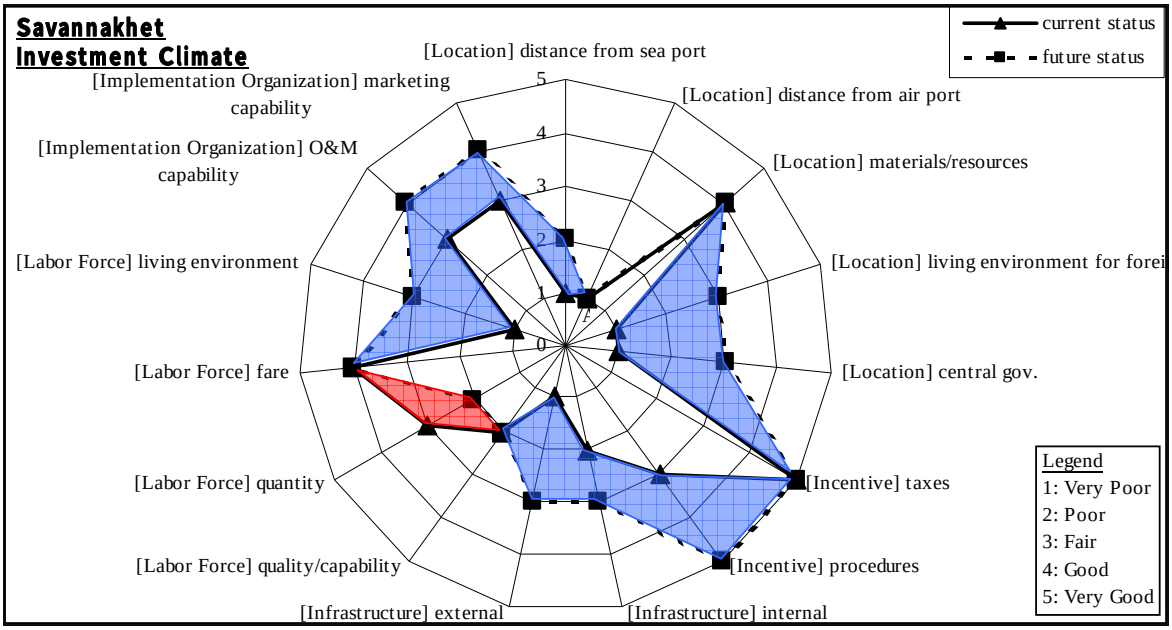
For a prosperous industrial estate development, the five factors, which are shown in Figure 3.5.4, should be considered to create a sufficient investment climate for investors to attract industries.



Source: JICA Survey Team

Figure 3.5.4: Industrial Estate Development Factors

The investment climate in Savannakhet Province was evaluated based on the factors above, and the result is shown in Figure 3.5.5 and Table 3.5.11.



Source: JICA Survey Team

Figure 3.5.5: Evaluation Summary of Investment Climate

Table 3.5.11: Examination Result of Investment Climate

Development Factors		Score		Examination	
		current	future	**current**	**future**
Location	Distance from Sea Port	1	2	Currently, cargo volume to Leam Chabang - Thailand (about 780 km) is larger than Danang – Vietnam (about 400 km), due to the inland accessibility, road condition, freight frequency and its fare.	In the future, and inland accessibility may improved by EWEC project and increase the freight frequency which also reduce the fare.
	Distance from Air Port	1	1	To Bangkok: 3 days a week	May not be much different.
	Materials/ Resources	4	4	Sepon copper and gold mines, sugarcane.	Potash for fertilizer as a potential.
	Living env. for foreigner	1	3	Lack of accommodation, restaurant/shops, hospital, education for child and entertainment.	Will be improved by Savan City (Site A) development.
	Central Gov. for procedures	1	3	It is necessary to have a direct connection with the related central government to accelerate procedures, improve request and update latest decrees and laws.	In line with decentralization, e-commerce will be established.
Incentives	Taxes	5	5	Advanced incentive by Savan-Seno SEZ degree No.177.	It will be revised in line with WTO affiliation and give the same incentives as that of the current.
	Procedures	3	5	Longer time compared with Thailand and Vietnam. The procedures are not transparent enough.	It may be improved through the one stop service which will be provided by Savan Park.
Infrastructure	Internal	2	3	Under construction. Will be finished by October 2010.	Savan Park developer only prepared the area for land reclamation and road construction. The other infrastructure will be provided by relevant supplier.

Development Factors		Score		Examination	
		current	future	**current**	**future**
Infrastructure	External	1	3	Ground water cannot be used due to salt intrusion. Required expansion of the road to the Thailand border.	Nam Papa will update existing treatment plant and guarantee to supply water for Phase 1 (50 ha). No specific high standard infrastructure was planned.
Labor Force	Quality/ Capability	2	2	Basic education level is low compared with Thailand and Vietnam. Not much familiar with industrialized life habit, such as time management and discipline.	Secondary education is planned to be improved. However, no countermeasures are provided to improve basic skills of industrial worker.
	Quantity	3	2	Currently no labor problems due to less factories operating.	Lack of labor manpower when Savan Park is fully occupied by fully operational factories
	Fare	4	4	Labor fare is low compared with Thailand.	No reason why labor fare in the Lao PDR will overtop Thailand.
	Living env.	1	3	No village within the walking distance.	No specific housing plan for labors working in Savan Park. New village may be developed in the neighborhood of Site-D (resettlement site of Savan City project).
Implementation Organization	O&M capability	3	4	Developer of Savan Park has experience on industrial estate development and management.	Capacity of SEZA is developing through suggestions and inputs from the Savan Park developer.
	Marketing capability	3	4	Developer of Savan Park has experience on industrial estate development and management.	Capacity of SEZA is developing through suggestions and inputs from the Savan Park developer.

Source: JICA Survey Team

3.5.7 Development Roadmap

(1) Key Success Factor

Based on present conditions, the following key factors are identified for a successful industrial estate development in Savannakhet Province:

(a) Concentration on Savan Park for Industrial Estate Development

The area of Savan Park is enough to cover industrialization demand for more than the short term target of 2015. Other related industrial development in its surrounding area which are without any countermeasures will cause deterioration of the investment climate such as price war among industrial estates due to over demand. It is recommended that the Government of Savannakhet Province regulate similar development projects in the surrounding area and give priority to Savan Park development to further attract investors.

(b) Government Support on Savan Park Project

Savan Park is also one of the national projects under the Prime Minister's Office (PMO). Therefore, activities supporting the success of the project are obligations of all relevant government authorities. The supporting activities are not limited to public infrastructure, especially for water supply. Moreover, incentives on taxation and customs should be included in government supports.

(c) Coordination among Other SEZ Projects

Savan-Seno SEZ consists of Site A, Savan City for housing and urban functions; Site B for logistics; Site C for industrial and commercial functions; and Site D for resettlement for Site A

residents. The harmonic development of the city requires the coordination and cooperation among the projects to improve attracting investors.

(d) Maximization of the Developer's Experience on Sales Marketing and Operation

A key factor is the prompt and fervent investment promotion for investors. Investor correspondence is not only in conclusion of MOU or contract agreement, but is also necessary in supporting investors until their enterprises are fully operated.

Savan Park has been managed by the joint venture company formed by the government and a Malaysian developer who have experience on industrial estate development and operation. Therefore, maximizing past experience will provide better service to investors.

(e) Secure Quantity of Qualified Labor

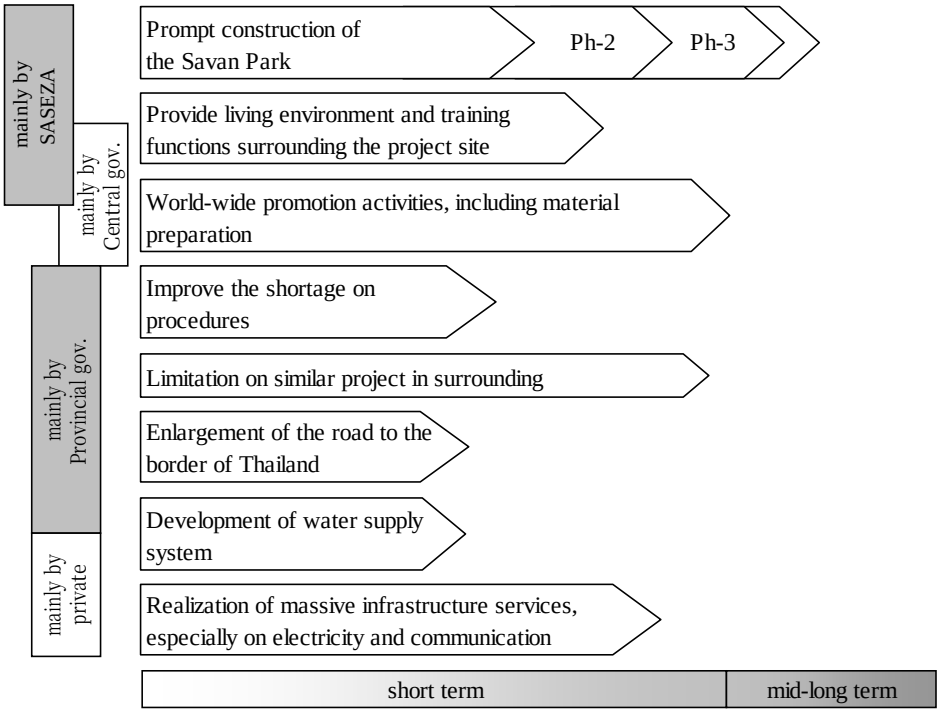
Labor issue is one of the important factors in deciding investment. To accelerate FDI promotion, it is necessary to ease their concerns by presenting countermeasures, such as employment support services, housing development and function support for qualified labors.

(f) Implementation of EWEC Improvement Project

Through the implementation of the project, it is expected that the accessibility to Danang as the nearest sea port will be improved. The physical accessibility shall be improved through road upgrading, while time for procedure should be shortened.

(2) Roadmap

The roadmap for successful implementation of the Savan Park development is shown in Figure 3.5.6.



Source: JICA Survey Team

Figure 3.5.6: Roadmap for Successful Implementation (Savannakhet)

CHAPTER 4 INDUSTRIAL ESTATE DEVELOPMENT IN CHAMPASAK

4.1 General Socioeconomic Conditions

4.1.1 Demography

Table 4.1.1 indicates the district population in Champasak Province. The province occupies 10.7% to 11.0% of the national population, and decreases gradually. Annual provincial population growth rate recorded was 1.9% from 1995 to 2008, which is smaller than national population growth rates of 2.1% from 1995 to 2005, and 2.2% from 2005 to 2008.

Table 4.1.1: Change of District Population in Champasak Province

	Population (Persons)			Percentage Share (%)		
	1995	2005	2008	1995	2005	2008
Champasak Province	501,387	607,370	642,642	11.0	10.8	10.7
Pakse	65,220	78,669	83,239	13.0	13.0	13.0
Xanasoumboun	55,716	62,238	65,853	11.1	10.2	10.2
Bachiangchareusouk	34,354	48,743	51,574	6.9	8.0	8.0
Pakxong	44,518	64,145	67,871	8.9	10.6	10.6
Pathoumphom	43,142	51,370	54,354	8.6	8.5	8.5
Phonthong	73,704	85,188	90,137	14.7	14.0	14.0
Champasak	49,242	55,403	58,612	9.8	9.1	9.1
Soukhouma	38,051	49,670	52,555	7.6	8.2	8.2
Mounlapamok	32,228	38,525	40,763	6.4	6.3	6.3
Khong	65,212	73,419	77,684	13.0	12.1	12.1
National Population	4,574,858	5,621,982	6,000,379	11.0	10.8	10.7

Source: Statistical Yearbook of Champasak Province 2008

About 13% of the provincial population belonged to Pakse District throughout the period. The most populous district is Phonthong, but the percentage share decreased from 14.7% in 1995 to 14.0% in 2008. Percentage share increased in Bachiangchareusouk, Pakxong (Boloven Plateau) and Soukhouma, while it dropped in Xanasoumboun, Pathoumphom, Champasak, Mounlapamok and Khong throughout the recorded period.

