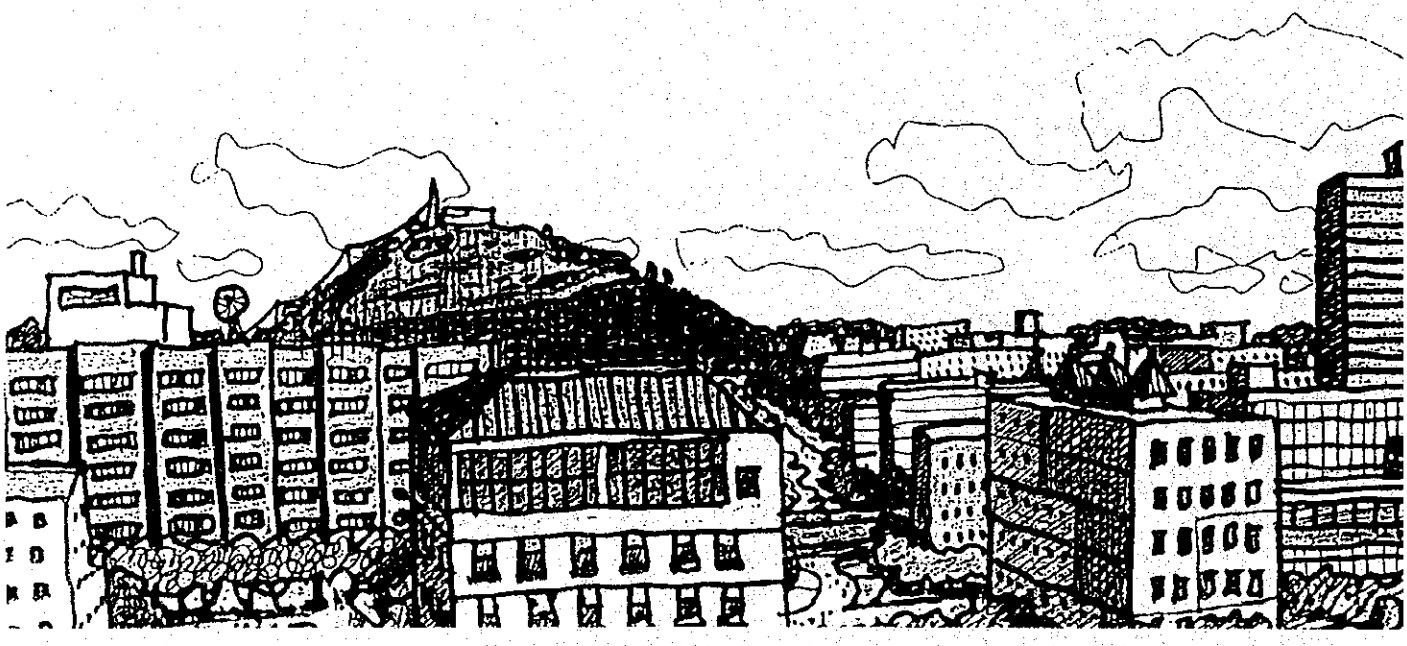
CHAPTER 3

DEVELOPMENT CONCEPT FOR THE CORRIDOR 21



CHAPTER 3 Development Concept for the Corridor 21

3.1 Goals and Objectives of the Corridor 21 Development

3.1.1 Overview of the Corridor 21 Development

The JICA Study consists of the formulation of the C/P and the M/P. The C/P involves the regional development covering the areas of Son Tay, Hoa Lac, Xuan Mai, and Micu Mon along the NR21A. While, the M/P specifically covers the urban development of the Hoa Lac and Xuan Mai areas.

In the forthcoming 21st century, Vietnam will face formidable social and economic challenges. Serious urban problems caused by increasing urban population will be the one crucial internal issue, and the other externally important issue will be how Vietnam can cope with fiercely competitive market conditions liberalized on a global basis.

Many Asian countries are facing serious urban problems caused by accelerated increase of urban population particularly in their capital cities. Extreme traffic congestion resulting in air pollution, inadequate waste management systems resulting in sanitary and hygienic problems, illegal settlement of migrated people resulting in squatters, and so on are, by and large, commonly seen in the capital cities. Vietnam's high population growth with its relatively low urban concentration would result in the accelerated increase of urban population in the 21st century as other Asian countries have experienced. In order to cope with the aggravating urban environment, urban planning and development should be pursued in a proactive manner before it goes to an unmanageable level.

The economic crisis currently gripping Asian countries could be attributable to many factors. However, it can be safely said that the previous development pattern, which is overly dependent on foreign financial resources and foreign technology, has already come up to a real need for deliberate reconsideration. Many Asian countries, including Vietnam, have actively pursued such development path, placing major emphasis on the export-oriented manufacturing industry as typically seen in Export Processing Zones (EPZs) in so-called growth-pole areas, and enjoyed their accelerated economic growth. However, foreign financial resources, regardless of foreign direct investments (FDI) or commercial loans, have potential risks in terms of their uncontrollable nature, and imported technology tends to generate marginal economic add-on value unless it is reasonably internalized.

In this context, developing Asian countries need to re-orient their development directions by making more inward-oriented "endogenous development efforts" to augment its economic capacity and fundamentals. Citing as examples are strengthening of capital formation, mobilization of domestic funds, exploitation of domestic market, maximum use of domestic resources, institutional building, human resource development, promotion of science and technology, and so on.

Vietnam cannot be an exception and needs to pay more attention to the endogenous or inward-oriented development path among which human resource development and promotion of science and technology are key issues. The Corridor 21 Development will be able to answer to these social and economic issues, and hence, it must be of national and strategic importance and significance. In this context, the Corridor 21 Development should be regarded as the "national project."

3.1.2 Goals of the Corridor 21 Development

The principal goals and related urban functions of the Corridor 21 Development are summarized as follows:

(1) To become the National Center for HRD and Development of Science and Technology

The Prime Minister's decision on the approval on the concept plan of the National University issued on January 26, 1998, outlined the policies as follows:

VNU is a center for education, training, and scientific research of multiple sectors, as well as inter-sector operational linkage among universities, research institutes, and experimental units, ensuring the integration of training and scientific research, and technology transfer. Also, VNU is a cultural center assuming the roles of solidifying science and cultural interchange in Vietnam's higher education.

According to the policies, VNU is expected to provide the functions of i) education, research and other related activities, and ii) science and cultural interchange in the higher education in Vietnam. Along this line, VNU is expected to grow as a comprehensive university that can cover a wide range of academic research fields as well as higher education and training activities, which necessitates for VNU to augment additional professional study courses in the fundamental fields. In relation with the science and cultural interchange, VNU is expected to assume a central function to network the information among academic institutes as well as between academic institutes and

industrial sector, and promote higher education among the nation through broadcast education, correspondence, social education, and so on.

(2) To assume the Leading Roles for Nurturing High-tech Industrial of the Country

The Prime Minister approved the HHTP Development in October 1998, with the following comments on the Development, which per se represents the policy of the Government.

"Dire experiences of economic crisis seriously gripping other Asian countries indicate that Vietnam should not completely imitate imported technology, as other countries had done to develop their national economy. Vietnam will be able to compete with other nations in the technological fields. Priority consideration should be given to improve human resources development, which is already recognized as one of the strengths of Vietnam, while personnel training should go hand in hand with research and development as well as business expansion. Vietnam should become a basically industrialized country over the next 25 years, and technology should be seen as a crucial factor in realizing that goal."

(3) To Share the Urban Functions of Hanoi Metropolitan Area (HMA)

In addition to the national center function for human resource development and development of science and technology, the Hoa Lac and Xuan Mai Development should also share the important HMA urban functions. International exchange, and culture and recreation will be the dominant functions to be shared. International exchange will be an inseparable part of the future economic growth, and the demand for culture, tourism and recreation will upsurge as per-capita incomes grow and a 5-day working system becomes popular. By sharing such functions, Hoa Lac/Xuan Mai will achieve its diversity, enhance its attractiveness, and strengthen its linkage with Hanoi.

(4) To absorb the increasing HMA urban population

As a matter of fact, by the year 2020, urban population of HMA is forecast to increase up to 4.5 million, and the Central Hanoi area may reasonably accommodate about 2.5 million and the rest need to be accommodated outside the Central area. Therefore, in order to avoid extreme concentration of population and resultant urban problems in the future HMA, accommodation of the probable spilled-over population is an important justification of the Corridor 21 Development.

As will be later discussed in detail, these goals and related urban functions of the Corridor 21 Development have functional linkages as illustrated in Figure 3.1.1.

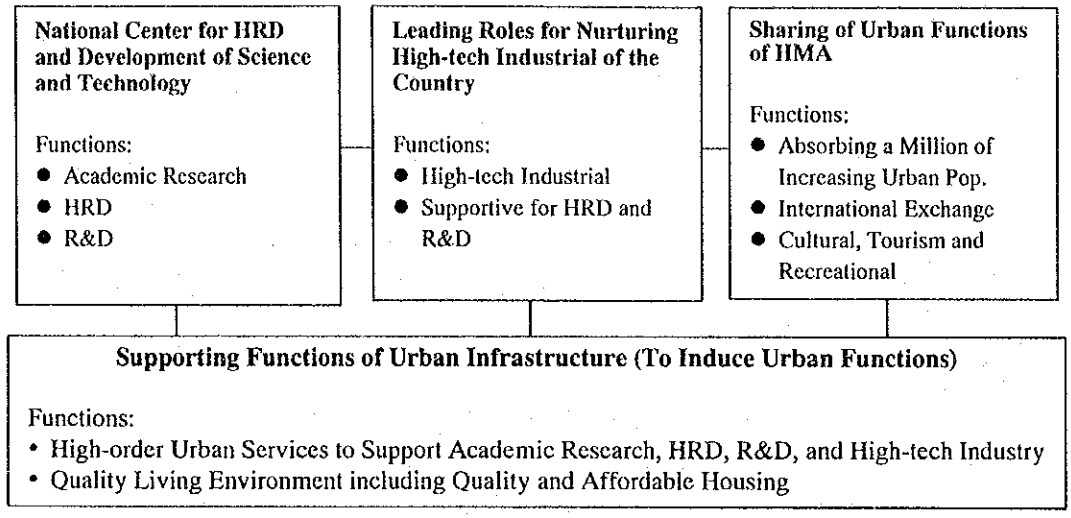


Figure 3.1.1 Goals Structure and Related Urban Functions

3.1.3 Objectives of the Corridor 21 Development

The above goals for the Corridor 21 Development are translated into more precise objectives to be challenged and reasonably achieved through its implementation process.

(1) Designation of the Hoa Lac and Xuan Mai Area as a Special Economic Zone (SEZ)

The Corridor 21 Development, particularly the core development on the Hoa Lac/Xuan Mai area, is of national importance and significance, and as such, to be regarded as the "national project." In order for the Project to receive special considerations and incentives from the Government, the concept of a "Special Economic Zone" will be proposed to apply to the Project. The SEZ incentives would induce private-sector investments of both domestic and foreign investors, thus expediting the implementation of the Project. Legal and institutional arrangements to effectuate the SEZ concept need to be done in advance. It is preliminarily conceived that the SEZ incentives should wholly cover the investment and economic activities that take place in the designated Zone (Hoa Lac and Xuan Mai Urban Area) but the existing high-tech and IZ incentives should also remain effective. And as such, application of these incentives should be optional with applicants.

(2) VNU Relocation

The Hoa Lac Urban Development includes the relocation of the Vietnam National University (VNU) to the Hoa Lac area. The VNU relocation is to reorganize and integrate its existing affiliated universities into a comprehensive university in the short run, and then integrate non-affiliated universities in the medium to long run. The VNU relocation is expected to respond to the increasing need for higher education as well as the development of science and technology in the country. In reorganizing and integrating, priority consideration will be given to strengthening the fields of science and technology, aiming at establishing a triad linkage among universities, enterprises, and public/private research and development (R&D) institutes.

(3) HHTP Development

The Hoa Lac Urban Development also includes the Hoa Lac High-Tech Park (HHTP) development. The HHTP development is to take a central role of internalizing and advancing the high technology, thus nurturing the high-tech industries in the country. The accomplished results will be diffused over the country to bolster the national efforts to promote science and technology in the 21st century.

(4) Share of HMA Urban Functions and Accommodation of HMA Urban Population

In addition to the central functions for HRD and R&D and harnessing high-tech industries, the Corridor 21 Development will also share the important HMA urban functions such as cultural exchange and recreation (in the Don Mo area), international exchange (in the Center Area in Hoa Lac), and so on. Also, it will partly absorb the sharply increasing HMA urban population in the future, and importantly act as "receptacles" to absorb the resettlement needs resulting from the urban renewal and redevelopment in the Central Hanoi area.