4.1.2 Economy

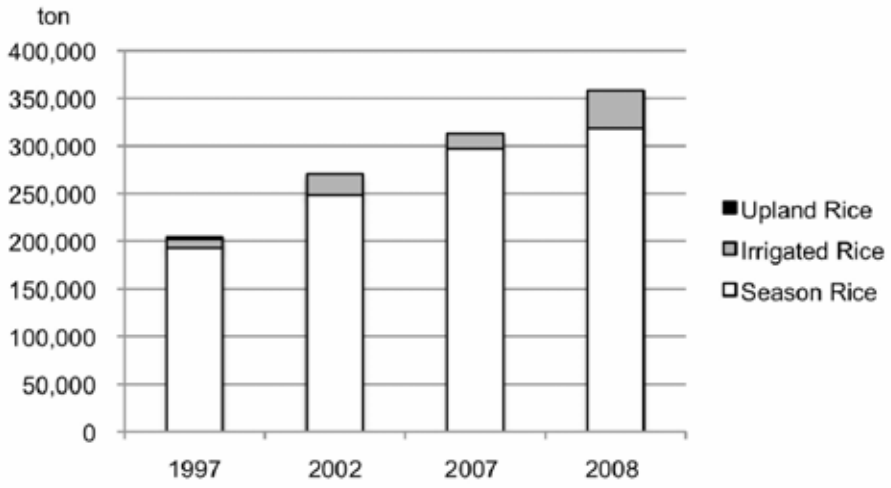
(1) Industrial Composition

According to the latest provincial statistics, nominal GRDP of Champasak Province was LAK4.70 tillion in 2008. It accounted for 10% of the national GDP. On the other hand, JICA Survey Team (JST) estimated that the provincial GDP percentage share was 10% in 2007. Provincial statistics also reported that the percentage shares of industries were 32% for the primary industry, 26% for the secondary industry, and 42% for the tertiary industry in 2008.

(2) Agriculture

Champasak Province has abundant agricultural products such as rice, vegetables and coffee bean. Forestry is also prominent in the Lao PDR.

Figure 4.1.1 indicates the rice production in 1997, 2002, 2007 and 2008. Rice production of 360,000 tons recorded in 2008, increased by 1.5 times in the preceding 11 years. Percentage share of rice production in the Lao PDR was 12%, which ranked third among the highest producers of rice, followed by Savannakhet Province and Vientiane Capital. Cultivation of seasonal rice accounts for 89% of the total provincial rice production, which is higher than that for Savannakhet Province (80%).

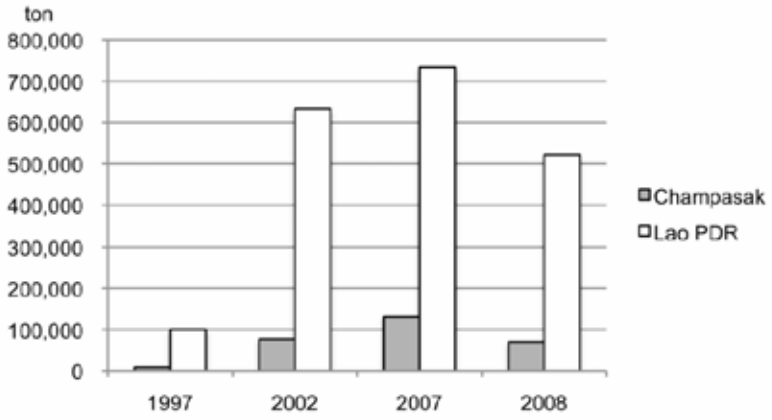


Source: Statistical Yearbook 1975-2005 and 2008

Figure 4.1.1: Change of Rice Production in Champasak Province

Figure 4.1.2 indicates vegetable production in the Lao PDR and Champasak Province. Vegetable production in Champasak Province was recorded to be 132,000 tonnes, or 13% of the national production, the highest ranking producer in 2007. However, in 2008, its position dropped to third after Luang Prabang and Vientiane Capital, but still has a production share of 13% in 2008. Vegetables produced in Champasak Province are transported to Vientiane Capital, which exports to Thailand under contract farming with Thai private companies.

Boloven Plateau located at the east of Pakse has bountiful soil, which is potential for agricultural development. Private-based agricultural development projects have started. Consequently, Vietnamese farmers are colonizing Pakson District, which is 40 km from Pakse.



Source: Statistical Yearbook 1975-2005 and 2008

Figure 4.1.2: Vegetable Production in the Lao PDR and Champasak Province

(3) Manufacturing

Major manufacturing industries in Champasak Province are wood and agricultural food processing. Table 4.1.2 indicates the numbers of business enterprise of the secondary industry in Champasak Province. Percentage share of Level-1 and Level-3 enterprises occupy 8-9% of the national total, and Level-2 enterprises cover 5%. Major industries to which Level-1 enterprises belong are manufacturers of wood and furniture (ISIC 20 and 36), food products and beverages (ISIC 15, 5) and other non-metallic products (ISIC 26, 4). The same trend is observed in Level-2 companies.

Table 4.1.2: Business Enterprises in Champasak Province

	Level-1	Level-2	Level-3
Champasak Province	33	25	1,821
Lao PDR	380	467	22,817
Share of Champasak (%)	8.7	5.4	8.0

Note: Numbers of employee are more than 200 for Level-1, 50 to 199 for Level-2 and 10 to 49 for Level-3.
Source: MoIC

Table 4.1.3 indicates foreign direct investment (FDI) in the secondary industry in Champasak Province. Percentage shares are 10% for Level-1, 6% for Level-2, and 1% for Level-3. Major industries are manufactures of food products an beverages (ISIC 15, 6), and chemicals and chemical products (ISIC 24, 4).

Table 4.1.3: FDI in Secondary Industry

	Level 1	Level 2	Level 3
Champasak Province	8	5	1
Lao PDR	83	82	80
Share of Champasak (%)	9.6	6.1	1.3

Note: Numbers of employee are more than 200 for Level-1, 50 to 199 for Level-2 and 10 to 49 for Level-3.
Source: MoIC

(4) Service Industry

Major industries in the tertiary sector are tourism and wholesale and retail trades. Table 4.1.4 indicates major tourism statistics in Champasak Province. Said province has attractive tourist destinations such

as Wat Phou, which is a World Heritage, Siphan Don and Boloven Plateau. In addition, Pakse Airport is connected with international tourist destinations such as Bangkok and Siem Reap. Therefore, tourists are more observed in Champasak than in Savannakhet Province. However, its numbers of tourists and room accommodations are fewer than in Savannakhet.

Table 4.1.4: Major Tourism Statistics in Champasak Province

	Unit	2007	2008
Number of Tourists	Persons	165,750	216,614
Domestic tourists	Persons	28,862	64,171
International tourists	Persons	45,605	66,171
Border tourists	Persons	91,283	87,272
Number of Hotel	Units	5	4
Number of Hotel Rooms	Rooms	97	90
Number of Guesthouse	Units	13	14
No of Guesthouse Rooms	Rooms	104	157

Source: Statistical Yearbook Champasak Province 2008

With regards to wholesale and retail trades, products such as petroleum, daily goods and construction materials are imported from the national border with Thailand, located 40 km west of Pakse. Pakse has two markets, and covers the surrounding provinces such as Attapeu, Sekong and Saravane.

(5) Public Investment

Table 4.1.5 indicates public investment in FY 2006-2007 and FY 2007-2008. More than half of the investment was disbursed in the agricultural sector. Public health and other administration areas were prominently invested upon in both fiscal years. Around 80% of the total investment comes from foreign resources.

Table 4.1.5: Public Investment in FY 2006-2007 and FY 2007-2008

Unit: million LAP

Items	FY 2006-2007			FY 2007-2008		
	Domestic	Foreign	Total	Domestic	Foreign	Total
Agriculture	875.0	33,172.0	34,047.0	1,973.4	33,548.4	35,521.8
Industry & Commerce	328.0	0.0	328.0	240.0	0.0	240.0
Public Works and Transport	0.0	0.0	0.0	2,993.1	6,351.6	9,344.7
Energy & Mining	2,250.0	3,550.0	5,750.0	730.0	0.0	730.0
Education	1,812.0	3,152.4	4,964.4	1,805.0	0.0	1,805.0
Public Health	440.0	8,283.0	8,723.0	680.0	8,484.0	9,164.0
Culture	330.0	0.0	330.0	923.6	0.0	923.6
Labor	110.0	47.0	157.0	382.6	0.0	382.6
Other Administrative Area	6,855.0	1,625.0	8,480.0	5,472.3	350.0	5,822.3
Total	13,000.0	49,829.4	62,779.4	9,727.7	48,734.0	63,934.0

Source: Statistical Yearbook Champasak Province 2008

4.2 Urban Development Policy in Pakse

4.2.1 Future Vision

According to the draft final report prepared by JST for the "Preparatory Survey on Formulation of Basic Strategies for Regional Core Cities Development in the Lao PDR", Pakse is envisioned to be:

- An international and regional core city with active exchange of people, goods, and information.
- The crossroad for EWEC and National Road No.13.

- An attractive place with green, French colonial towns with a sunset view over the Mekong.

According to this vision, the following urban development strategy was also elaborated.

1) Initial Phase (2010-2020)

- Prioritizing industrial promotion at SEZ as a national policy.
- Improving the overall image of EWEC with Thailand and Vietnam.
- Upgrading urban function and services (infrastructure, environment, and residences).

2) Second Phase (Over 2020)

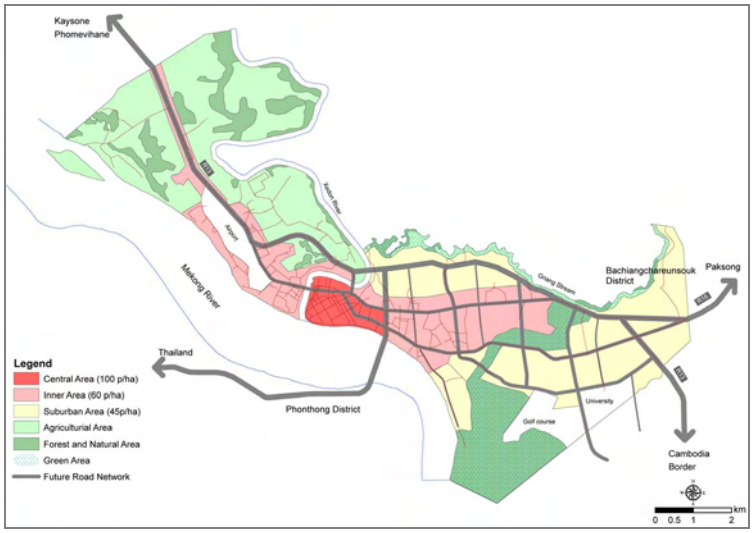
- Expanding support trade to serve industries in SEZ.
- Diversifying economic activities promoting the tertiary industry, particularly tourism.

4.2.2 Urban Development Policy for Land Use in the Future

According to the draft final report prepared by JST for the "Preparatory Survey on Formulation of Basic Strategies for Regional Core Cities Development in the Lao PDR", the urban structure and land use concept plans are as shown in Figure 4.2.1 and Figure 4.2.2, respectively.

Source: JICA Survey Team for "Preparatory Survey on Formulation of Basic Strategies for Regional Core Cities Development in the Lao PDR", Draft Final Report.

Figure 4.2.1: Proposed Urban Structure Plan (Pakse)



Source: JICA Survey Team for "Preparatory Survey on Formulation of Basic Strategies for Regional Core Cities Development in the Lao PDR", Draft Final Report.

Figure 4.2.2: Proposed Land Use Concept Plan (Pakse)

Inside the urban planning boundary, there is no area zoned as industrial. The city of Pakse has three industrial zones. However, these are located outside the urban planning boundary. Referring to the proposed urban structure plan, there will be two logistics centers, one of which will be located east of the urban planned area.

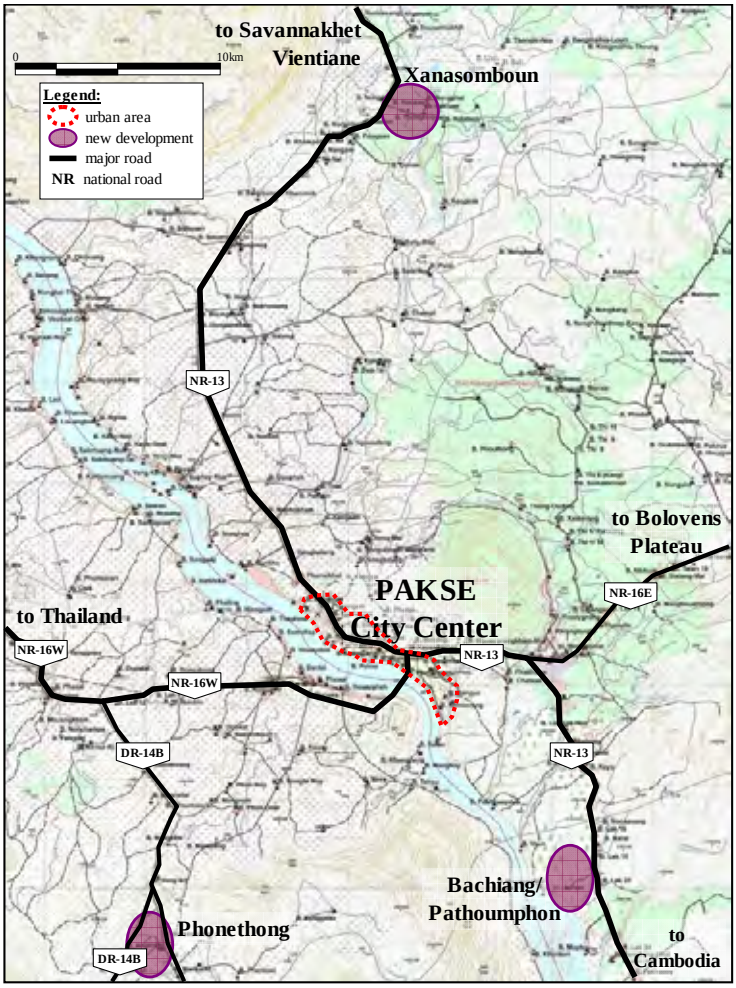
4.3 Existing Infrastructure

4.3.1 Road Network and Transportation

(1) Road Network

Vangtao Chongmek, the western side of the province, is the main gate to Thailand. Meanwhile, Veun Kham, the southern side of the province, is the gate to Cambodia, which links to Siem Reap and Angkor Wat. A large duty-free shopping mall is under construction at the Thailand border, Forthermore, the provincial government plans to improve the road connecting to Siem Reap and develop SEZ in Si Phan Don's Four Thousand Islands to attract FDI.

Road transportation network consists of two major roads: the National Road No.13, which goes through whole country and connects Pakse to Vientiane Capital; and National Road No.16, which crosses the province and links the Thailand border to Bolovens Plateau. National Road No.16 West starts from Thailand border to Pakse City and National Road No.16 East from the city to Bolovens Plateau.



Source: JICA Survey Team

Figure 4.3.1: Alternatives for Industrial Estates Site and Major Road Network

Source: JICA Survey Team

Figure 4.3.2: Current Road Condition of National Road No. 16W (left), National Road No. 13S (center) and National Road No. 13S in City Center (right)

Distance from the province to Danang (Vietnam) is about 400 km; to Siem Reap (Cambodia) about 200 km; and to Bangkok (Thailand) about 780 km.

The total road length in the province is about 1,617,098 km in year 2008, which consists of road types listed in Table 4.3.1.

Table 4.3.1: Road Length by Type of Pavement (2006)

Road Type		Length	Coverage Ratio
1.	Concrete Road	11,310 km	0.7 %
2.	Tar Road	517,750 km	32.0 %
3.	Gravel/Earth Road	1,088,038 km	67.3 %
4.	Asphalt Road	0 km	0.0 %
TOTAL		1,617,098 km	100.0 %

Source: DPI Champasak

(2) Public Transportation

As the capital of Champasak Province, Paske has four bus stations/terminals as listed in Table 4.3.2.

Table 4.3.2: Bus Stations in Pakse

Bus Station		Operator	Traffic
1.	Morning Market Bus Station	Government	long distance and local
2.	Sengcha Loen Bus Station	Private	long distance and local
3.	Kieng Kai Bus Terminal	Private	mainly local/city bus
4.	Chitpa Song B us Terminal	Private	mainly local/city bus

Source: JICA Survey Team

(3) Airways Transportation

Outline of the Pakse International Airport is as shown Table 4.3.3.

Table 4.3.3: Outline of Pakse International Airport

1.	Direction and distance from the City	Northwest 2.8 km
2.	Type of traffic permitted	IFR/VFR
3.	Hangar space/repair facilities for visiting ACFT	NIL
4.	Runway	1.63 km x 36 m
5.	Helicopter landing area	NIL

Source: The Lao PDR Aeronautical Information Publication

Its current flight schedule is shown in Table 4.3.4.

Table 4.3.4: Flight Schedule (2009)

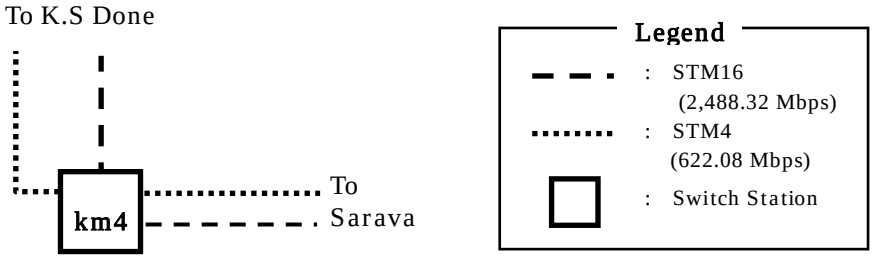
Destination		Type	Frequency
1.	Vientiane	domestic	4 days/week 2 or 4 flights/day
2.	Savannakhet	domestic	3 days/week 2 flights/day
3.	Luang Prabang	domestic	2 days/week 2 flights/day
4.	Bangkok (Thailand)	international	3 days/week 2 flights/day
5.	Siem Reap (Cambodia)	international	6 days/week 2 flights/day

Source: LAO Airways

4.3.2 Telecommunication

(1) Trunk Line Network System

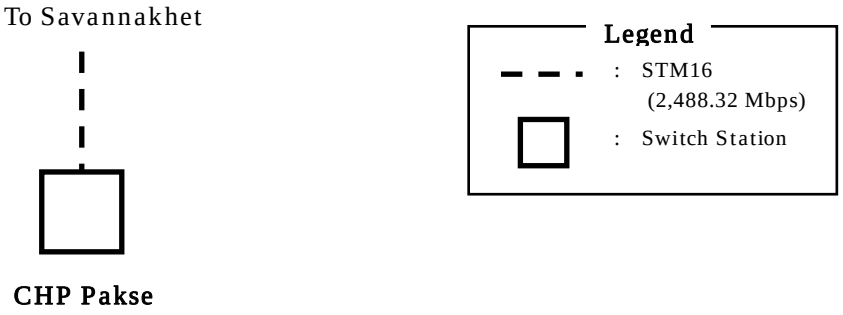
Trunk line diagram of Enterprise of Telecommunications Lao (ETL) in the surrounding area of Pakse District is shown in Figure 4.3.3. The Km 4 station is the main switch station located in downtown Pakse. The trunk line of Km 4 station is connected with STM 16 (2.49 Gbps) from Savannakhet to Saravan by means of optical fiber cables.



Source: JICA Survey Team

Figure 4.3.3: Trunk Line Diagram of ETL in the Surrounding Area of Pakse District

Trunk line diagram of Lao Telecom in the surrounding area of Pakse District is shown in Figure 4.3.4. CHP Pakse station is the main switch station located in downtown Pakse. The trunk line of SVK Kaison Station is connected with STM16 (2.49 Gbps) from Savannakhet by means of optical fiber cables and microwave system. Branch line is connected to CHP Pakse station through star configuration.



Source: JICA Survey Team

Figure 4.3.4: Trunk Diagram of Lao Telecom in the Surrounding Area of Pakse District

(2) Present Status of Telecommunication

Transmission in fixed phone lines between the switch station and cus tomers channels through metallic cables.

Transmission in internet lines between the switch station and customers channels through metallic cables, optical fiber cables and wireless LAN.

Existing internet service in the surrounding area of Pakse district is shown in Table 4.3.5. The use of optical fiber cables provides faster and more reliable internet service. However, cost for internet connection is very expensive.

As for the cell phone service, since base stations are maintained extensively, cell phones can be used in most low-land sites.

Table 4.3.5: Internet Service in the Surrounding Area of Pakse District

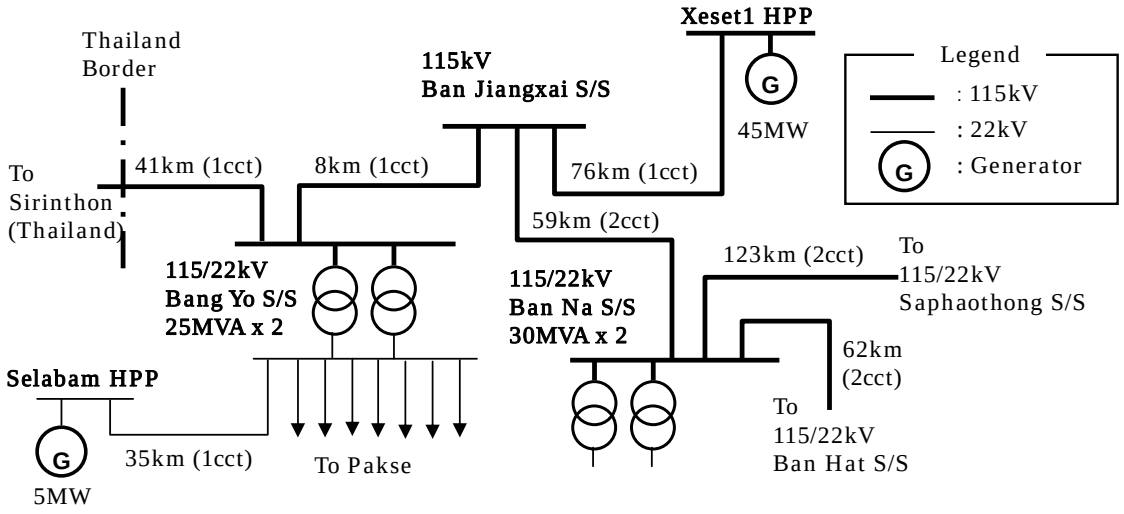
Item	Description			Remarks
1. ETL				
(1) ADSL	128/64 Kbps	:	LAK950,000 per month	Minimum Speed
	1,536/512 Kbps	:	LAK4,450,000 per month	Maximum Speed
(2) Leased Line	128 Kbps	:	LAK4,500,000 per month	Minimum Speed
(Optical Fiber)	2,048 Kbps	:	LAK21,400,000 per month	Maximum Speed
(3) Wireless LAN	64-256 Kbps	:	LAK 450,000 per month	
2. Lao Telecom				
(1) ADSL	128/64 Kbps	:	LAK300,000 per month	Minimum Speed
	2 Mbps/512 Kbps	:	LAK3,000,000 per month	Maximum Speed
(2) Wireless LAN	11-54 Mbps	:	LAK5,000 per hour	

Source: ETL, Lao Telecom

4.3.3 Power Supply

(1) Power Grid System

Power grid system in Champasak Province is shown in Figure 4.3.5. The southern region has Xeset 1 and Selabam hydroelectric power plant, which also generate power to Champasak Province. On the other hand, surplus electricity is generally exported to Thailand.