(5) Pioneering Housing Development

The Corridor 21 Development, in general, and the Hoa Lac and Xuan Mai Urban Development, in particular, is a pioneering project in the context of promoting a nationwide housing development in order to improve the aggravating living environment of the people, thus contributing to enhancing the national economy and welfare. New policies and institutions will be introduced to encourage people to own quality homes at

affordable prices. Citing as examples are the issuance of a "Housing Development Bond," and the establishment of the "Housing Development Corporation."

(6) Creation of an Environment-Friendly Garden City

In order for the Corridor 21 Development to flexibly respond to changes in future, a belt-shaped zone along the NR21A should be designated as an urban development zone. Any development activities outside the zone should be strictly controlled from the viewpoints of a natural environmental conservation and preservation of high-productive agricultural area. The concept is to create a "Garden City" where convenient urban life and natural environment can coexist.

(7) Creation of an Attractive Urban Center

An attractive and convenient "Urban Center" should be planned and developed from the beginning phase, which should cater not only to the people living in the Hoa Lac area but also to those living in the Corridor 21 or even in neighboring regions. It is rightly presumed that the success in inducing people and investors to come in would be partly dependent on the attractiveness of the Urban Center created.

(8) Compact Development Approach

In order to reduce the development cost for infrastructure, "Compact Development" approach is always to be pursued particularly for the first phase development of VNU, HHTP, the Urban Center, as well as Dong Xuan Housing. Such compact development will also present a "unified" impression rather than "piecemeal" appearance, thus alleviating the sense of incompleteness in the development process.

(9) Land Acquisition and Resettlement Harmonious with Existing Communities

In order to develop the Hoa Lac/Xuan Mai area in a cost-effective manner in both economic and social terms, land acquisition and resettlement should be handled using innovative means in order to minimize compensation in cash. Attempts should be made to conserve in principle the existing major village communities and already urbanized areas, unless they have to be dispersed in a smaller scale, which would contribute to savings in land acquisition cost.

(10) Active Participation of the Local Government

Although the Hoa Lac and Xuan Mai Urban Development is considered as a national project, expectations are high that the Ha Tay Province will have an important role for its implementation as a major stakeholder. The Ha Tay Province would be responsible for land management and administration, as well as for construction and operation/maintenance of various public and community facilities. Should decentralization becomes an issue in the future, local governments would have to build their capability for implementing development projects and programs. In this context, the Corridor 21 Development will be a precious opportunity to enrich their experiences and capacities.

3.2 Functional Roles of Son Tay, Hoa Lac, Xuan Mai, and Mieu Mon

3.2.1 Son Tay

Son Tay is predominantly characterized as the tourist service center along the Corridor due to its endowment of tourism resources such as cultural heritages and natural resources such as Hai Lake and Dong Mo Lake, and Ba Vi Mountain. Son Tay is conveniently accessible from Hanoi via NR32, Lang-Hoa Lac Highway and NR21A, and the Red River cruise. A cultural village project is planned on the surrounding area of the Dong Mo Lake, where not only Hanoi citizens but also international tourists would visit. Tourism-related services and industries will locate in Son Tay including hotels and restaurants, souvenir shops, cottage industries for handicrafts, and so on.

Son Tay will also be a center for marketing perishable foods such as vegetables, fruits, fishes, and meats, as well as agri-processed products. Associated with the development of Hoa Lac, some educational and R&D functions may spill over Son Tay due to its proximity to Hoa Lac.

Future urban developments of Son Tay will be of the "expansion type" centering around and harmonizing with the existing urban structure and communities. The direction of major urban expansion are proposed to the south along NR21A and to the west along the road to Hai Lake.

3.2.2 Xuan Mai

Xuan Mai will be the center for trade and industry as well as goods circulation for the region. Due to its proximity to Hoa Lac, industrial developments may ripple over Xuan Mai in rather a

short period of time. Trade processing industries will be induced to locate in Xuan Mai due to its convenient accessibility to peripheral and inland areas via NR6 and NR21A.

The Hoa Lac and Xuan Mai Urban Development Project will generate massive construction needs including production of construction materials and equipment. Xuan Mai, associated with Mieu Mon, will be the center of construction industries to support the Urban Development.

With the existence of schools, university, colleges, and vocational training facilities, Xuan Mai will remain as a regional center for education and training functions. Future urban developments of Xuan Mai will be of the "expansion type" centering around and harmonizing with the existing urban structure and communities. Also, with the relocation of some military facilities from Hoa Lac, Xuan Mai will assume important national defense functions.

3.2.3 Mieu Mon

The master plan prepared by MOC indicates the possibility of developing a new Mieu Mon International Airport within the planning period (2020). If it comes true, enormous development potentials will be created in Mieu Mon such as various passenger services, high-tech industries, off-shore business center, tourism and convention, and so on. Given the little possibility of developing the airport, potential industries will be dominated by construction industries including production of construction materials and equipment like Xuan Mai.

Among the production, pre-cast concrete products for use in various construction purposes are considered to have high potential, taking advantage of the existing pre-cast concrete factories and easily available concrete aggregates from nearby quarries. Although it depends on the future technological development, pre-cast concrete system for housing construction will be in massive need even for the Hoa Lac and Xuan Mai Urban Development.

3.3 Social and Economic Framework for the Corridor 21 Development

3.3.1 Population Framework

In the MOC master plan, the Corridor 21 is allocated a population of one million, which is coordinated with the MHAM/P. The population framework of the MOC Plan is summarized in the following table:

Table 3.3.1 Population Framework of the MOC Master Plan

Urban Area	Present (1996)	Phase-1A (2005)	Phase-1B (2010)	Phase-2 (2020)
1. Son Tay	40,000	60,000	80,000	100,000
2. Hoa Lac	44,000	150,000	420,000	670,000
3. Xuan Mai	35,000	60,000	90,000	170,000
4. Mieu Mon	1,000	5,000	10,000	30,000
5. Reservation		10,000	20,000	30,000
Total Population	120,000	285,000	620,000	1,000,000

Source: MOC master plan

After careful assessment of the MOC master plan, the Study Team reset the population framework from the following point of views:

- To apply the proposed strategic development scenario for the four urban areas to minimize a front-heavy investment and to maximize an investment effect.
- Commuters to Hanoi will start and grow to settle in the C21 Area from the beginning of Phase-2 towards the maturing development phase.
- Migration to the C21 will keep pace with increasing job opportunities resulted from industrial development.
- Economic recession will influence the C21 Development causing delay in investment and financial difficulty for public sector investment.
- Socio-economic framework for the existing plans (such as VNU and HHTP) should be reviewed and updated.

The one million targeted population for C21 on the HMA M/P and the MOC master plan is proposed to maintain, however the target year for one million population is proposed to postpone to Phase-3 (after the year 2020).

Based on the review of the existing plans, the job creation in each sector is shown as follows.

Table 3.3.2 Employment Framework for C21 by Sector and Phase

Sector	Phase-1A (2005)	Phase-1B (2010)	Phase-2 (2020)	Phase-3 (post 2020)
University	7,100	9,900	14,700	23,000
R&D	2,700	5,300	9,600	18,000
Manufacture	24,000	43,500	96,100	160,000
Construction	15,000	23,000	30,300	46,000
Services	15,700	29,200	72,500	120,000
Existing Industries	48,000	48,000	48,000	48,000
Total	125,000	158,900	271,200	415,000
Commuter from Hanoi	7,700	9,400	13,700	20,000
Commuter to Hanoi	-	-	22,000	50,000
Employed Resident in C21	104,800	149,500	279,500	445,000

Source: JICA Study Team

Note: Commuters to Hanoi will settle in Hoa Lac subject to the development of mass transportation system.

Based on the employment framework, the target population of Corridor 21 is set on the assumption of the labor participation ratio, which is 50 % in each phase. The target population is allocated to the urban development areas taking into consideration of the land availability and suitability analysis as well as the development direction for each urban area. The result is summarized as follows.

Table 3.3.3 Population Framework for C21 by Urban Area and Phase

Urban Area	Phase-1A (2005)	Phase-1B (2010)	Phase-2 (2020)	Phase-3 (post 2020)
Total Population	241,500	342,000	624,000	1,000,000
(students with family in dormitory)	(32,000)	(43,000)	(65,000)	(110,000)
Son Tay	50,000	60,000	90,000	150,000
Don Mo Area	10,000	20,000	30,000	30,000
Hoa Lac	135,000	205,000	400,000	570,000
(students with family in dormitory)	(32,000)	(43,000)	(65,000)	(110,000)
Xuan Mai	45,000	55,000	100,000	200,000
Mieu Mon	1,500	2,000	4,000	50,000

Source: JICA Study Team

3.3.2 Economic Framework

(1) GDP Growth

1) GDP in 2020

The late 90's saw Vietnamese economy proceeding to a high growth on track, with the FDI playing an important role as catalyst. In the near future, the key element to the economic growth of Vietnam shall be FDI; therefore, the active promotion of FDI will be required.

The major investors to Vietnam, on the other hand, have been France, the USA and those of Asian countries, which have been facing economic difficulties in recent years. To set-up the target of economic growth, the JICA Study Team came up with the following 3 scenarios of "Optimistic", "Intermediate", and "Pessimistic".

The most optimistic scenario is as follows:

- The financial crisis covering the neighboring countries will end within a few years owing to international cooperation and the adoption of appropriate policies by each Government; thereafter the Asian dynamism will be recovered.
- The growth of Vietnamese economy in the year 2000 will slightly fall short of its target or maintain its current situation. From the year 2000 onwards the Vietnamese economy will recover and move to a higher growth track with the expanding inflow of FDI.
- Regarding FDI, the major sector will be manufacturing. The investment for service sector will increase.
- The economic growth will cause the structural change to an industry-oriented economy. Share of the Primary sector to the GDP, therefore, shall decline rapidly and the secondary sector shall be the prime engine for economy. With the expansion of the secondary sector, the income level will be go up and, in the long run, the purchasing power generated by the rising income will provoke the tertiary sector to grow.

The most pessimistic scenario, on the other hand, is as follows:

- Recovery of the Asian economies is delayed until the year 2005 unavoidably caused by the rather long aftereffects of the financial crisis.
- The low inflow of FDI will slow down the growth of Vietnamese economy.
- Effects of recession will remain till the year 2005 at the least, thereafter signs of recovery will show gradually.
- The Vietnamese economy will return to its growing track at the year 2010.

There is a third scenario, that is, the intermediate growth scenario. The difference among the scenarios is to consider the period of economic or financial crisis and that of aftereffects. In other words, when the Vietnamese economy will return to the high growth path is the important question. In the optimistic case, it is expected at the year 2000, and the pessimistic at the year 2010. The third one, therefore, presumes it to be year 2005.

The Study Team projected the GDP in each case. The results of the forecast are summarized in the following table.

Table 3.3.4 GDP Forecast by 3 Scenario

	Scenario	1997	2000	2005	2010	2015	2020
GDP (c.'97) (billion VND)	Optimistic	295,700	372,492	573,125	902,235	1,453,059	2,340,166
	Intermediate		362,240	520,043	764,114	1,175,683	1,893,450
	Pessimistic		352,179	471,295	661,015	971,248	1,564,204
Per-capita GDP ('000 VND)	Optimistic	3,854.8	4,623.8	6,576.3	9,667.1	14,667.4	22,512.4
	Intermediate		4,496.5	5,967.2	8,187.2	11,875.6	18,215.0
	Pessimistic		4,371.6	5,407.8	7,082.6	9,810.6	15,047.7
GDP (Annual Growth Rate)	Optimistic	8.8%	8.0%	9.0%	9.5%	10.0%	10.0%
	Intermediate		7.0%	7.5%	8.0%	9.0%	10.0%
	Pessimistic		6.0%	6.0%	7.0%	8.0%	10.0%
Population ('000)	Intermediate	76,710	80,560	87,150	93,330	99,000	103,950

Source: JICA Study Team

Note: GDP is indicated as constant price in 1997. The nominal per-capita GDP shall be around two times that of constant price. The population (unit: thousand) is adopted at the case of intermediate growth scenario.

The annual GDP will be 5-8 times in 2020 to compare with that in 1997. The JICA Study Team select the moderate growth scenario, hereafter, uses the intermediate scenario as GDP.

2) Per-capita GDP

The per-capita GDP in 2020 will be five times that in 1997. However, it will still be a very low level as indicated by the US dollar. Assuming the exchange rate to be fixed at the middle of 1998 at US$ 1.00 equals VND 13,900, the per-capita GDP in 2020 will be US$ 1,310. In the long run, however, the value of constant price would diminish since the basket for the price determination will change. The nominal indicator of per-capita GDP is estimated at US$ 2,580 in 2010. In general, the inflation rate will be higher in the case of high growth than that of low growth, therefore, the nominal per-capita GDP in the case of the higher growth might be some 4,500 US dollars.

3) Economic Structure

Although the primary sector marks a moderate growth, the share to the GDP gradually decreases during the projection period and reaches 16.5 % in 2010 and 11 % in 2020. The secondary sector, on the other hand, grows at some 10 % and above, and the share to the

GDP gains 40 % in 2010 and 43.5 % in 2020. Regarding the tertiary sector, during the early projection period, the growth rate is slightly moderate and thereafter it shows a pronounced increase and the share to the GDP is 43.5 % in 2010 and 45.5 % in 2020. In 2020 it achieve the industrialized society. The primary sector, especially the agriculture falls from the leading sector but remains as the important sector.

Table 3.3.5 National Economic Structure

		1997	2000	2005	2010	2020
Primary	Amount (billion VND)	76,028	86,938	104,009	126,079	208,280
	Share (%)	25.7	24.0	20.0	16.5	11.0
	Annual Growth (%)	-	4.6	3.7	3.9	5.1
Secondary	Amount (billion VND)	93,849	123,162	195,016	305,646	823,655
	Share (%)	31.7	34.0	37.5	40.0	43.5
	Annual Growth (%)	-	9.5	9.6	9.4	10.4
Tertiary	Amount (billion VND)	125,819	152,141	221,018	332,390	861,524
	Share (%)	42.6	42.0	42.5	43.5	45.5
	Annual Growth (%)	-	6.5	7.8	8.5	10.0

Source: JICA Study Team
Note: Growth indicates the annual average growth rate.

(2) Economic Structure in RRD Region and HMA

1) Red River Delta (RRD) Region

Since the regional data in time series is limited, the Study Team, using the sectoral output as proxy variables for GRDP component, estimated the GRDP and economic structure in the RRD Region. In the case of the national economy, the Study Team estimated the GDP through the scenario at first and the calculated GDP as benchmark was distributed to the economic sectors. The economic structure was estimated at first and then the GRDP was calculated. In the calculation, the provincial share of each proxy variable, such as the provincial agricultural out put to those of primary sector, provincial manufacture output to secondary and retail sales to the tertiary, to the whole country, was calculated. The share to the nation is assumed to be stable. The GDP component of whole country was distributed by the structure. Therefore, the expected GRDP in each group of provinces is slightly moderate or their regional structure is rather stable. The GRDP and economic structure in RRD Region are summarized in the following table.

Table 3.3.6 GRDP and Economic Structure in RRD Region

	2000	2005	2010	2020
GRDP (billion VND)	65,724	94,170	138,018	339,929
Primary (billion VND)	17,006	20,384	24,733	40,837
Secondary (billion VND)	21,973	34,858	54,685	147,287
Tertiary (billion VND)	26,745	38,928	58,600	151,804
Primary (%)	25.9	21.6	17.9	12.0
Secondary (%)	33.4	37.0	39.6	43.3
Tertiary (%)	40.7	41.3	42.5	44.7
GRDP Growth Rate (%)	6.9	7.5	7.9	9.4
Per-capita GRDP ('000 VND)	4,679	6,198	8,482	18,756

Source: JICA Study Team

Note: Since the available data in the RRD Delta is limited, the coverage area of RR Delta in the population estimation is different from that in GRDP estimation. In this section, the area of RR Delta consists of the following provinces: Hanoi, Hai Phong, Ha Tay, Hung Yen, Hai Duong, Thai Binh, Ha Nam, Nam Dinh, and Ninh Binh. The growth rate indicated in year 2000 is the annual average from 1997-2000. The population allocation used in the calculation of per-capita GRDP was that of the current population structure.

2) Hanoi Metropolitan Area (HMA)

Although HMA covers 7,800 sq. km, the urban area is the focal point. In the HMA Master Plan, the projected economic activities are rather weak, except for Hanoi City, as indicated by its economic structure. The estimation of the economic structure in HMA aims to contribute to set the economic framework in the Corridor 21. Since published economic data on the urban area is unavailable, the Study Team considered using Hanoi data to proxy variables anew. The expected Hanoi GRDP will be similar to that of the HMA urban. Bases of the hypothesis are as follows:

- The objectives of HMA M/P are directed towards the distribution of the expected population to Hanoi.
- The estimated Hanoi GRDP, excluding those generated by the projects in HMA M/P, will be considered as the results of the economic activities generated by the above expected population.

Since the above hypothesis ignores the effect from the development of the projects in HMA M/P, the following GRDP might be considered as underestimated. The GRDP and per-capita GRDP in HMA are presented in the following table.

Table 3.3.7 Economic Structure in HMA

	2005	2010	2020
GRDP (billion VND)	38,211	57,629	151,654
Primary (billion VND)	1,188	1,982	531
Secondary (billion VND)	15,338	25,933	69,230
Tertiary (billion VND)	21,685	29,714	81,893
Primary (%)	3.11	3.44	0.35
Secondary (%)	40.14	45.00	45.65
Tertiary (%)	56.75	51.56	54.00
GRDP Growth Rate (%)	8.0%	8.6%	10.2%
Per-capita GRDP ('000 VND)	15,855	16,367	32,042

Source: Study Team estimates based on the modification of the Master Plan for Hanoi capital up to 2020 by HPC/MOC.

(3) Economic Framework in Corridor21

Based on the economic structure and per-capita GRDP in HMA M/P, the economic framework in Corridor 21 is drawn up assuming the following scenario.

- The prime engine of the Corridor 21 Development in its Phase 1A shall be the R&D and education institutes, hi-tech industries and its supporting industries, construction, and related services. The share of secondary sector, therefore, is rather high.
- The primary sector occupies a certain position until Phase 1B, thereafter; the share to the GRDP falls sharply.
- The tertiary sector will be the followers except for the R&D institutes and software industry. The share to the GRDP, therefore, is rather low.
- The economic structure in Phase 2 shall be much sophisticated and the productivity in each sector shall be highest in the country.

Under the above scenario and the working population estimated in the previous section, the JICA Study Team worked out the economic framework in the Corridor 21. In the Phase 1, the low-productivity sector, such as the existing agricultural sector, remains, with its portion, relatively large. Therefore, the per-capita GRDP is slightly lower than that of Hanoi. Phase 2 is positioned as that of expansion, with both secondary and tertiary sectors having a 10 % share and an increasing growth rate, and the industry-driven GRDP is more than double. The per-capita GRDP exceeds that of Hanoi at least in the year 2020. The target economic framework in the Corridor 21 Development is summarized below.

Table 3.3.8 Economic Framework in the Corridor 21

	2005	2010	2020
GRDP (billion VND)	2,608	5,185	26,949
Primary (billion VND)	287	461	135
Secondary (billion VND)	1,134	2,309	13,340
Tertiary (billion VND)	1,187	2,415	13,474
Primary (%)	11.0	8.90	0.50
Secondary (%)	43.5	44.53	49.50
Tertiary (%)	45.5	46.57	50.00
Per-capita GRDP ('000 VND)	9,513	13,094	33,644

Source: JICA Study Team

3.4 Phasing Scenario for the Corridor 21 Development

The reality of the Corridor 21 Development should be carefully examined as to how to introduce diverse urban functions and to induce the settlement of people, in order to create a new counter growth cities in the Corridor 21. A large-scale urban development cannot be created only by means of administrative control and/or conducive measures from the urban planning aspects. The real issue is how to create an attractive urban space for the purpose of introducing diverse urban functions as well as settlement of people.

Particularly, associated with the planned urban functions such as VNU and HHTP, highly intelligent people with relatively high incomes and diverse value consciousness are expected to reside in the Hoa Lac area. Therefore, its living environment should be attractive enough to induce the settlement of such categories of people. The phase-wise basic development scenario will consist of the following three conceptual phases. However, in the light of the current economic crisis and the resultant extremely tight fiscal situation of the Government, "Action Plan," designed to minimize the initial capital investment, will be proposed for consideration by the Government.

3.4.1 Phase-1 (by 2010) – Initiation Phase

The first phase, which is referred to as the "initiation phase," is to strategically introduce the principal urban functions, such as VNU and HHTP, in order to initiate and put the Development on the right implementation track. As a matter of fact, VNU relocation and HHTP development will be the "two strong engines" to pull the Development towards actual implementation. In other words, the Development is largely dependent upon the successful introduction of these two components.

This phase may take up to the year 2010, during which the Development will progress in two sub-phases, i.e. Phase-1A by the year 2005 and Phase-1B by the year 2010. Phase-1A is categorized as the initial start-up phase and Phase-1B as the momentum-gaining phase.

In Phase-1A, VNU will achieve the relocation of its four affiliated universities (Natural Science, Social Science and Humanities, Pedagogy, and Foreign Languages) and the establishment of three new faculties (Technology, Law, and Economics) with the total number of 30,000 students. Meanwhile, HHTP will achieve the partial development of five planned zones (R&D, High-Tech Industry, HHTP Center, Urban Business, and Residential) with the total of 9,000 employed population in about 440 hectares.

In the subsequent Phase-1B, VNU will expand its academic fields (Faculties of Agro-forestry, Pharmacy, Architecture, State Management, Health Care and Social Services, and International Relations) with the total number of 40,000 students. On the other hand, HHTP will expand the scale of the zones to increase to the total number of 15,000 employed population in the about 750 hectares.

Accompanied by the VNU relocation and the HHTP development, construction industries and service industries will emerge from the beginning of this phase. Particularly, massive construction demand will rapidly ripple over the construction industries in Xuan Mai. Also, international exchange will be an inseparable part of the future economic growth, and there will be an upsurge for cultural and recreational demand as per-capita incomes grow and a five-day working system becomes popular. Son Tay, associated with the Dong Mo Lake, will be the center for cultural and recreational activities. The development framework for other urban functions will be discussed in Chapter 4 of this report.

However, the development in this phase will be characterized as the "self-contained development" centering the Hoa Lac Urban Area, without being strongly linked neither with Central Hanoi nor with the other urban development area in the Corridor 21. This implies that the people living in the Hoa Lac area will mostly reside and work therein without generating massive demand for commuting to and from Central Hanoi. Although the Lang-Hoa Lac Highway will be expanded to four lanes by the year 2005, other mass transport modes, such as a mass railway transit, may not become necessary in this phase.

Among the infrastructure development, water supply for the Hoa Lac and Xuan Mai is of the prime importance due to its prerequisite nature for urban development as well as its financial and time-wise implications for development. Therefore, the proposed water supply project, i.e. using Da River as water source for the Development, should be fast-tracked as an independent project so that water will have been ready when the urban functions in the area come to

operation. Other infrastructure and public/community facilities will be developed on a staged basis, depending on the demand generated from the Development.

3.4.2 Phase-2 (by 2020) – Growing Phase

The second phase, which is referred to as the "growing phase," is to achieve the development momentum towards the creation of a multi-functional counter growth city with more diverse urban functions and more settlement of people.

This phase may take up to the year 2020, the time when Corridor 21 will have been substantially completed with the total population of some 600,000. The original master plan prepared by MOC was planned to have one million by the end of this phase, but it was downscaled by the JICA Study Team.

In this phase, the Hoa Lac and Xuan Mai area will grow to a 500,000 city, having 400,000 and 100,000 population respectively. The total number of VNU students will increase to 60,000 in the campus area of about 800 hectares, and the total number of employed population in HHTP will increase to 25,000 in the area of about 800 hectares. Also, apart from the HHTP development, industrial development will grow in Phu Cat in Hoa Lac and Xuan Mai, the total area of which will amount to about 600 hectares.

In this phase, as various social and economic activities will be thriving in the Corridor 21, the primary linkage between the Hoa Lac/Xuan Mai area and Central Hanoi will be much strengthened, followed by the strengthening of the secondary linkages between Hoa Lac and other Son Tay and Mieu Mon Urban Areas. Consequently, various service industries will agglomerate in the Corridor 21 in general, and in particular, in the Hoa Lac area. The Urban Center in Hoa Lac will be the core of the service industries, gathering many visitors for cultural and international exchange, sports and leisure, civic services, health and medical care, physical distribution, commerce and business, and so on.

The strong linkage between the Hoa Lac Urban Area and Central Hanoi will eventually necessitate the introduction of a mass railway transit (MRT) system. Conversely, it can be said that without the convenient MRT system, the Corridor 21 Development will limit its potential for growth as a multi-functional counter growth city for Hanoi. It is envisioned that the economic situation of Vietnam after the year 2010 would make it possible to introduce the MRT system on a privatized basis. Also, the strengthened inter-city linkages among the four urban development areas in the Corridor 21 would necessitate the introduction of a public

transportation system (bus service), although its scale may not be as large as that to Central Hanoi.