Source: JICA Survey Team

Figure 4.3.5: Power Grid System in Champasak Province

(2) Power Supply System

The existing 115/22 kV substation in the surrounding area of Pakse District is shown in Table 4.3.6. The power to the surrounding area of said district is supplied through 22 kV distribution lines directly from 115/22 kV Bang Yo substation and Selabam hydropower plant. As for the surrounding area of Bachiang and Pathoumphone industrial zones, 22 kV distribution lines are maintained.

If the number of tenants would increase favorably in the future, the existing 22 kV distribution lines will not be sufficient for the additional load demands.

Table4.3.6: Existing 115/22kV Substation for the Surrounding Area of Pakse District

Name of Substation	Description	Remarks
1. 115/22 kV Bang Yo Substation	Transformer : 25 MVA × 2 Peak Demand : 24.0 MW	Power source of all industrial zone

Source: EDL

4.3.4 Water Supply

(1) Water Supply

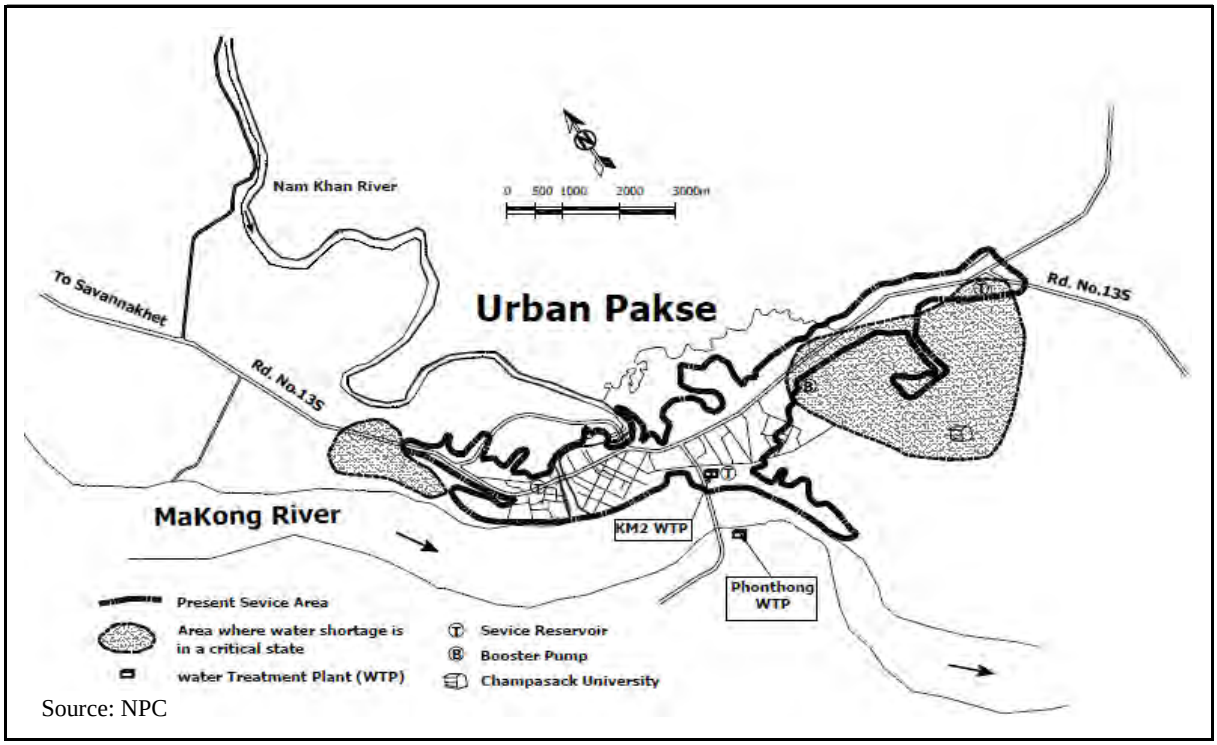
Piped water supply facilities are limited and installed only in urban areas. Nam Papa Champasak (NPC), which functions under the Ministry of Public Works and Transport (MPWT), supplies water to the province. Main potable water sources are surface water form the Mekong River system and groundwater. The present conditions and water demand projection are summarized in Table 4.3.7.

Table 4.3.7: Present Conditions and Water Demand Projection in Pakse and Champasak Province

	Item	Unit	2001*	2003*	2005	2007	2009
1	Population in Champasak Province	Persons	586,198	615,874	647,052	679,809	714,225
	Population in Pakse District	Persons	74,043	77,791	81,730	85,867	90,214
	Growth Rate	%	2.6	2.6	2.6	2.6	2.6
2	Population in Urban Pakse	Persons	48,394	50,944	53,627	56,452	59,426
3	Number of Connection	Households	7,126	7,705	8,305	8,905	10,105
4	Population Served	Persons	47,032	50,853	54,813	58,773	66,693
5	Service Ratio in District	%	63.5	65.4	67.1	68.4	73.9
6	Ave. Daily Demand	m^3/d	13,810	14,338	15,661	16,456	18,674
	Max. Daily Demand	m^3/d	15,000	22,383	19,576	20,570	23,343
	Unit Water Demand	Lpcd	294	282	286	280	280
7	Ave. Daily Consumption	m^3/d	9,540	10,510	10,963	11,519	13,072
	Ave. Daily Consumption per Capita	Lpcd	203	207	200	200	200
8	Ratio of Accounted Water	%	69	70	70	70	70
9	Production Capacity	m^3/d	15,000	15,000	15,000	15,000	15,000
10	Max. Ration of Operation	%	100	149	131	137	156

Source: WASA * Actual Data

At present, NPC supplies water only to Urban Pakse in the district with a service ratio of 65% due to lack of water production capacity and shortage of distribution network as shown in Figure 4.3.6. The existing water facilities for Pakse are summarized in Table 4.3.8.



Source: NPC

Figure 4.3.6: Present Service Area

Table 4.3.8: Existing Water Facilities in Urban Pakse

Facilities	Description
Km 2 Phonsavanh WTP	Existing capacity: 15,000 m^3/d
Transmission & Distribution Pipeline	98.6 km with diameters 500 mm – 40 mm (DIP, uPVC and PVC)
Reservoirs	2,550 m^3 (two ground reservoirs & three elevated tanks)

Source: NPC

NPC plans to expand the capacity of Km 2 Phonsavanh WTP to 25,000 m^3/d to meet the maximum daily demand for Pakse District. NPC has been managing the water supply in Phonthong and Pathoumphon Districts, where industrial zones are located. Phonthong WTP system is located at the right bank of the Mekong River and supplies water to villages along National Road No.10 through a 31.31 km long pipeline with diameters varying from 50 to 200 mm. The Phonthong WTP has a capacity 2,000 m^3/d. In Pathoumphon District, there are boreholes with yields of 440m^3/d and an elevated tank with a capacity of 150 m^3/d operated by NPC. The boreholes are located at the Meamgkhong village with a distance of 120 km south of Urban Pakse along National Road No.13. NPC supplies water through a 11.5 km long pipeline (DN 50 200 mm) to Meamgkhong village and its surrounding area.

The Department of Irrigation (DOI) intends to create a policy wherein each developer shall develop industrial zones with self-responsibility, as well as supply water to industries. For instance, existing factories, such as the 2nd factory of Beer Lao and wood processing companies in Bachiang and Pathoumphon Zone constructed water supply facilities with boreholes and individual wastewater treatment tanks.

NPC dictates the water tariff for domestic use and non domestic use as shown in Table 4.3.9.

Table 4.3.9: Water Tariff

User Category	Water Consumption (m^3)	Water Tariff (LAK/m^3)
Private Households and Government	1 to 5	1,200
	6 to 15	2,600
	16 to 30	3,400
	More than 30	4,000
Hotels and Beverage Shops	1 to 5	3,300
	6 to 15	3,700
	16 to 30	4,500
	More than 30	5,600
Industries	1 to 5	3,700
	6 to 30	4,700
	More than 30	5,700

Source: DPI, Champasak Province

Revenue and expenditure of NPC for the past five years are shown in Table 4.3.10.

Table 4.3.10: Service Condition of NPS

Indicators	Unit	2003	2004	2005	2006	2007
Turnover	LAK million	5,053	6,190	6,590	7,416	7,860
Operating Costs	LAK million	4,055	5,208	4,848	5,509	6,205
Net Operating Income	LAK million	998	982	1,742	1,907	1,655

Source: NPC and WASA

4.3.5 Drainage and Sewerage Systems

For Pakse and its surrounding area, storm water is managed by the road drainage system and the Mekong River ecosystem. The Nam Khan River and its tributaries function as the main drainage in Pakse. The national road drainage system has more than two (2) years return period of flood. It is supposed that bank protection of the Mekong River to accomodate more than 10 years return period of flood and its tributary rivers to cater five (5) years return period of flood. Combined sewer system collects both storm water and wastewater since no sewerage system exists even in urban areas.

Domestic and commercial wastewaters, excluding sewage from toilets, are discharged directly to Mekong River ecosystem through the existing road drainage system. Sewage from toilets is treated either in individual septic tanks or discharged directly to road drainages without proper treatment. Industrial wastewater is treated by individual on-site treatment plants in accordance with the Industrial Effluent Standards (Decree No.326/IH, October 6, 2005).

Champasak Urban Development and Administration Authority (UDAA) is responsible for the operation and maintenance (O&M) of individual wastewater treatment facilities. However, there are still concerns that individual treatment facilities are not functioning accordingly due to lack of appropriate O&M and monitoring. It is recommended that a wastewater management system for O&M and monitoring be established properly and a public wastewater treatment system be planned and implemented in urban areas in order to preserve the Mekong River ecosystem.

4.3.6 Urban Sanitation

(1) Urban Development and Administration Authority (UDAA)

MPWT is responsible for policy, strategy and planning of solid waste management in the Lao PDR. Champasak UDAA is responsible for solid waste management in Champasak Province. Its urban

management and service division conducts daily activities for solid waste management including solid waste collection, transportation, and disposal as shown in Figure 4.3.7.

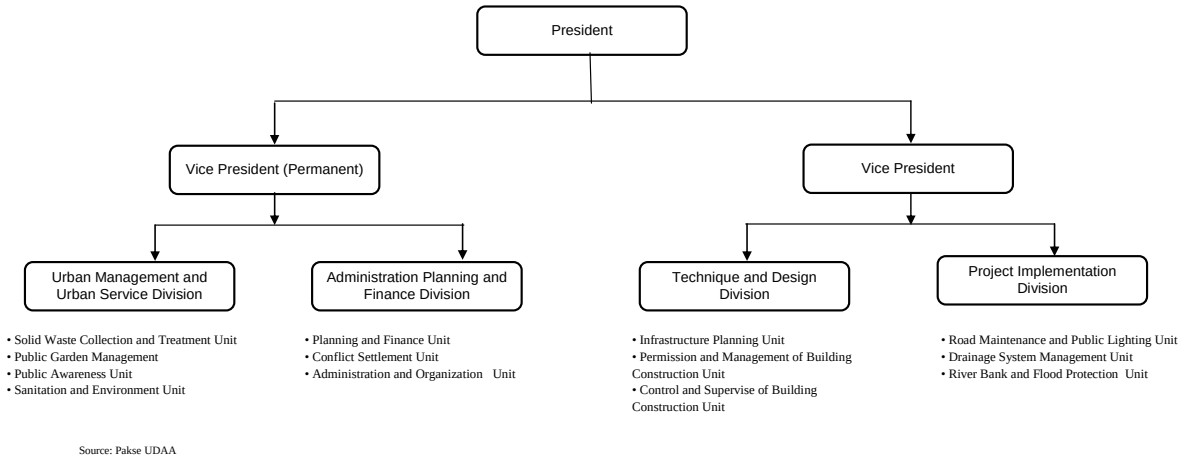


Figure 4.3.7: Organization of UDAA

Garbage collection and disposal fees of UDAA are summarized in Table 4.3.11.