This phase will face increasing pressure of absorbing the spilled-over population from Central Hanoi Area, as well as the increasing demand for diverse urban functions including those required for international exchange such as hotels, convention halls, international exhibitions, tourism resorts, and so on. Also, as the per-capita incomes of the Hanoi citizens steadily grow, certain motorization will take place, and the citizens' increasing bargaining power will bring about certain consumerism, on the one hand, and a variety of housing demand, on the other hand. The Corridor 21 Development will properly respond to these changing circumstances.

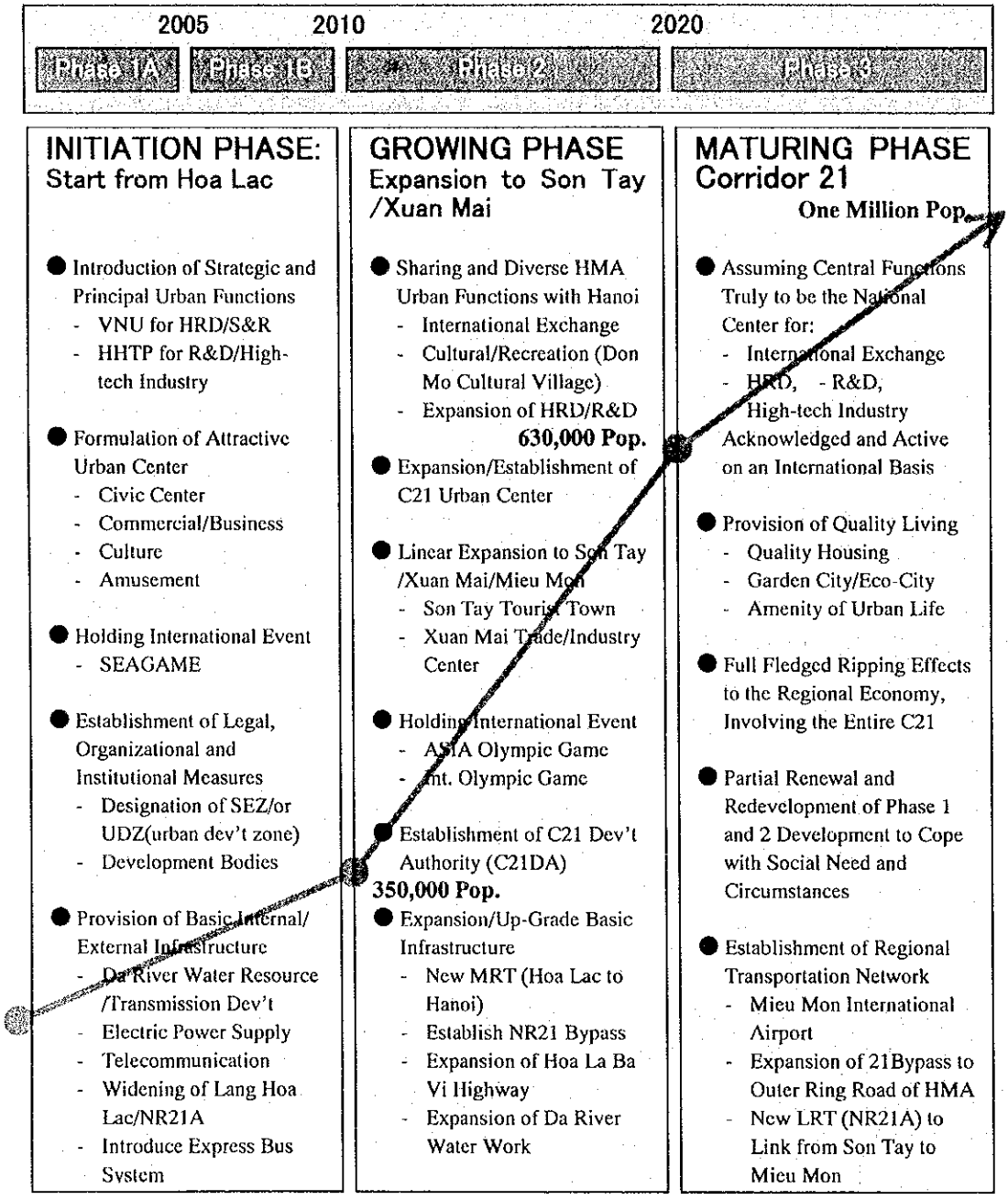
As a matter of fact, one of the key issues that will dominate the development of this phase will be how to successfully formulate the housing market where even the low-to-medium income groups can afford to purchase quality housing. In this context, appropriate housing policies should be well established to support and nurture a healthier housing market, as the housing sector is one of the important macro-economic stimulators. The JICA Study Team's vision is that by the end of this phase, more than 20,000 residents in Hoa Lac will commute to Central Hanoi for work, which implies that a considerable number of population will be attracted to reside in the area just as a dormitory city.

3.4.3 Phase-3 (After 2020) – Maturing Phase

The third phase, which is referred to as the "maturing phase," during which the Development will be maturing towards a substantive counter growth city for Hanoi, having diverse urban functions and quality residential function absorbing spilled-over population of Hanoi Central Area.

In this phase, earlier developments will be partly renewed and redeveloped to meet the changing demands of the residents, and the landscape and environment of the area will change to provide more comfortable and convenient place for the people to live, work, and enjoy. The Corridor 21 will have been world famous of its "Garden City" and "Eco-Science City" where many foreigners will gather for various purposes. In this phase, a new light rail system will be required to integrate the four urban developments in Corridor 21. Also, a new international airport is likely to be established in Mieu Mon, the NR21 Bypass will be established to the new Outer Ring Expressway of HMA, and motorway linking Hanoi to Ho Chi Minh City will link to the Corridor 21. These will surely give further impetus for the development of the Corridor 21.

Over this phase, the Corridor 21 will be nearing a one-million city, providing more balanced and quality urban space to absorb different categories of residents, such as different generations, different professions, different income levels, and so on.



The gray line shows the expected tendency of the targeted population increase in the Corridor 21.

Figure 3.4.1 Development Scenario

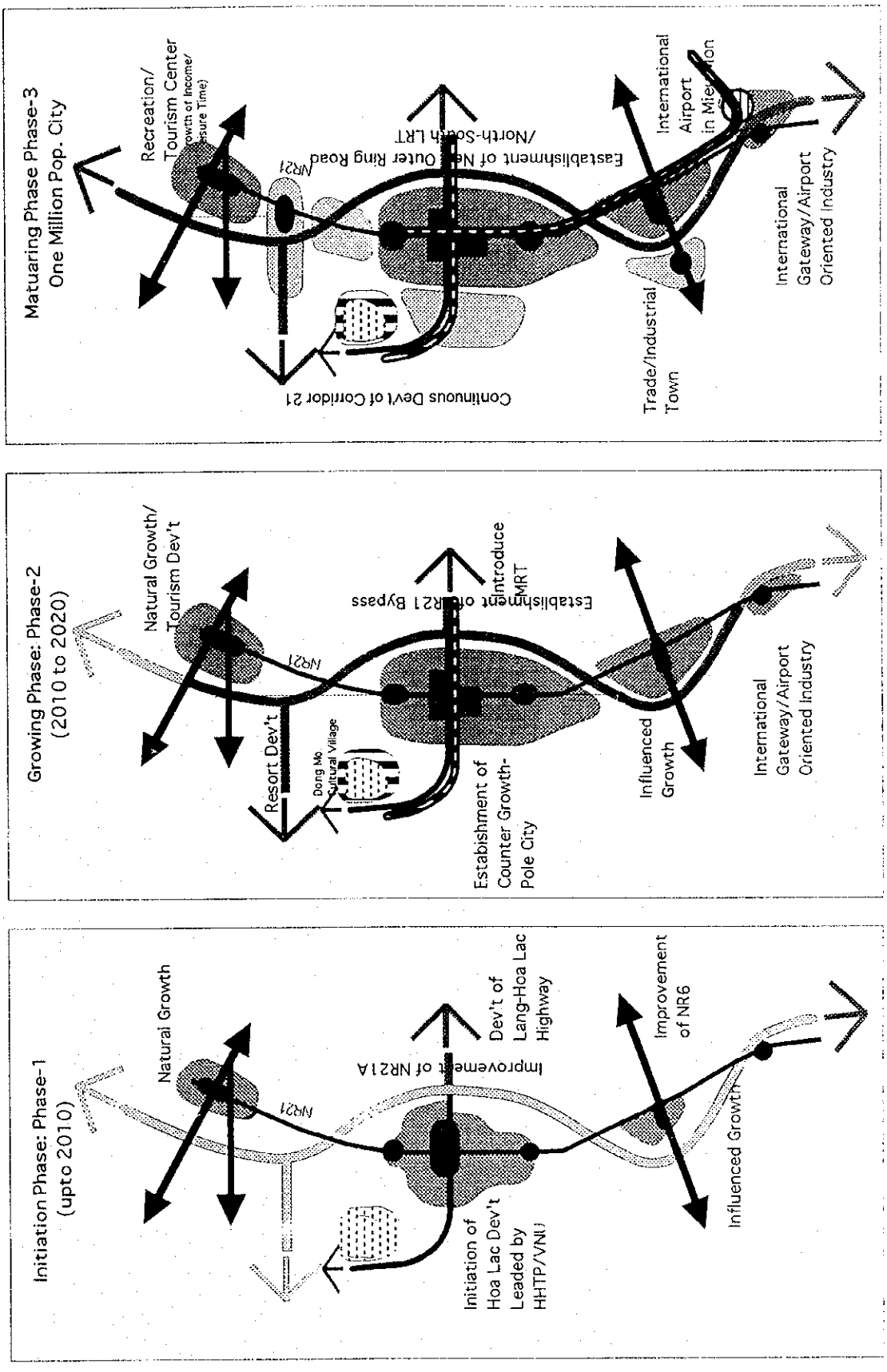


Figure 3.4.2 Spatial Growth Scenario of the Corridor 21 Development

3.5 Structure Plan for the Corridor 21 Development

3.5.1 Development Concept of the Corridor 21

(1) Flexibility for the Urban Development

In order for the Corridor 21 Development to flexibly respond to future changes, a belt-shaped zone along the NR21A should be designated as an "urban development area (UDA)," and any development activities outside the UDA should be strictly prohibited or regulated. The Corridor 21 Development should be implemented from the Hoa Lac Urban Area and expanding to Son Tay, Xuan Mai, and Mieu Mon along the north-south axis of NR21A on a step-by-step basis. The conceptual pattern of UDA is proposed to form a "ladder urban structure" along NR21A.

(2) Creation of a Garden City

As the Corridor 21 is aimed at achieving an environment-friendly model city of the 21st century, the natural environment in and around the development area should be carefully preserved so that it may be truly called as a "**Garden-city**" or "**Eco-city**." At the end of the 19th century, Dr. Howard, a prominent British town planner, advocated the concept of a "garden city." According to his concept, an ideal city is the city where convenient urban life and natural environment coexist. A garden city can be created if the natural environment outside the city is strictly preserved far into the future. To apply the concept, it is necessary to conserve the natural environment and to preserve the high productive agricultural areas around the Corridor 21 as they are at present. In addition, the proposed nature conservation area on the western mountain-side and the eastern agricultural preservation areas should be networked by the proposed "public open space network" along tributaries of Tick River within the Corridor 21. The conceptual development pattern of UDA is shown in Figure 3.5.1.

3.5.2 Major Transportation Network

The NR21A should take a north-south urban arterial road function as a spine of the Corridor 21 development, and the Lang-Hoa Lac Highway between Hanoi and Hoa Lac should maintain a regional highway function as planned by the MOC master plan. In addition to these two major roads, the proposed NR21 Bypass should substitute the regional road function of the NR21A, it could link the four urban areas and manage a through traffic inter and intra vehicle traffic of the Corridor 21, the alignment of which should run along the NR21A. This bypass could be used

as part of the future outer ring road of HMA. When the Lang-Hoa Lac Highway be extended to Mt. Ba Vi, the proposed route (hereinafter called Hoa Lac-Ba Vi Highway) should has the bypass function to the north, where are Don Mo Lake Culture Village, Hai Lake Resort and Mt. Ba Vi in the long run. The Lang-Hoa Lac and Hoa Lac-Ba Vi highways should be carefully connected in the urban area to avoid through traffic and adverse environmental effects on the Urban Center in Hoa Lac. Figure 3.5.2 shows the alternative schemes of the NR21A and the NR21 Bypass.

The NR21 Bypass could manage a regional through traffic from the north, east and south, and to avoid heavy through traffic entering into the Urban Center, and enables NR21A to serve as the Urban Boulevard thus providing attractive urban landscape for the whole Corridor 21 Development. The Lang-Hoa Lac Highway will have a full-scale interchange with NR21 Bypass instead of NR21A, so that negative environmental effects would be avoided in the Urban Center in Hoa Lac.