Table 4.3.11: Garbage Collection and Disposal Fees

Category	Fee
Collection for Domestic Solid Waste	LAK15,000– 20,000 per month
Collection for Commercial Solid Waste	LAK35,000 – 80,000 per month
Collection for Industrial Solid Waste	LAK80,000 – 150,000 per month
Disposal of Solid Waste at Site	LAK100 per kg

Source: UDAA

In Pakse District, four markets and one hotel collect their own solid waste and transport them using their own vehicles.

The monthly solid waste volume disposed at the sanitary landfill is estimated to be 3140 m^3 and the transport ratio of UDAA is about 82% as shown in Table 4.3.12.

Table 4.3.12: Monthly Garbage Transport Volume at Sanitary Landfill Site

	Name	Trip	Monthly Volume	Weight
1	Super Market	11	66.0 m^3	16.50 ton
2	Dao-Heuang New Market	58	432.5 m^3	108.13 ton
3	Lac-Song Market	4	27.0 m^3	6.75 ton
4	Tha-Hin Market	2	9.6 m^3	2.40 ton
5	Tong-Ja-Learn Hotel	7	42.0 m^3	10.50 ton
6	UDAA	320	2,563.0 m^3	640.75 ton
Total		402	3,140.1 m^3	785.03 ton

Source: UDAA Monthly Report April 2009

The following shows vehicles for garbage transport used by UDAA, provincial markets and Tong-Ja-Leam Hotel:

Table 4.3.13: Number of Vehicles for Transporting Garbage

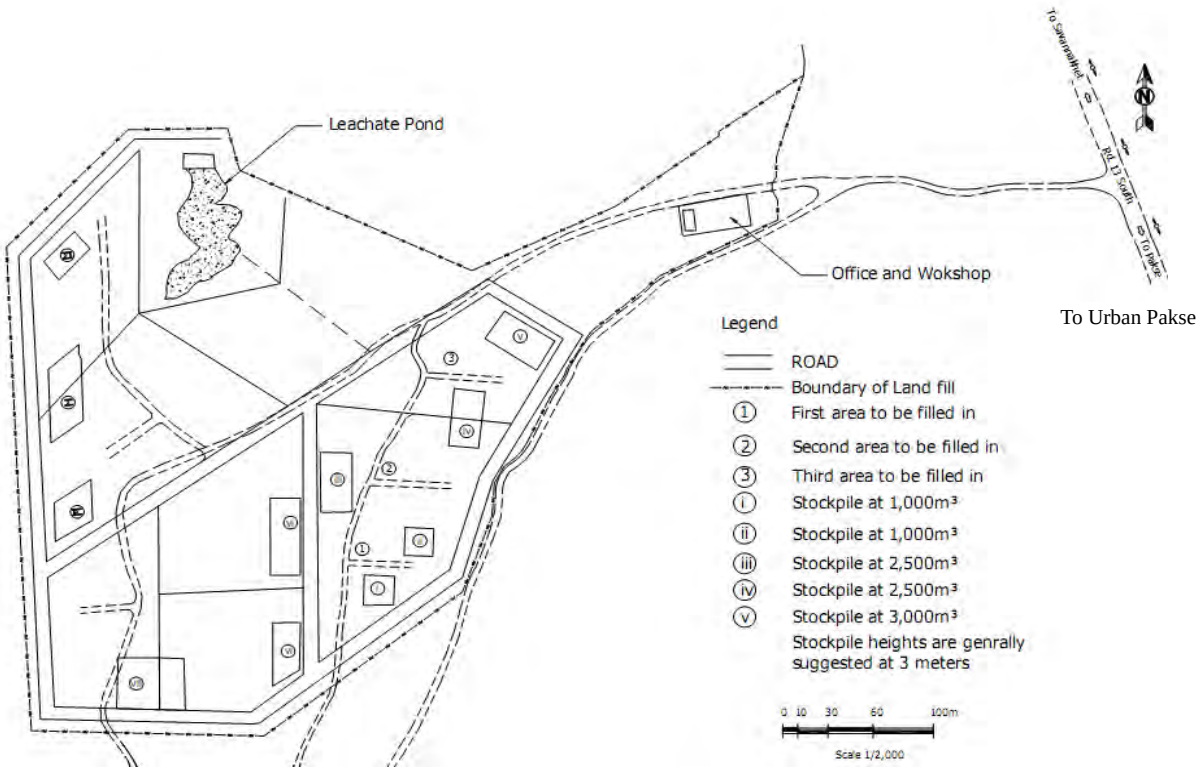
Name	Number of Vehicles	Capacity of Vehicle
1 Super Market	1	6 m^3
2 Dao-Heuang New Market	2	7.5 m^3
3 Lac-Song Market	1	4 m^3
4 Tha-Hin Market	1	4 m^3
5 Tong-Ja-Learn Hotel	1	6 m^3
6 UDAA	5	2 units with 10 m^3, 3 units with 7.5 m^3

Source: UDAA

Champasak UDAA does not collect industrial solid waste in Bachiang and Pathoumphon Industrial Zone (BPIZ). Solid wastes generated by the factories in said industrial zone are being disposed by the factory owners themselves.

(2) Km 17 Sanitary Landfill

At present, the Km 17 sanitary landfill site Pakse has been operated by Champasak UDAA. The site is shown in Figure 4.3.8.



Source: UDAA

Figure 4.3.8: Km 17 Sanitary Landfill Site at Pakse

The outline of the sanitary landfill is summarized below.

- Location: located at Ban Xonpong village
- Distance: about 17 km north of Pakse Urban Center along the National Road No.13 South
- Type of Final Disposal: adopted the sanitary landfill in cooperation with UNDP
- Total Area: 2.2 ha with depth of 2.5 m including a leachate pond (refer to Figure 4.3.8)
- Office & Workshop: one unit without truck scale (refer to Figure 4.3.9)


Source: JICA Survey Team

Figure 4.3.9: Sanitary Landfill Site at Pakse

4.4 Industrial Location

4.4.1 Existing Industrial Location

Champasak Province has rich farm lands for organic crops production, which is highly admired by foreign markets. Rubber and coffee, as industrial raw materials, have been cultivated on a large scale in and around the province. A large-scale coffee factory has already been running in the province. In addition, potato is also cultivated in this area for export to Thailand for manufacturing potato chips. Vegetables are cultivated and processed to dry vegetables in the area.

About 33 Level-1 factories are located in the province, accounting for 4% of all Level-1 factories in the Lao PDR. From the 33 Level-1 factories, 20 are manufacturers of wood and furniture, five for food and beverage, and four for non-metallic products.

Table 4.4.1: Existing Factories in Vientiane Capital

ISIC Rev.3	Activity	No. of Factory			
		Level-1	Level-2	Level-3	Total
15	Manufacture of food products & beverages	5	4	1,533	1,542
19	Tanning & dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	1			1
24	Manufacture of chemicals and chemical products	1	4		5
26	Manufacture of other non-metallic mineral products	4	1	109	114
28	Manufacture of fabricated metal products, except machinery & equipment	2		2	4
20+30	Wood manufacturing and furniture	20	13	24	57
	Others	-	3	153	156
	Total	33	25	1,821	1,879

Remark: This is the latest of data of year 2008

Note: Level-1: "more than 200 labors" or "more than 200 horsepower of machine" or "high environmental impact"
Level-2: "51-200 labors" or "51-200 horsepower of machine" or "medium environmental impact"
Level-3: "10-50 labors" or "5-50 horsepower of machine" or "low environmental impact"

Source: MoIC

4.4.2 Potential Industrial Location

Champasak Province will continue to have opportunities in cultivating various kinds of agricultural products. Therefore, the province has sufficient development potentials for processing agricultural products and manufacturing food. Measures to promote processing agriculture products are described in Part I of this report.

Safe and healthy agricultural products are preferred in foreign markets. It is recommended that new agricultural products such as natural medicines be taken into consideration to meet the preferences.

Table 4.4.2: Potential Industries in Champasak Province

Category	Product	Market	Location Factor	Potential
Agriculture -related	Beverage: beer and other alcoholic beverage, soft-drink	Mainly for domestic market	• Agricultural products • Large amount of quality water	High
	Sugar, coffee, dry vegetable, frozen foods (vegetable, fruits, cooked food, etc.)	Export	• Stable supply and large amount of agriculture products • Homogeneous agriculture products • Freezers and cold storage facilities will give business opportunities and contribute to price stabilization • Power consumption for freezers and cold storage	High
	Containers, glass bottle, etc.	Containers for beverage for domestic market	• Close to market • Reusable bottle, recyclable • Power consumption	Medium
	Bio-ethanol	Alternative automobile fuel	• High potential when byproduct of sugar factories is used as raw material • When cassava is used as raw material, consider the impact on feedstuff production • Potential of cane complex in sugar factories	Medium
Agriculture -related	Bio-diesel	Alternative automobile fuel	• Bottleneck is acquisition of cultivation land for oil-enriched plants	Medium
	Organic fertilizer	Domestic	• Presence of raw material such as agricultural waste, compost and leaf mold	Medium

Category	Product	Market	Location Factor	Potential
Agriculture -related	Vegetable oil detergent	Domestic and export	• Plantation of oil palm	Medium
	Raw natural medicine	Export	• Cultivation of medical plants • Cold storage and transport	High
	Latex processing	Export	• Cultivation of rubber	Medium
Others	Molded plastic products	Domestic	• Import plastic resin (pellet) • Sheet, jumbo bag for vegetable, feedstuff, etc., container	Medium
	Knockdown furniture, woodworking, etc.	USA, EU, Japan, etc.	• Presence of raw materials	Medium

Source: JICA Survey Team

4.5 Conceptual Plan for Industrial Estate

4.5.1 Future Prospects

Industrial estate development is recommended to support the current provincial industrialization, such as the industrial estate to be developed, to produce safe and healthy foods, and provide value-added quality and design for the lumber and woodworks.

For the industrial estate development, various common facilities required for quarantine treatment, quality inspection, certification, export procedure, and storage would accelerate investment promotion.

4.5.2 Development Framework

Basis for the development framework are the following:

1) Target years of 2015 for short term and 2025 for mid-long term.

2) Required area for industrial estate based on the macro economic framework, especially the number of employment, with confirmation from the result of the demand survey.

3) Japanese Guidelines for Industrial Estate Planning (JGIEP).

(1) Required Industrial Estate Area based on the Marco Economic Framework.

Based on the national working population forecast published by MPI (Socio-Economic Development Report 2006-2007), JST estimates employment population for years 2015 and 2025 as shown in Table 4.5.1.

Table 4.5.1: Forecasted Employed Population

(population in terms of 1,000 persons)

Working Population		2005 (real)	2010	2015	2025
1.	Agriculture	1,810	2,063	2,154	2,190
2.	Industry	210	312	424	730
3.	Services	170	329	481	730
TOTAL		**2,190**	**2,704**	**3,059**	**3,650**

Source: JICA Survey Team

To distribute the working population of the industry above by region, the 2008 MoIC database for employment number of registered industries will be adopted, where Vientiane Capital is 26%, Savannakhet Province is 9%, and Champasak Province is 7% of the total national population. The

share of Vientiane Capital was adjusted based on the power balance in accordance with the urbanization growth of other regions.

As a result, the industrial working population is estimated in Table 4.5.2.

Table 4.5.2: Industrial Employment

(1,000 population)

2010	2015		2025	
22	30	(+8)	51	(+21)

Source: JICA Survey Team

Following the JGIEP, the average required employee per hectare is 81.7 persons. As a result, the required additional industrial land is estimated as shown in Table 4.5.3.

Table 4.5.3: Required Additional Industrial Area

(ha; rounded figure)

2015	2025	
100	360	(+260)

Source: JICA Survey Team

Considering the current progress on the industrial estate development, the ratio of those that will enter the industrial estates was estimated to be 50% for 2015 and 70% for 2025. Considering an industrial area efficiency of 70%, the required area for the estate is estimated as shown in Table 4.5.4.

Table 4.5.4: Required Additional Industrial Estate Area

(ha)

Industrial Area		2015	2025	
1.	Industrial Area for Industrial Estate (Net)	50	232	(+182)
2.	Area of Industrial Estate (Gross)	71	331	(+260)

Source: JICA Survey Team

(2) Required Industrial Estate Area based on the Result of Demand Survey.

The required area for the industrial estate based on the result of demand survey is as shown in Table 4.5.5:

Table 4.5.5: Estimated Industrial Park Development Demand

1.	Investment Demand of Japanese Enterprise (based on the survey result)	
	a) Nos. of surveyed Japanese enterprises	1,248 companies
	b) Nos. of enterprise interested to invest	3 companies
	c) Ratio of enterprise interested to invest [b/a]	0.2%
	d) Average factory lot based on the industrial category as the survey result and Japanese Guideline for Industrial Estate Planning (JGIEP)	0.7 ha
	e) Estimated required factory lot [b x d]	2.1 ha
2.	Estimated Investment Demand for Non-surveyed Japanese Enterprises	
	f) Nos. of Japanese enterprises operated abroad Source: Tokyo Keizai, list of overseas invested enterprise	2,640 companies
	g) Estimated ratio of enterprise interested to invest [c x50%]	0.1%
	h) Estimated no. of enterprise interested to invest [f x g]	3 companies
	i) Estimated required factory lot [h x d]	2.1 ha
3.	Total Estimated Required Factory Lot for Japanese Enterprises [e + i]	4.2 ha
4.	Investment Demand of Enterprises Operated in Thailand (based on the survey results)	
	j) Nos. of enterprise interested to invest	7 companies
	k) Average factory lot based on the industrial category as the survey result and JGIEP	1.1 ha
	l) Estimated required factory lot [j x k]	7.7 ha

5.	Investment Demand of Enterprises Operated in Vietnam (based on the survey result)	
	m) Nos. of enterprise interested to invest	1 company
	n) Average factory lot based on the industrial category as the survey result and JGIEP	1.0 ha
	o) Estimated required factory lot [m x n]	1.0 ha
6.	Ground Total of Estimated Required Factory Lot [3 + l + o]	12.9 ha
7.	Preference for locating the Industrial Park (IP)	
	p) Nos. of enterprises at least showing their interest in locating in IP based on survey result	58%
	q) Required factory lot for IP [6 x p]	7.5 ha
8.	Estimated Required Industrial Park	
	r) Effective ratio for Industrial Park Area for Factory Lot	70%
	s) Required factory lot for IP [q/r]	10.7 ha

Source: JICA Survey Team

(3) Industrial Estate Development Target

Industrial estate development target by 2015 will be settled based on the larger figure estimated from the two said methods. As a result, the rounded required target area for the industrial estate to be developed is shown below.

2015	**2025**
70 ha	330 ha (+260 ha)

4.5.3 Site Alternatives

Site alternatives for Champasak Industrial Zone development was previously shown in Figure 4.3.1. The current conditions of the alternatives are summarized in Table 4.5.6.

Table 4.5.6: Site Alternatives for Champasak (Pakse) Industrial Zone Development

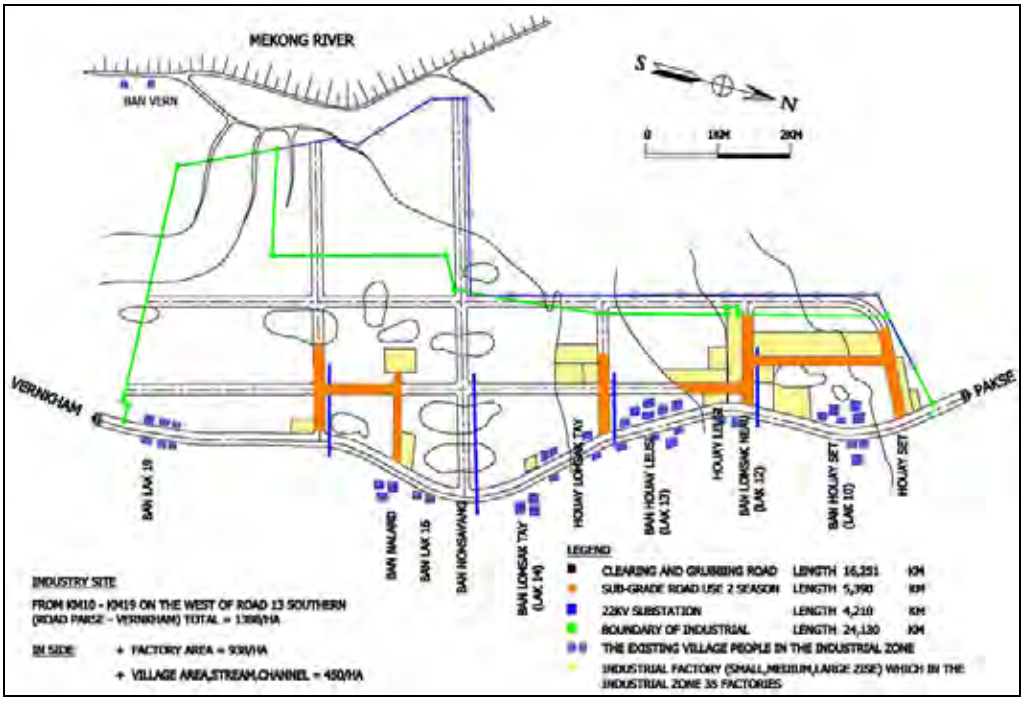
Site Alternatives	Bachiang and Pathoumphon	Xanasomboun	Phonethong
1. Location	Located in Pathoumphon and Bachiangchareunsouk districts, along NR13 around 12 km south of Pakse.	Located in Xanasomboun district, about 33 km north of Pakse beside NR13.	Located in Phonethong district, south-west of Pakse urban area. Going to the west about 12 km by National Road No.10 and down to south by National Road No.14B about 15 km.
2. Elevation at Entrance	170 m	144 m	126 m
3. Available Land Area	1,388 ha	660 ha	606 ha
4. Current Condition	Site development and factory construction has started since 1997. Out of 1,388ha, 938 ha belongs to the government and 200ha have already been occupied by 45 investors and other factories. Current rental cost is USD12/ha/year with flexible payment condition from 1 to 25 years. Remaining 400 ha belongs to the citizens, which consists of residences and lakes.	Mainly forest and green area, however some villages are located along rural road branched from National Road No.13, with approximate residential area of 112 ha.	Many villages located along National Road No.14B and roughly estimated to be about 474 ha in total, including surrounding paddy field.
5. Land Owner	Government (938 ha) and private (400 ha)	Mainly government, private houses are located along existing road.	Mostly private.

Site Alternatives	Bachiang and Pathoumphon	Xanasomboun	Phonethong
6. Public Infrastructure Condition			
a) Road	Beside National Road No.13	Beside National Road No.13	About 15 km to paved road (National Road No.10) by earth road (National Road No.14B). There are two single line bridges with load limitation of 8.0 ton on the way to National Road No.10 (National Road No.14B).
b) Water Supply	Public (piped) water supply service is limited to Pakse City and its surrounding. Currently, residents and operated factories are utilizing own private wells, including Beer Lao who utilize huge water volume.		
c) Sewerage	Individual treatment, however only few public and private facilities are having own treatment plant due to lack of governmental leadership. Almost all houses in urban area are equipped own septic tank.		
d) Solid Waste	Sanitary landfill (solid waste treatment facility) is located at Km 17 of NR 13 in Ban Xonpong District, north of Pakse. The facilities were funded by UNDP under operation of UDAA.		
e) Power Supply	Transmission Line installed along National Road No.13.		Transmission Line installed along National Road No.14B.
f) Communication	Communication line and antenna tower (for mobile phone) is available at the site.		
7. Development Progress	Common infrastructure development is not sufficient, except power supply and telecommunication which done by the supplier/provider.	Nil.	Nil.

4.5.4 Planned Industrial Estate Development

DoIC is implementing and accelerating the development of Bachiang and Pathoumphon Industrial Estate. This is located on National Road No.13S Km 10 to Km 19 south of Pakse City. Presently, about 45 factories already invested (as for September 2009) in said estate.

Due to lack of construction funds, infrastructure development works is only limited to earth roads which serve as access for the existing investors/factories. Water supply has been developed by each factory while power supply has been contracted directly between EDL and the investor.



Source: DoIC

Figure 4.5.1: Rough Sketch of Existing Bachiang and Pathoumphon Industrial Estate

Regarding Bachiang and Pathoumphon Industrial Estate with a total area of 1,388 ha, a Vietnamese private developer offers to develop 584 ha for the Special Industrial Zone, which consists of industry, housing and commercial centers. Feasibility study has been done by a Vietnamese consultant and currently (as of September 2009) under negotiation on resettlement and land acquisition of the site.

Source: DoIC

Figure 4.5.2: Feasibility Study on Vietnamese Industrial Estate

4.5.5 Infrastructure Development Plan

Public infrastructure demands for the industrial estate development in Pakse, Champasak are estimated based on the development framework (required area for the industrial zone) and interested industrial sector (investment demand survey result). The preliminary estimation results are summarized in Table 4.5.7.

Table 4.5.7: Demand Estimation for Champasak (Pakse) Industrial Zone Development

Demands		2015	2025
Industrial Estate Development Area		70 ha	330 ha
1.	Water Supply (m^3/d)	7,450	35,110
2.	Wastewater (m^3/d)	5,210	24,580
3.	Solid Waste (ton/d)	67	314
4.	Power Supply (MW)	8	35
5.	Communication (Mbps)	39	183

Source: JICA Survey Team

Infrastructure development concepts to supply above demands are proposed as shown in Table 4.5.8:

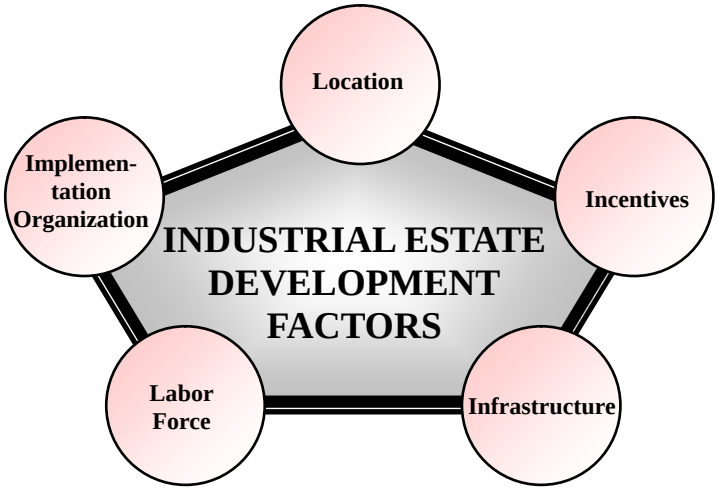
Table 4.5.8: Infrastructure Development Concepts

Sector		2015	2025
1.	Water Supply	Overall water supply demand is can be covered by groundwater resource. To minimize financial impact both for investors and developer, private well is most preferable. In this case, maximum conservation of existing trees and installation of monitoring well are recommended. Moreover, maximum groundwater abstraction volume per area may necessary to regulate in the industrial estate byelaw or construction guideline.	
2.	Wastewater	Considering the cost impact and O&M experience, currently proposed to be treated by each factory. DoIC is recommended to establish the effluent water monitoring system.	
3.	Solid Waste	Solid waste from the industrial can be treated by UDAA at current disposal site. Toxicity waste should be preliminary treated by factory own self.	
4.	Power Supply	Initial demand is plan to be supplied from external sub-station. EDL already have a contract with all existing factory individually. Power line was and will install by EDL.	It is recommended to install internal sub-station operated and managed by EDL which only supply to Bachiang and Pathoumphon Industrial Estate.
5.	Communication	The factory/investor will make a contract directly with own favorite service provider. Communication line installation space already secured by the developer.	