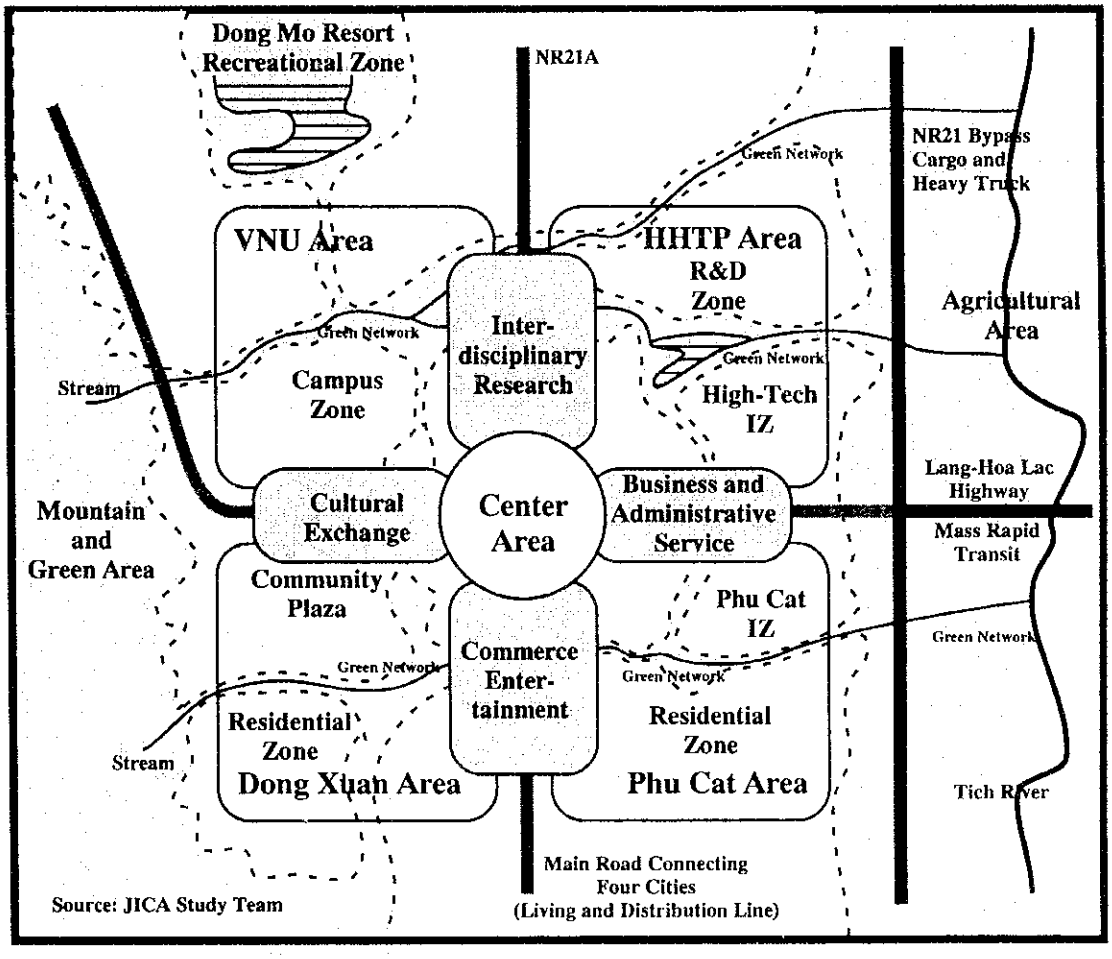


Figure 3.5.1 Urban Development Area and its Surrounding Environment

This bypass concept is commonly adopted in many cities in the world from the smooth traffic management, integrated urban land use, environmental aspect and so on. Thus, the land requirement for the intersection of NR21A and Lang-Hoa Lac Highway could be minimized by the NR21 Bypass. The saved space on the intersection can be used for more value-added purposes in the Urban Center. An urban center should be easily accessible from adjacent areas, and the Urban Center in Hoa Lac is ideally located in this context. The future MRT system will have its central station in the proximity of the Urban Center.

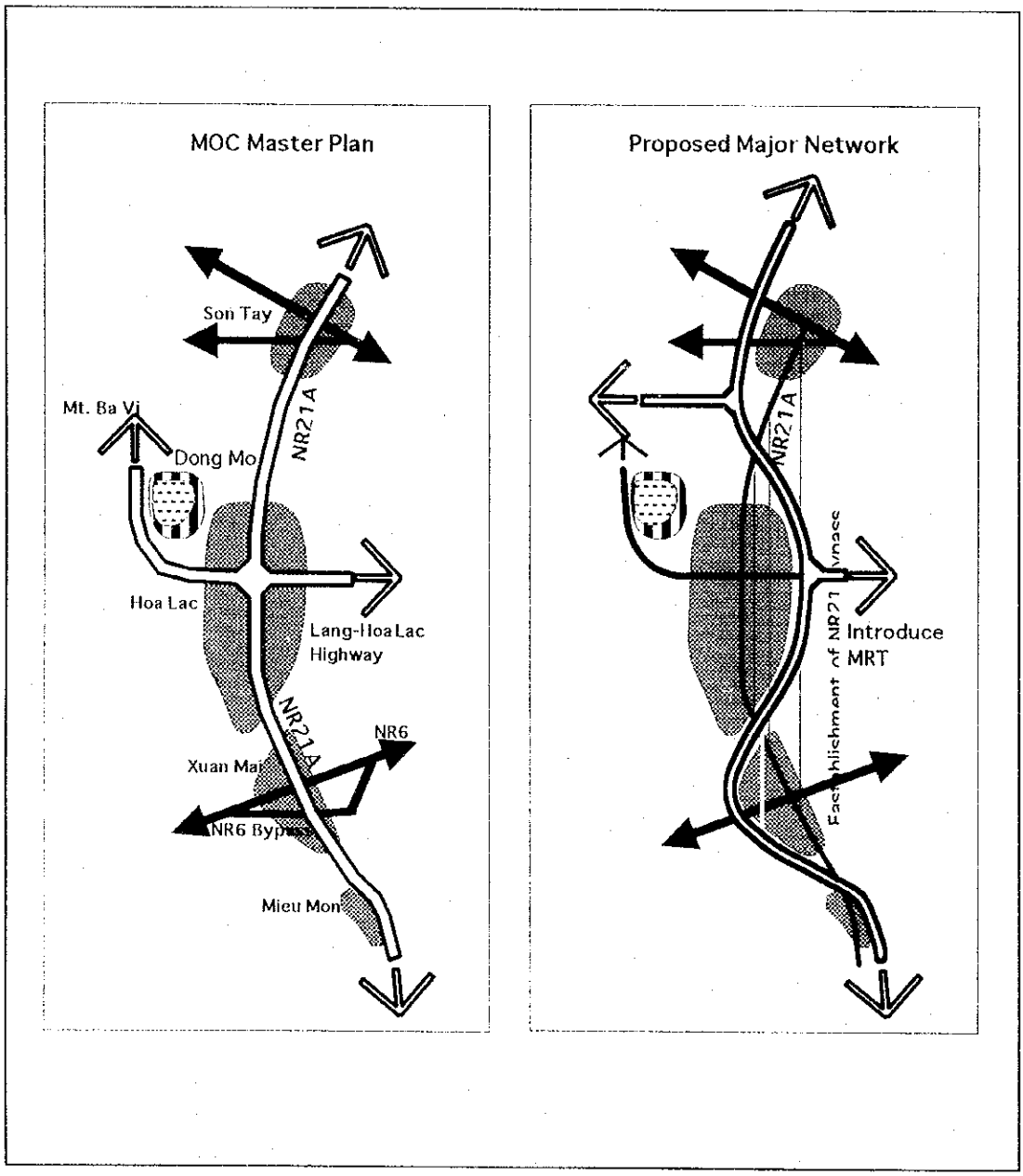


Figure 3.5.2 Alternative Routes of the NR21A and NR21 Bypass

3.5.3 Structure Plan for the Corridor 21

Figure 3.5.3 shows the structure plan depicted on the basis of the previous concepts. As planned by MOC, the four urban areas of Son Tay, Hoa Lac, Xuan Mai, and Mieu Mon will remain along the NR21A, but the principal function of the NR21A was modified from the high-standard regional highway to a urban arterial road, thus transferring the regional highway functions to NR21 Bypass.

The Lang-Hoa Lac Highway will be extended to run through the Urban Central in Hoa Lac to the Dong Mo area down to Mt. Ba Vi. The Lang-Hoa Lac and Hoa Lac-Ba Vi Highways should not be directly connected with a wider high standard in the urban center. The forecasted heavy through traffic from Hanoi destined to the Dong Mo Lake and the Mt. Ba Vi will be diverted to use the new NR21 Bypass and running through the north of the Dong Mo lake.

In the long run, the NR21 Bypass will link to Son Tay in the north and Xuan Mai and Mieu Mon in the south, and will be required to expand to a multiple-lane urban artery with exclusive bus lanes step by step basis on a traffic demand. The overall road network will be structured as a ladder or grid pattern by the north-south and east-west arterial roads.

The part of area divided by the ladder road network within the C21 Development are proposed to be the reserved for future urban expansion towards the target population of one million. The eastern areas from the NR21 Bypass are proposed to be preservation area for high productive agricultural field, as well as the area west from the proposed urbanized area are also proposed to be conservation area for the existing natural resources to maintain the Corridor 21's image as a "Garden City". A green and open space network within the C21 Area is proposed to link the proposed preservation area in the east and conservation area in the west, taking advantage of the existing condition of the terrain and rivers/canals, thus creating an ecologically friendly city ("Eco-City") in the 21st century.

In addition, the functional setting of Son Tay, Hoa Lac, Xuan Mai, and Mieu Mon was taken into consideration in the land use planning for the Corridor 21 Development.

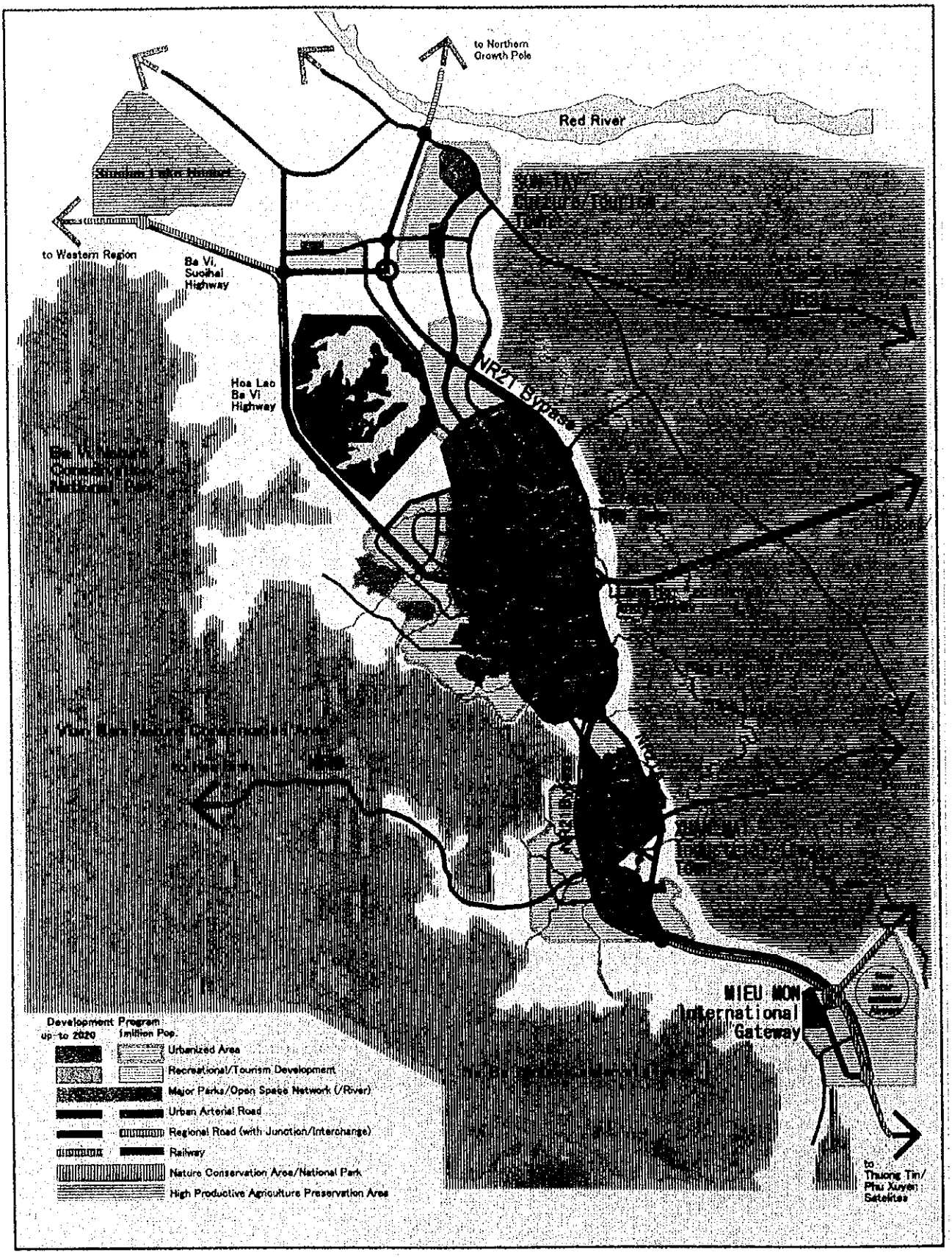


Figure 3.5.3 Structure Plan for the Corridor 21 Development

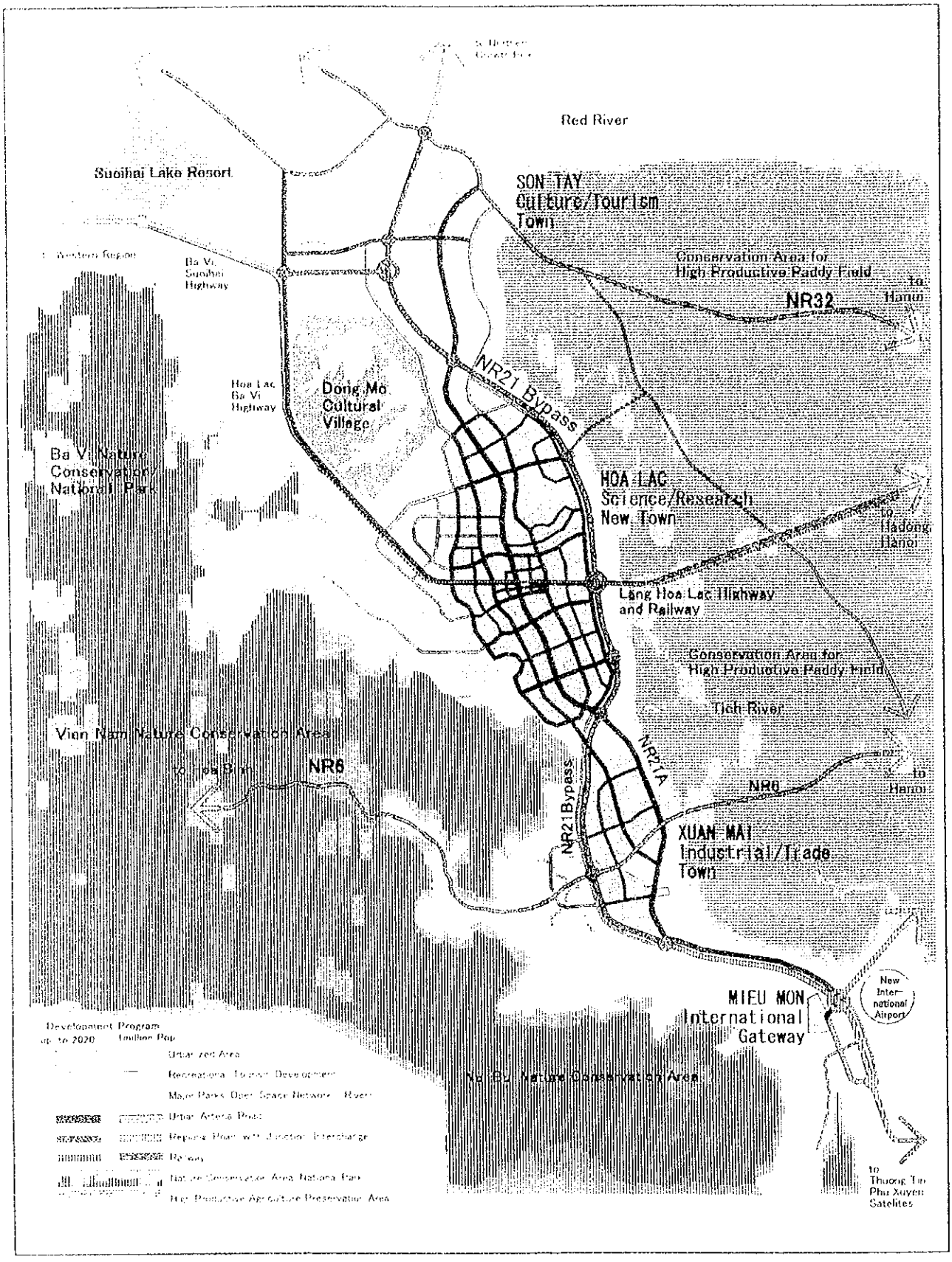
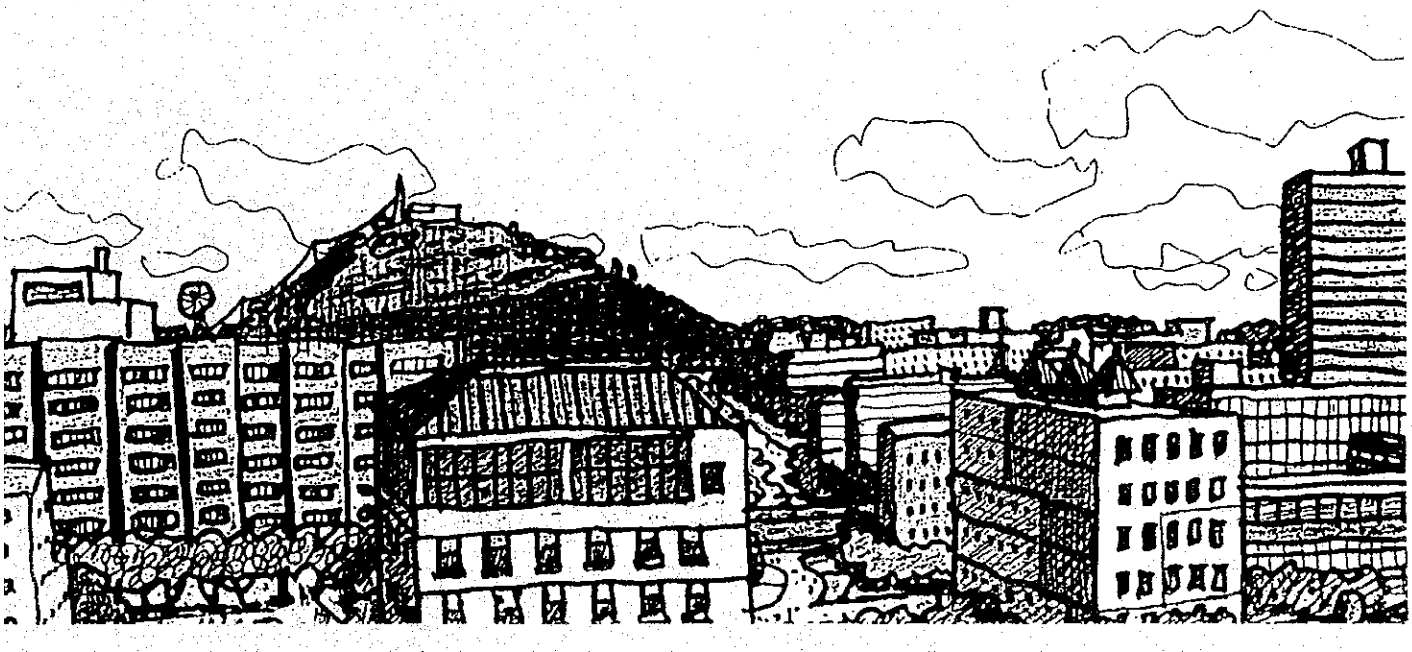


Figure 3.5.3 Structure Plan for the Corridor 21 Development

CHAPTER 4

MASTER PLAN FOR HOA LAC AND XUAN MAI AREA URBAN DEVELOPMENT



CHAPTER 4 Master Plan for Hoa Lac and Xuan Mai Area Urban Development

4.1 Policies of the Urban Development

The Hoa Lac and Xuan Mai is the New Town development project that Vietnam treats it as a national project; thus, it is expected to be a pioneer of a the New Town development in Vietnam. It should be the leading the New Town development project for the country. Therefore, it should apply a new planning methods and approaches as well as the past experiences and lessons learned in both developed and developing countries since E. Howard established his idea of "Garden City" for the New Town development in the early 20th century. On the other hand, it is required to propose a plan that can ensure the sustainable development in consideration of the future Vietnamese socio-economic changes and circumstances as well as the current serious economic situations.

Taking these into consideration, the Study Team formulates the Hoa Lac and Xuan Mai Area Urban Development Master Plan, based on the following policies.

4.1.1 New Town Development as a Pioneer

A new town should be neither a mere absorber of increased urban population from a mother city nor merely sharing urban functions with a mother city. A new town development should always play a role of creating a new urban environment. The Hoa Lac and Xuan Mai new town development should contribute to up-grade the quality of urban life and to create a new urban environment for the Vietnamese. In particular, the Hoa Lac and Xuan Mai development should attract the people to settle down by providing incentives for living in the area for the highly educated people, who work for the national center of HRD, R&D, and high-tech industries. From this point of view, one of the basic policy for the master plan should focus on establishing highly qualified urban environment, which include qualified housing, living environment, urban center, and urban infrastructure.

4.1.2 Roles of the Hoa Lac and Xuan Mai in the Hanoi Metropolitan Area

The Hoa Lac and Xuan Mai have to play a role of sharing the future urban functions of the Hanoi Metropolitan Area (HMA). It should also create new urban functions, which are necessary for HMA in the 21st century. From these points of view, the Hoa Lac and Xuan Mai Area should not be only as national center for HRD, R&D, and high-tech

industrialization, but also a city where should share an expanded and newly added capital and regional urban functions.

Therefore, Master Plan proposes international exchange functions as well as regional cultural and recreational functions as the urban function that the Hoa Lac and Xuan Mai Area should share with HMA. International exchange functions, which are composed of convention center and messe, are one of the key functions to be reinforced as the Vietnamese economy develops. At the same time, they are important functions to support and enhance R&D functions. In addition, the demand for cultural and recreational functions is expected to increase along with the national regulation of two-day-off per week and the improvement of the quality of life. To fulfill these functions makes the Hoa Lac and Xuan Mai Area even more diverse and attractive. Furthermore, those functions will strengthen the linkage between the Hoa Lac/Xuan Mai and the City of Hanoi.

4.1.3 Flexibility of the Master Plan and Urban Infrastructure Services

It takes a long time to complete the urban structure of the C21 Development with the targeted population of 1 million. During the development, the economic situation, societal situation, standard of living, and life style of Vietnamese will drastically change.

As many new towns constructed in the 20th century were based on the rigid plan, they could not flexibly respond to social changes and new needs, thus resulted in many problems. Japanese new towns have also faced many problems such as small housing, shortage of parking space, depression of a neighborhood urban center, vacant classrooms of primary and lower secondary schools due to change in the population structure. In consideration of these experiences, it is important that the Master Plan of the Hoa Lac and Xuan Mai should flexibly respond to future changes and needs.

Moreover, while the planning standard of urban infrastructure should maintain the flexibility to adapt to the future changes and needs, the construction strategy should properly adopt its phased development in consideration of the present social and economic conditions of Vietnam. It is inevitable to adopt a policy that minimizes the initial investment in order to steadily carry on the development over the future. In this context, it is extremely important to make the initial development as compact as possible, thus maximizing the development efficiency.

The step by step development method for arterial road development is proposed to minimize the initial investment cost and to adapt to a changing traffic demand and mode in the future. For instance, international standards should be utilized for planning and design

of a road network including the right of way (hereinafter call ROW). However, for actual road construction, minimum required lanes within the designated ROW should be built to cater the traffic demand in the immediate future, because the vehicle ownership per 1,000 people in Vietnam is 3 in 1994, compared to 520 in Japan, 141 in Malaysia, and 67 in Thailand. On the other hand, planning standards should be taken into consideration the future motorization and share of public transportation.

4.1.4 Public Transportation as a Primary Transportation Mean

In the late 1980s, air pollution caused by "Emission Gas" and deteriorated natural resources had arisen as urgent global environmental issues. Today, a self-sustainable urban planning has become an indispensable approach for city planning. Many new town developments in the 20th century have been planned to support the motorized society, which have generated many social and environmental problems. In the circumstances, many cities in the world are now changing themselves to rebuild a more public transport oriented society.

Many cities in Southeast Asia, including the Hanoi City, are facing serious transportation problems, due to lack of investment for public transport system and inappropriate policies to control private traffic and vehicle ownership. A modal split of public transportation in Hanoi currently stands at only 3 percent.