Source: JICA Survey Team

4.5.6 Evaluation of Investment Climate

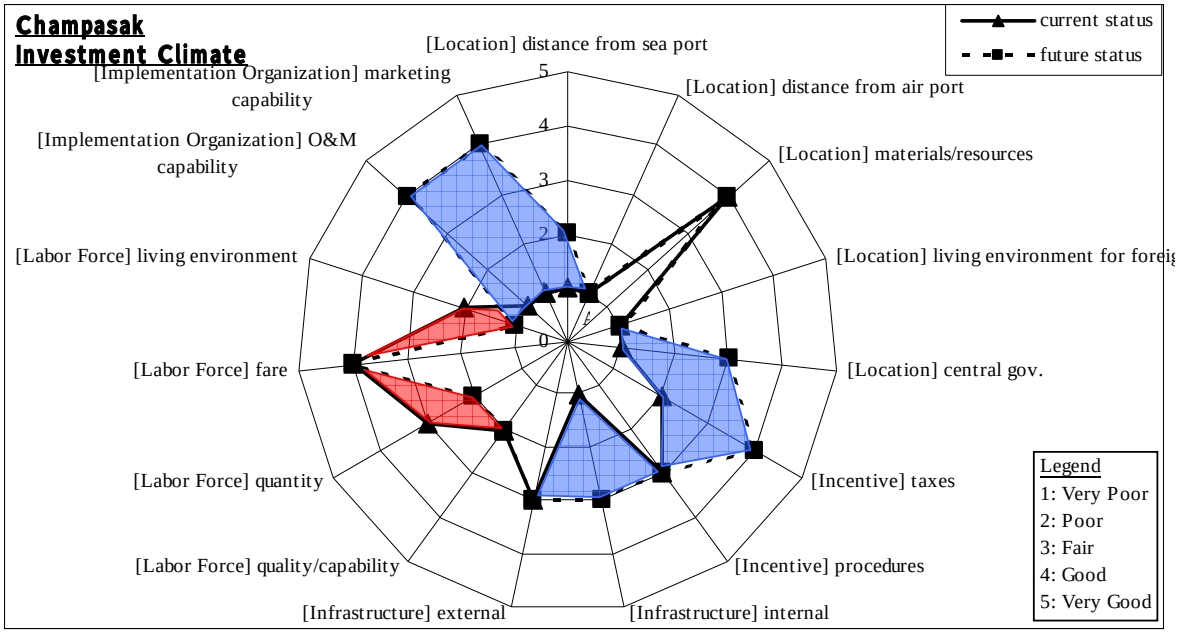
For prosperous development of industrial estate, five factors, which should be considered to create sufficient investment climate for the investor to attract industries, are shown in Figure 4.5.3.



Source: JICA Survey Team

Figure 4.5.3: Industrial Estate Development Factors

The investment climate of Champasak was evaluated based on the factors above, and the result is shown in Figure 4.5.4 and Table 4.5.9.



Source: JICA Survey Team

Figure 4.5.4: Evaluation Summary of Investment Climate

Table 4.5.9: Examination Result of Investment Climate

Development Factors		Score		Examination	
		current	future	current	future
Location	Distance from Sea Port	1	2	Currently, cargo volume to Leam Chabang - Thailand (about 780 km) is larger than Danang – Vietnam (about 400 km), due to the inland accessibility (road condition), freight frequency and its fare.	In the future, and inland accessibility may improved by East-West Corridor project and increase the freight frequency which also reduce the fare.
	Distance from Air Port	1	1	To Bangkok: 3days a week	Not much difference.
	Materials/ Resources	4	4	Boloven Plateau (agriculture).	No changes.
	Living env. for foreigner	1	1	Lack of accommodation, restaurants, shops, hospitals, education for child and entertainment.	No exclusive development plans yet.
	Central Gov. for procedures	1	3	It is necessary to have a direct connection with the related central government to accelerate procedures, improve request and update latest degree/law.	Inline with decentralization, it hopes that e-commerce will be established.
Incentives	Taxes	2	4	Can enjoy incentives stated in the investment promotion degree. However, it is not as much as an advantage compared with neighbor countries, such as Thailand and Vietnam.	There is a possibility to adopt better incentives through special degrees by each industrial estate.
	Procedures	3	3	There is no special procedure for industrial estate. All factories are required to have the same procedures.	No improvement programs yet.
Infrastructure	Internal	1	3	About 45 factories already invest and start operation at the Zone with minimum infrastructure as listed below. Road: unpaved Drainage: nil Water Supply: by own Sewerage: by own Solid Waste: VUDAA or own Power Supply: EDL Telecommunication: provider	Vietnam developer plans to invest for industrial estate with area of 500 ha among total zone area of 1,388 ha.
	External	3	3	The suppliers will respond based on request or real (contract) demand.	No specific infrastructure will be developed especially for VIZ.
Labor Force	Quality/ Capability	2	2	Basic education quality is low compared with Thailand and Vietnam. Not much familiar with industrialized living, such as time management and discipline.	Secondary education is planned to be improved. However, no measures have been made to improve basic skill for industrial workers.
	Quantity	3	2	Currently no labor problems due to countermeasure done by each factory, such as company dormitory and service bus.	Lack of labor when 500 ha of industrial estate is occupied by fully operational factories.
	Fare	4	4	Labor fare is low compared with Thailand.	No reason why labor fare in the Lao PDR will overtop Thailand.
	Living env.	2	1	There are villages within the zone.	It is necessary to plan for the housing and living environment for labor and resettlement.

Development Factors		Score		Examination	
		current	future	current	future
Implementation Organization	O&M capability	1	4	Not enough budget for operation and development. One Stop Service is not yet functioning at par with the international level.	Capacity of DoIC is expected to develop based on suggestions and inputs from the Vietnamese developer.
	Marketing capability	1	4	Not much sales promoting activities.	Capacity of DoIC is expected to develop based on suggestions and inputs from the Vietnamese developer.

Source: JICA Survey Team

4.5.7 Development Roadmap

(1) Key Success Factor

Based on the observed present conditions, the following key factors are identified for the successful implementation of industrial estate development in Champasak:

(a) Concentration on BPIZ Development

Area of BPIZ is enough to cover industrialization demand for more than the short term target (by year 2015). Similar development in the surrounding area without any countermeasures will cause deterioration of investment climate and price war among the industrial estate due to over demand. Consequently, it is recommended that the Government of Champasak Province concentrate on supporting private development to accelerate industrial estate development and attract investors.

(b) Revising Industrial Zone Development Plan based on Existing and Future Investors Needs

It is necessary to conduct demand survey for infrastructure improvement and cost sharing for the existing investors. Based on this proposed survey and the feasibility study done by the Vietnamese developer for the 500 ha industrial estate, infrastructure development policies for both occupied and vacant areas should be arranged to meet investment demand.

(c) Secure Quantity of Qualified Labor

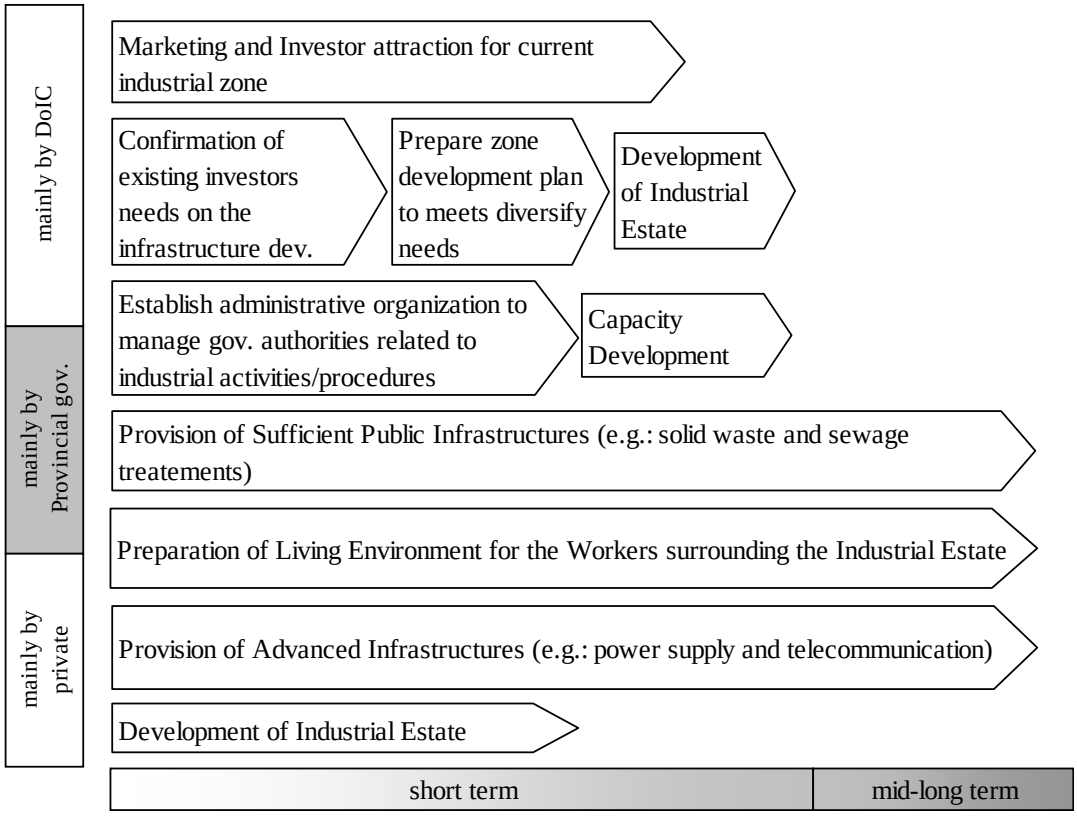
Especially for FDI, the labor issue is one of the important factors for their investment decision. To accelerate FDI promotion, it is necessary to ease their concerns by presenting countermeasures, such as employment support services, housing development, and support functions for qualified labors.

(d) Improvement of Investor Support Service

Coordination among related government agencies is necessary to improve investment climate, in terms of approved investments and information management related to the factory operation.

(2) Roadmap

The roadmap for successful implementation of the Vietnamese industrial estate development and to attract investors is summarized in Figure 4.5.5.



Source: JICA Survey Team

Figure 4.5.5: Roadmap for the Successful Implementation (Champasak)

CHAPTER 5 SELECTION OF A PRIORITY REGION FOR AN INDUSTRIAL PARK DEVELOPMENT STUDY

This chapter aims to rationalize the selection of a priority region for the first industrial estate in the Lao PDR. At the same time, the regional characteristics of Vientiane, Savannakhet and Pakse are discussed in terms of appropriate industrialization with a view for efficient use of local advantages.

5.1 Selection Process of a Priority Region for the First Industrial Estate in the Lao PDR

A nation generally has two different policies for locating an industrial park at regional level:

Policy 1: Socioeconomic Condition-Base: As a logical consequence to appeal to potential investors

Policy 2: Political Initiative: For the purpose of industrializing a certain region

Policy 1 is the most common. That is, a region with a large core city, which is densely inhabited, will be naturally selected by ordinary foreign investors from the socioeconomic point of view. However, Policy 2 is also true for some cases, especially when a government has particular intentions. For example, the Government of Japan promoted relocating factories from urbanized areas such as Tokyo, Osaka, and Nagoya, to depopulated areas far from big cities in the 1970s. In Vietnam, the construction of industrial parks and introduction of automobile and motorcycle industries have been strongly promoted in the north, which had been much less industrialized compared with the south, to reduce economic differentials between the two regions.

As for the Lao PDR, there seems to be no strong political movements at national level to promote industries in a specific region or city toward the near future. Therefore, the first industrial estate in the Lao PDR should be promoted in a region that strongly appeals to foreign investors. As described already in this section, unless there is a special reason, foreign investors commonly prefer urbanized areas where all the basic necessities for their daily lives and businesses are conveniently located, than rural areas where the living environment is often lower.