In consideration of the past experiences and lessons, public transportation oriented urban planning approach is essentially important for the Hoa Lac and Xuan Mai Urban Development. Particularly, major roads of the transportation network is a skeleton to establish the urban structure. From Phase-1, an efficient bus service system is proposed to be the priority public transportation mode. Otherwise, as experienced in many cities in the world, motorization would be accelerated, thus becoming increasingly difficult to establish public transportation systems.

In order to establish an efficient public transportation system, it is inevitable to develop a compact city, where a public transportation system can easily be established and used by citizens. Furthermore, a compact city makes it possible to maintain a rich natural environment inside and outside the city. The concepts of a "Garden City" and a "Compact City" to be adopted for the development are in fact compatible each other.

It is also the key factor to reinforce the linkage between Hanoi and the Hoa Lac Urban Development by introducing a convenient public transport means in order to achieve the objectives of the development. In the future, a mass transit system will become inevitable,

but for establishing a public transport means from Phase-1A, a system having appropriate transport capacity and least cost investment should be considered. For example, an express bus system can serve fast and punctual operation with its reasonably large transport capacity, if priority or exclusive lanes are provided only for the operations of buses or articulated buses. In order to introduce the bus system, the Lang-Hoa Lac Highway should be widened more than four lanes as soon as possible. Simultaneously, the access control system for private vehicle traffic to the highway should be introduced and strictly enforced.

In addition, counter measures to solve transportation problems caused by the increased motorcycles and bicycles ought to be carefully considered. At present, there are 80,000 automobiles, 600,000 motorcycles, and more than one million bicycles in Hanoi with population of 2.4 million. Two-wheel and four-wheel vehicles currently share and compete to use main streets, which causes serious traffic congestion in Hanoi. The Study Team proposed to implement well-organized traffic management system by an access control and vehicle separation for each mode.

4.1.5 The Housing Supply for Low Income Group

A housing supply system for people to settle in the M/P area is indispensable for the success of this project. In particular, it is important to establish a system, which supplies affordable housing for low to middle income groups.

A housing policy commonly seen in developing countries including Vietnam is to decrease public housing supply, while the government supports citizens or communities to build their own housing. However, the Hoa Lac and Xuan Mai Urban Development has to play a role of improving the quality of housing and living environment. From this point of view, it is not appropriate to implement a housing policy that is overly dependent on the private housing supply. Therefore, a public housing supply system should be established to realize the Hoa Lac and Xuan Mai Project, and it should supply reasonably quality and affordable housing. The main housing type in the M/P area is planned to be a middle-rise apartment.

Moreover, a housing policy, which enables low-income people to obtain housing, should be considered. For instance, the public sector provides infrastructure services, and the government secures the land use right for citizens and supports them to build their own housing by providing low cost construction materials with technical assistance. In the Master Plan, the above housing supply measures are proposed in the Chapter 7.

4.1.6 Harmonious Development with the Existing Communities

The master plan prepared by the MOC proposed to relocate the whole existing settlements within the MOC master plan area, which was counted about 79,000 people. The development of the Hoa Lac and Xuan Mai ought to minimize the negative social impacts as much as possible, keeping in harmony with the existing local communities. Eventually, this could reduce the land acquisition cost and expedite the easier implementation.

From these points of view, agglomerated existing villages and towns should be remained and improved as much as possible. The M/P propose to designate the **"villages improvement and expansion areas"**, where the settlement environment should be improved with infrastructure and public facilities. It will provide housing and real estate business opportunities with the local communities. Also, it will provide low and limited income residents with housing at a reasonable price. Further study for the implementation body and measures for development are required.

4.2 Development Framework for the Hoa Lac and Xuan Mai

4.2.1 Socio-Economic Framework

(1) Target Employment by Industrial Sector

The target employment by industrial sector of the Hoa Lac and Xuan Mai area is set as the following table. The development frameworks of VNU and HHTP are individually set on the review of the Pre-feasibility Study of VNU and the Feasibility Study of HHTP. The target employment of the manufacturing sector is formulated based upon the forecast of the future industrial structure. The employment of the service sector, including the employment related to the Urban Center, education, public services, and so on are assumed to be about 30 % of the increment employment.

Table 4.2.1 Target Employment by Industrial Sector

	VNU	HHTP	Manufact-uring	Const-ruction	Service Sector	Existing (1996)	Total
1996	0	0	0	0	0	31,600	31,600
Phase-1A	7,100 (9)	9,000 (11)	12,000 (15)	12,000 (15)	10,000 (12)	31,600 (39)	81,700 (100)
Phase-1B	9,900 (8)	15,000 (13)	24,000 (20)	19,400 (16)	18,000 (15)	31,600 (27)	117,900 (100)
Phase-2	14,700 (7)	25,000 (12)	60,000 (29)	32,900 (16)	45,000 (22)	31,600 (15)	209,200 (100)

Source: Study Team
The data of Existing (1996) is based on the MOC master plan.
Note: Parenthesis shows the ratio (%).

Table 4.2.2 Additional Increment Employment

	VNU	HHTP	Manufact-uring	Const-ruction	Service Sector	Existing	Total
Phase-1A	7,100 (14)	9,000 (18)	12,000 (24)	12,000 (24)	10,000 (20)	0 (0)	50,100 (100)
Phase-1B	2,800 (8)	6,000 (17)	12,000 (33)	7,400 (20)	8,000 (22)	0 (0)	36,200 (100)
Phase-2	4,800 (5)	10,000 (11)	36,000 (39)	13,500 (15)	27,000 (30)	0 (0)	91,300 (100)
Total	14,700 (8)	25,000 (14)	60,000 (34)	32,900 (19)	45,000 (25)	0 (0)	177,600 (100)

Source: Study Team
Note: Parenthesis shows the ratio (%).

(2) Target Resident Employment of the Hoa Lac and Xuan Mai Area

The target resident employment by industrial sector is set based upon the target employment as mentioned previously. The target employment by industrial sector is composed of the two categories as follows,

- Employees reside in the Hoa Lac and Xuan Mai
- Employees commute from Hanoi

In Phase-1A, about 30 % and 40 % of the respective employment in VNU and HHTP are set as commuters from Hanoi. This proportion is assumed to decrease to 20 % and 20 % in Phase-1B, and 5 % and 10 % in Phase-2 as the city grows towards its maturity. Also, about 10 % of the employment in manufacturing and service sectors are assumed as commuters from Hanoi by Phase-2.

On the other hand, as the city becomes matured with enhanced quality of urban and living environment, it is expected that commuters to Hanoi will migrate to the Hoa

Lac and Xuan Mai area. In the circumstances, it can be assumed that about 10 % of the resident employment in the Hoa Lac and Xuan Mai area would commute to Hanoi.

Table 4.2.3 Target Resident Employment by Industrial Sector

	VNU	HHTP	Manuf-acturing	Const-ruction	Service Sector	Existing (1996)	Commuter to Hanoi	Total
Phase-1A Total Emp.	7,100	9,000	12,000	12,000	10,000	31,600	0	81,700
Resident. in M/P area	4,100	6,500	10,800	12,000	9,000	31,600	0	74,000
(%)	(60)	(70)	(90)	(100)	(90)	(100)		(91)
Residents in Hanoi	3,000	2,500	1,200	0	1,000	0	0	7,700
(%)	(40)	(30)	(10)	(0)	(10)	(0)		(9)
Phase-1B Total Emp.	9,900	15,000	24,000	19,400	18,000	31,600		117,900
Resident. in M/P area	7,700	12,000	21,600	19,400	16,200	31,600	0	108,500
(%)	(80)	(80)	(90)	(100)	(90)	(100)		(92)
Residents in Hanoi	2,200	3,000	2,400	0	1,800	0	0	9,400
(%)	(20)	(20)	(10)	(0)	(10)	(0)		(8)
Phase-2 Total Emp.	14,700	25,000	60,000	32,900	45,000	31,600		209,200
Resident. in M/P area	14,000	22,500	54,000	32,900	40,500	31,600	22,000	217,500
(%)	(95)	(90)	(90)	(100)	(90)	(100)		(104)
Residents in Hanoi	700	2,500	6,000	0	4,500	0	0	13,700
(%)	(5)	(10)	(10)	(0)	(10)	(0)		(7)

Source: JICA Study Team

The target resident employment by phase is distributed to the Hoa Lac and Xuan Mai area as follows:

Table 4.2.4 Resident Employment by the Hoa Lac and Xuan Mai Area

Total Empolyment

	Hoa Lac	Xuan Mai	Total
1996	17,600	14,000	31,600
Phase-1A	51,500	22,500	74,000
Phase-1B	81,000	27,500	108,500
Phase-2	167,500	50,000	217,500

Additional Increment Employment

	Hoa Lac	Xuan Mai	Total
Phase-1A	33,900	8,500	42,400
Phase-1B	29,500	5,000	34,500
Phase-2	86,500	22,500	109,000
Total	149,900	36,000	185,900

Source: Study Team

Note: The 1996 data is based upon the report by MOC

(3) Target Population

The future population is estimated based upon the target resident employment and the assumption of 50 % employment rate. The target population are set on the estimated future population and the framework of VNU students and families (32,000 students in 2005, 43,000 in 2010, and 65,000 in 2020 at Hoa Lac). The target population,

including the exiting population, is estimated to be 180,000 by 2005 (Phase-1A), 260,000 by 2010 (Phase-1B), and 500,000 by 2020 (Phase-2) as follows,

Table 4.2.5 Target Population

	Hoa Lac			Xuan Mai	Total
	Employment with Families	VNU Student with Families	Sub Total		
1996	44,000		44,000	35,000	79,000
Phase-1A	103,000	32,000	135,000	45,000	180,000
Phase-1B	162,000	43,000	205,000	55,000	260,000
Phase-2	335,000	65,000	400,000	100,000	500,000

Source: Study Team
Note: The 1996 data is based upon the report by MOC.

(4) Target Household

The target household is estimated on the assumption that the average household (hereinafter called "HH") size is four persons per household. The VNU students and families are excluded on the estimation of target HH in each phase. The current average HH size is about 4.5 persons in Hanoi, but in the future birth rate is expected to be lower. Thus, the average HH size is estimated as 4 persons in the Study. The target households in the Hoa Lac and Xuan Mai area is estimated to be 37,000 HH in Phase-1A, 54,250 HH in Phase-1B, and 108,750 in Phase-2.

Table 4.2.6 The Target Household

Target Number of Household

	Hoa Lac	Xuan Mai	Total
1996	11,000	8,750	19,750
Phase-1A	25,750	11,250	37,000
Phase-1B	40,500	13,750	54,250
Phase-2	83,750	25,000	108,750

Additional Increment Household

	Hoa Lac	Xuan Mai	Total
Phase-1A	14,750	2,500	17,250
Phase-1B	14,750	2,500	17,250
Phase-2	43,250	11,250	54,500
Total	72,750	16,250	89,000

Source: JICA Study Team

(5) Distribution of Target Population

The resident and employment in the Hoa Lac and Xuan Mai M/P Area will be composed of the three types of peoples as follows:

- people who move to the M/P Area from other regions and to get a job in the area,
- people who live in the existing villages inside and/or outside the M/P Area and to get a job in the area (for example, new school graduates and farmers who want to get another type of job), and

- people who have their relatives at the existing villages in the M/P Area and look for a job opportunity.

The target population of each phase is distributed to the proposed "New Residential Areas", the "VNU Dormitory", and the "Village Improvement and Expansion Area" as the following table shows. Around 24,900 persons or 70 % of additional increment population, which exclude 65,000 students and families in VNU dormitory, are proposed to be covered by the development of New Residential Area. The remaining 107,000 persons or 30 % of the additional increment population are proposed to live in the "Village Improvement and Expansion Area".

4.2.2 Land Use Framework

The above mentioned Development Frameworks are converted to the land requirement compiled into the Land Use Framework.

(1) Urban Center

The land requirement for the Urban Center, which should serve not only for Hoa Lac but also for C21 as a whole, is set and checked on the two approaches. The around 300 ha gross land requirement for the Urban Center is estimated on the assumption of the 3 m^2 per capita. The net land requirement is estimated on the floor area and the site requirement for center facilities development as follows:

- Phase-1A: about 50 ha,
- Phase-1B: about 120 ha, and
- Phase-2: about 210 ha.