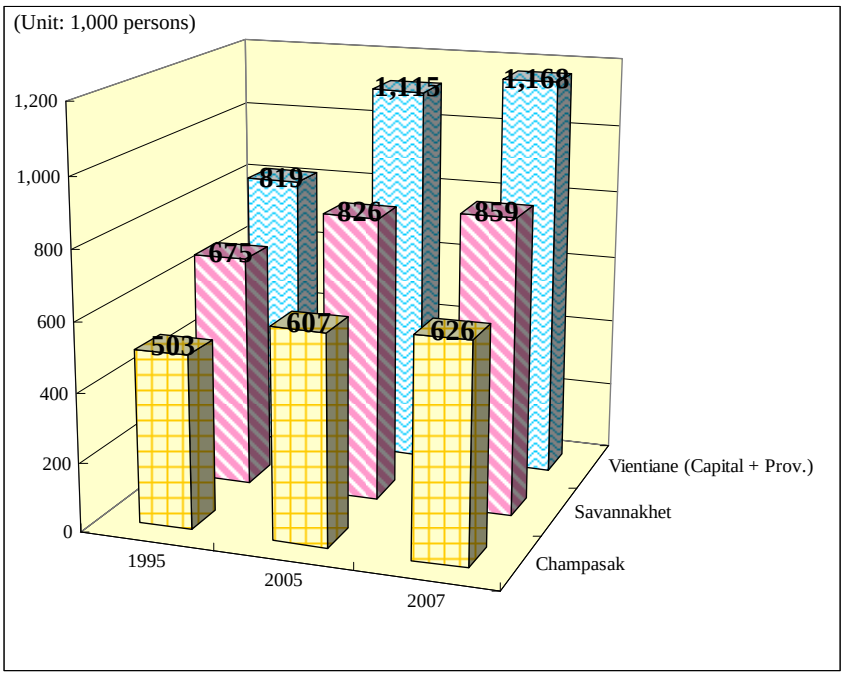
In this context, the following four valuation bases should be carefully considered as important factors in selecting the best location for the first industrial estate in the Lao PDR:

- Demographic Size
- Investment Trend
- Air Route Accessibility
- Basic Social Services

1) Demographic Size

Demographic scale together with the growth rate is one of the most basic factors for rationalizing an investment.

Referring to Figure 5.1.1, Vientiane (comprises Vientiane Capital and Vientiane Province) has a population of 1.17 million people (2007), which is at the top of the demographic list of the country. Population growth rate is also the highest in Vientiane throughout the period 1995-2007 (Table 5.1.1). Savannakhet and Pakse are the second and the third most populated provinces with a population of 859,000 and 626,000, respectively, but are evidently smaller than Vientiane in demographic scale.



Source: "Statistical Year Book 2007", Vientiane Capital, June 2008

Figure 5.1.1: Demographic Scale of Vientiane, Savannakhet and Pakse (1995-2007)

Table 5.1.1: Population Growth Rate of Vientiane, Savannakhet and Pakse (1995-2007)

	Province	1995-2005	2005-2007
1	Vientiane (Capital + Prov.)	36.1%	4.8%
2	Savannakhet	22.4%	4.0%
3	Champasak	20.7%	3.1%

Source: "Statistical Year Book 2007", Vientiane Capital, June 2008

2) Investment Trend

The investment trend in the three regions can be a barometer for determining the potential demand for industrial parks.

i) Investment Demand in Vientiane

According to the results of the investment demand survey, the number and the percentage of foreign companies interested in the Lao PDR and in each of its three regions are as shown in Table 5.1.2.

About 75 respondents out of 230 (32.6%) are interested in Vientiane, while 20 (8.7%) and 11 respondents (4.8%) are interested in Savannakhet and Pakse, respectively. As for Japanese enterprises, 34 respondents out of 179 (19.0%) are interested in Vientiane, while only 4 (2.2%) and 3 (1.7%) respondents are interested in Savannakhet and Pakse, respectively.

Table 5.1.2: Number and Percentage of Foreign Companies Interested in the Lao PDR and in Each of Its Three Regions

Country		Lao PDR	Vientiane	Savannaket	Pakse	Num of total respondents
1	Japan	44 24.6 %	34 19.0 %	4 2.2 %	3 1.7 %	179 100.0 %
2	Vietnam	25 100.0 %	23 92.0 %	2 8.0 %	1 4.0 %	25 100.0 %
3	Thailand	26 100.0 %	18 69.2 %	14 53.8 %	7 26.9 %	26 100.0 %
Total (3 countries)		95 41.3 %	75 32.6 %	20 8.7 %	11 4.8 %	230 100.0 %

Source: JICA Survey Team. (Investment Demand Survey)

ii) Existing Factories Owned by Foreign Investors in Vientiane

As shown in Table 5.1.3, there are 245 existing factories owned by foreign investors in the Lao PDR in 2009. About 134 factories out of 245 (55%) are located in Vientiane Capital. When it comes to garment and metal/machinery industries, 38 (97%) and 22 (52%) factories, respectively are located in Vientiane Capital.

Table 5.1.3: Number and Percentage of Factories Owned by Foreign Investors Located in Vientiane

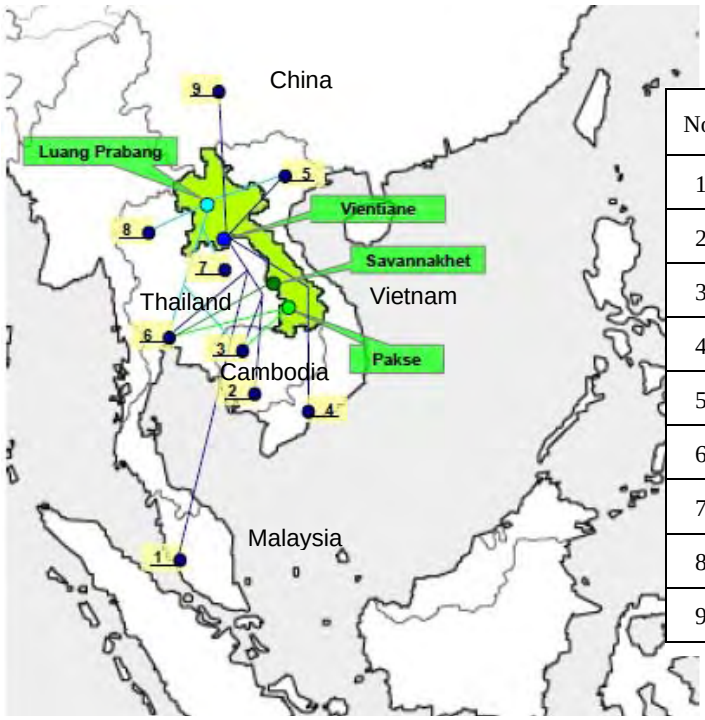
	Factory Type/ Location	Number	Percentage	Remarks
a	Total Number of factories	245		
b	of which located in Vientiane Capital	134	55%	= b/a
c	of which for garment industry	39		
d	of which located in Vientiane Capital	38	97%	= d/c
e	of which for metal/ machinery industry	42		
f	of which located in Vientiane Capital	22	52%	= f/e

Source: JICA Survey Team.

3) Air Route Accessibility

From the point of view of worldwide travel convenience for business management and personal matters, the air route accessibility between the Lao PDR and the major cities in its neighboring countries (Bangkok, Hanoi, etc) is one of the most important factors to encourage potential foreign investors.

Figure 5.1.2 shows all the air flight routes between the Lao PDR and its neighboring Southeast Asian countries. Vientiane is connected to seven foreign cities (Bangkok, Hanoi, Ho Chi Minh City, Phnom Penh, Siem Reap, Kunming, and Kuala Lumpur) in five countries via direct flights, while Pakse and Savannakhet have two and one direct flights to/from Thailand and Cambodia, respectively.



No.	Country	City (Airport) (IATA Code)
1	Malaysia	Kuala Lumpur (KUL)
2	Cambodia	Phnom Penh (PNH)
3		Siem Reap (REP)
4	Vietnam	Ho Chi Minh (SGN)
5		Hanoi (HAN)
6	Thailand	Bangkok (BKK)
7		Udon Thani (UTH)
8		Chiang Mai (CNX)
9	China	Kunming (KMG)

Note: Cities (airports) where flights are operated by up to one stopover are shown as the destinations in the figure above.
Source: LATM, OAG Flight Guide (April 2009)

Figure 5.1.2: International Scheduled Flight Routes to/from the Lao PDR (As of Apr. 2009)

Table 5.1.4 shows the scheduled international flights to/from Vientiane Airport (as of April 2009). Vientiane comes overwhelmingly as the most convenient for air travel among the three cities.

Table 5.1.4: Scheduled International Flights to/from Vientiane Airport (As of April, 2009)

Name of Airport (IATA Code)	Destination up to 1 stopover (IATA Code, Distance) and Aircrafts in Operation	Number of Flights per Week	Carriers for Operation	Remarks
Vientiane (Wattay Int'l AP, (VTE))	Kuala Lumpur (KUL,1,652 km) A320	6 flights	AK	
	Phnom Penh (PNH, 756 km) A320	14 flights	QV, VN	All flights are coded with QV and VN.
	Siem Reap (REP, 526 km) ATR72	8 flights	QV	
	Ho Chi Minh City (SGN, 909 km) A320	14 flights	VN	
	Hanoi (HAN, 493 km) A320,ATR72	24 flights	QV, VN	All flights are code share with QV and VN.
	Bangkok (BKK, 1,002 km) B737, ATR72	56 flights	QV, TG	Some flights are code share with QV and TG.
	Kunming (KMG, 777 km) ATR72, CRJ	22 flights	QV, MU	

Note: Number of flight services is counted as one-way trip.
Source: OAG Flight Guide (April 2009), Lao Air Home Page

4) Basic Social Services

Basic social services are indispensable for foreign investors and their families who stay long in the Lao PDR. Educational and medical services on a certain international level are most available in Vientiane Capital, while it is impossible to ensure access to social services of the same level in Savannakhet and Pakse.

i) Medical Facilities in Vientiane and Thailand

One French hospital in Vientiane and three Thai hospitals in Thailand are accessible in case of emergency. These facilities are as follows:

- Centre médial de l'ambassade de la France au Laos (Vientiane)
- Nongkhai Wattana General Hospital (Nongkhai City, Thailand)
- Aek Udon International Hospital (Udonthani, Thailand)
- Bumrungrad Hospital (Bangkok, Thailand)

ii) Educational Facilities in Vientiane

The following two schools could be chosen by Japanese investors:

- Vientiane Supplementary Lesson School for Japanese Children Staying in Laos
- Kiettisack International School (English school)

In addition, there are schools that teach in French and Chinese languages mainly for those who comprehend such languages.

5.2 Conclusion

The analysis stated above can be summarized as shown in Table 5.2.1. Vientiane ranks the highest among the other two regions for all the valuation bases. For this reason, it is concluded that Vientiane be selected as the priority region for the implementation of an industrial park.

Table 5.2.1: Summary of the Valuation for Selecting a Priority Region

**	Valuation Basis	Vientiane *	Savannakhet	Pakse (Champasak)
1	Population	3	2	1
2	Investment Trend	3	2	1
3	Air Route Accessibility	3	1	2
4	Basic Social Services	3	1	1
	Total	12 points	6 points	5 points

Note: * "Vientiane" = "Vientiane Capital" + "Vientiane Province"
** Rating
1 Population: In order of demographic size, 3 points, 2 points, and 1 point
2 Investment Trend: In order of attractiveness for foreign investors, 3 points, 2 points, and 1 point
3 Air Route Accessibility: In order of convenience, 3 points, 2 points, and 1 point
4 Basic Social Services: Best in the country = 3 points, Much less convenient when compared with the "Best" = 1 point

Source: JICA Survey Team