Table 4.2.7 Population Distribution by Phase and Area

	Year	New Residential Area	Village Improvement & Expansion	Sub Total	Student/family in VNU	Total of Additional Increment
Hoa Lac	1996		44,000 (11,000)	44,000 (11,000)		44,000
	Phase-1A	41,200 (10,300)	61,800 (15,450)	103,000 (25,750)	32,000	135,000
	Phase-1B	82,400 (20,600)	79,600 (19,900)	162,000 (40,500)	43,000	205,000
	Phase-2	203,400 (50,850)	131,600 (32,900)	335,000 (83,750)	65,000	400,000
Xuan Mai	1996		35,000 (8,750)	35,000 (8,750)		35,000
	Phase-1A	7,000 (1,750)	38,000 (9,500)	45,000 (11,250)		45,000
	Phase-1B	14,000 (3,500)	41,000 (10,250)	55,000 (13,750)		55,000
	Phase-2	45,600 (11,400)	54,400 (13,600)	100,000 (25,000)		100,000
Total	1996	0 (0)	79,000 (19,750)	79,000 (19,750)		79,000
	Phase-1A	48,200 (12,050)	99,800 (24,950)	148,000 (37,000)	32,000	180,000
	Phase-1B	96,400 (24,100)	120,600 (30,150)	217,000 (54,250)	43,000	260,000
	Phase-2	249,000 (62,250)	186,000 (46,500)	435,000 (108,750)	65,000	500,000
Additional Increment		249,000	107,000	356,000	65,000	421,000
Population by 2020		(62,250)	(26,750)	(89,000)		
	%	70.0%	30.0%	100.0%		

Source: Study Team
Note: Unites is persons (households). Village Improvement & Expansion Area indicates inside the Master Plan area.

Table 4.2.8 Facility Plan of the Urban Center

4 Urban Center Sub-Areas	Floor Area of Facilities/Site Area					
	Phase-1A		Phase-1B		Phase-2	
	Floor Area m^2	Site Area ha	Floor Area m^2	Site Area ha	Floor Area m^2	Site Area ha
Academic & Cultural Center (northwest-VNU side)	78,200	15	174,000	31	226,200	36
Research & International Exchange Center (northeast-HHTP side)	36,700	5	61,100	8	237,900	40
Civic Center/ Commercial Center (southwest-Dong Xuan)	137,100	21	279,700	41	638,500	88
Ammusement & Recreation Center (southeast-Phu Cat side)	15,300	7	23,200	39	47,300	45
Total	267,300	47	538,000	119	1,149,900	209

Source : JICA Study Team

(2) University

Based upon the review of the VNU relocation plan by the JICA Study Team, the land-use framework of VNU is set along with the facilities development plan as shown in Table 4.2.9. Some social service facilities included in the VNU relocation plan, such as a central library and science museum, are planned to be located in the Urban Center because these facilities should be utilized for citizens in Hoa Lac and C21. Moreover, the Olympic Game Complex is proposed to be located not inside the VNU site, but the east of the Urban Center in Phu Cat Area. In this framework, approximately 160 ha of land within the designated VNU Relocation Area is proposed to reserve for other technology universities such as AIT and other international universities.

Table 4.2.9 Land Use Frame for VNU

Frames	Items and Facilities	Phase-1A	Phase-1B	Phase-2
Population and Employment Framework	Students and Families	32,000	43,000	65,000
	Staff and Workers	7,100	9,900	14,700
	Total	39,100	52,900	79,700
Land Use Frame	Study Area*	140	208	331
	Institute/Center	14	22	32
	Dormitory	60	70	100
	Guest House	20	10	10
	HQ of VNU	3	4	5
	Park &Open Space	45	60	90
	Roads	44	60	90
	Total	326	434	658
Reserved Area for Other Tech. Univ. (ha)		160	160	160
Total Development Area (ha)		486	594	818

Source : JICA Study Team

(3) HHTP

The framework of HHTP is set in consideration of the feasibility studies done by JICA and MOSTE as well as its implementation program and project finance. The targeted employment for HHTP is 9,000 in Phase-1A, 15,000 in Phase-1B, and 25,000 in Phase-2. The planning criteria of the employment density at HHTP by each land-use component comply with the result of JICA Feasibility Study. The whole land requirement for HHTP is estimated 250 ha in Phase-1A, 550 ha in Phase-1B, and 800 ha in Phase-2.

Table 4.2.10 Land Use Frame for HHTP

Landuse Item	Phase-1A		Phase-1B		Phase-2	
	Land Require-	Employment (person)	Land Require-	Employment (person)	Land Require-	Employment (person)
R&D Zone	60	1,800	100	3,200	170	5,400
High-Tech Industry Zone	50	6,100	80	9,500	130	15,100
Center Zone	20	300	30	550	50	900
Urban Business Zone	10	600	20	1,500	50	3,300
Housing	50	200	100	250	170	300
Others	60		220		230	
Total	250	9,000	550	15,000	800	25,000

Source: Study Team
Note: The Land Requirement indicates the development area, which does not include Tan Xa Lake, rivers, and village improvement & expansion.

(4) Industrial Zone

On the assumption that the density of workers in the Phu Cat and Xuan Mai industrial zone is 100 workers per ha, the development area can be calculated as follows.

Table 4.2.11 Land Use Frame for Industrial Zone (IZ)

Year	Target Employment (person)	Land Requirement for Industrial Zone (ha)	Total Land Requirement for IZ, incl. IZ in HHTP
Phase-1A	12,000	120	170
Phase-1B	24,000	240	320
Phase-2	60,000	600	730

Source: JICA Study Team

(5) Residential Area

Based upon the distribution of target population, the land use frame for the New Residential Area is set as shown in Table 4.2.12. The planning criteria for an average population density of the New Residential Area is assumed to be around 130 persons per ha which is roughly 75.0 sq. m/person of a semi-gross residential area. The planned 62,250 dwelling units by the year 2020 will require around 1,870 ha of semi-gross New Residential Area in the M/P Area.

Table 4.2.12 Land Use Frame for New Residential Area

		Hoa Lac		Xuan Mai		Total	
Population Distribution to New Resiential Area	Phase-1A	41,200		7,000		48,200	
	Phase-1B	41,200		7,000		48,200	
	Phase-2	121,000		31,600		152,600	
	Total	203,400		45,600		249,000	
Required Dwelling Units in New Residential Area	Phase-1A	10,300		1,750		12,050	
	Phase-1B	10,300		1,750		12,050	
	Phase-2	30,250		7,900		38,150	
	Total	50,850		11,400		62,250	
No. of Neiborhood Units		(30)		(6)		(36)	
	Landuse Zone	Area (ha)	%	Area (ha)	%	Area (ha)	%
Land Requirement : Phase-1A	Residential Area (SG)	113	40	19	40	132	40
	Road and Street	42	15	7	15	50	15
	Parks and Open Space	85	30	14	30	99	30
	Public Facilities Area*	42	15	7	15	50	15
	Total	283	100	48	100	330	100
Land Requirement : Phase-1B	Residential Area (SG)	227	40	38	40	265	40
	Road and Street	85	15	14	15	99	15
	Parks and Open Space	170	30	29	30	199	30
	Public Facilities Area*	85	15	14	15	99	15
	Total	568	100	95	100	663	100
Land Requirement : Phase-2	Residential Area (SG)	623	40	125	40	748	40
	Road and Street	234	15	47	15	281	15
	Parks and Open Space	467	30	94	30	561	30
	Public Facilities Area*	234	15	47	15	281	15
	Total	1,558	100	313	100	1,870	100

Source: Study Team
Note: * except for the Urban Center

(6) Others

The Olympic Game Complex (approximately 50 ha) including a main stadium, indoor gymnasium, and indoor swimming pool, which is one of the proposed new urban functions of the new city, should be located along the Lang Hoa Lac Highway and adjacent to the future railway station in Phu Cat Area.

4.2.3 Overall Land Use Framework

The land use frame is set on the above estimated net land requirement for future urban functions and residential, which are based on the development framework and physical frames. It dose not include the proposed "reserve area for residential/industrial/other

development", proposed "nature conservation area", and proposed "village improvement and expansion area". The land use framework for the Hoa Lac and Xuan Mai Urban Area is set by the land use category, urban areas, and three development phases as shown in Tables 4.2.13 and 4.2.14.

Table 4.2.13 Land Use Framework by Land Use Component and Phase

	Phase-1A	Phase-1B	Phase-2
Urban Center	50	120	210
University (VNU)	490	590	820
Hoa Lac High-Tech Park	250	550	800
(Included Residential Area)	(50)	(100)	(170)
Industrial Zone	120	240	600
Residential Zone	330	660	1,870
Olympic Game Complex	—	—	50
Total (ha)	1,190	2,060	4,180

Source: JICA Study Team
Note: The above areas (ha) are net urban development areas, excluding a proposed reserved area for development before and after the year 2020 and proposed nature conservation area, and a proposed village improvement and expansion area.

Table 4.2.14 Land Use Framework by Area and Phase

Area	Phase-1A	Phase-1B	Phase-2
Urban Center Area	50	120	210
VNU Area	490	590	1,030
HHTP Area	250	550	980
Don Xuan Area	230	370	600
Phu Cat Area	60	240	750
Hoa Lac Urban Area Total	1,080	1,870	3,570
Xuan Mai Urban Area	110	190	610
Total (ha)	1,190	2,060	4,180

Source: JICA Study Team
Note: The above areas (ha) are net urban development areas, excluding a proposed reserved area for development before and after the year 2020 and proposed nature conservation area, and a proposed village improvement and expansion area.

4.3 The Urban Structure of Hoa Lac and Xuan Mai Area

4.3.1 Physical Structure and Development Direction

(1) Physical Structure of Hoa Lac and Xuan Mai

NR21A and NR21 Bypass are the spine of the urban development of the Hoa Lac and Xuan Mai Area. NR21A is the primary axis and urban arterial road, which is linking the four urban areas and urban centers from the north to the south within the Corridor 21. NR21 Bypass should take the roles of the present functions of NR21A, which is the regional road function linking with the areas in the western part of MHA. NR21 Bypass is not only take the above functions, but also take the functions of bypassing Hoa Lac in the east and Xuan Mai in the west. NR21 Bypass is also to manage a regional through traffic and heavy goods vehicle traffic generated from and coming through NR21A and the Lang-Hoa Lac Highway. It will likely be the part of the Outer Ring Road of MHA in the long-term future.

The Lang-Hoa Lac Highway links Hoa Lac and the central Hanoi as an access-controlled highway, which is not only the key element for the Hoa Lac Urban Development, but also for the C21 Development as a whole. For the Master Plan Area, NR21A and the Lang-Hoa Lac Highway should be the urban boulevard, which link the five major urban development areas such as VNU, HHTP, Dong Xuan, Phu Cat, and Xuan Mai. The development directions and the land use principles of the five areas are; VNU (scientific research and HRD), HHTP (R&D and high-tech industrial development), Dong Xuan (residential), Phu Cat (industry and residential), Xuan Mai (residential and industry). The intersection of NR21A and the Lang-Hoa Lac Highway is a key transportation node in the Hoa Lac where the Urban Center for Hoa Lac and the C21 Development should be developed.

(2) The Hoa Lac Urban Area

The north-to-south stretch of the Hoa Lac Urban Area is about 13 km, and east-to-west width about 6 km in Phase-2. It is expected that when the C21 Development will reach one million after the year 2020, the east-to-west width may be expanded to 8 km. The basic principle of the C21 Development is that the high productive paddy field in the east of the Hoa Lac and Xuan Mai Area as well as hills and forests in the west of the Area are proposed to be the conservation area. By doing so, the Hoa Lac and Xuan Mai Urban Development can coexist with the rich agricultural green areas in the east and the natural environment in the west, thus establishing a "Garden City."

Primary urban arterial roads are composed of NR21A and the Lang-Hoa Lac Highway, which constitute the north to south urban axis and east to west urban axis in the Area. The other urban arterial roads also run from north to south and east to west. Those urban arteries are planed to form a grid pattern, which can be safely stated as one of the most flexible and systematic urban and transportation structure in the world. NR21A and the Lang-Hoa Lac Highway outside the Area take the regional road functions, which should link with the Don Mo Cultural Village and other major development areas outside the M/P Area. Furthermore, the urban collector roads and service roads are planned to support the grid system in Hoa Lac. This road network inter-connects the major urban functions each other. The road network are not strictly designed as a fixed grid pattern, it is adjusted and coordinated with the conditions such as topography, location of rivers and channels, and allocated major urban functions.

The development pattern is basically formulated to accord with the direction of urban development and the orientation of future land use as well as the future development on the surrounding areas. A ring and radial road network system is frequently used for a large urban development as an appropriate development pattern. However, this development pattern is not suitable for the Corridor 21 Development because of the identified available and suitable land is a narrow shape along NR21A. The proposed conservation areas are the limit to develop toward the east and west directions. Therefore, a linear urban shape along NR21A should be taken into consideration.

The development of urban functions in the C21 is of remarkable importance for the development of Vietnam. The Master Plan should encourage the initiation of the Development as early as possible. The prioritized urban functions should be developed along the two boulevards due to convenient accessibility. In order to secure the development efficiency and convenient urban space, residential functions of Dong Xuan and Phu Cat should also be distributed along NR 21A from Phase-1. The proposed ladder (or grid) pattern is the most appropriate in that it can flexibly respond to the future urban development needs and changes.

(3) The Xuan Mai Urban Area

The urban development area of the Xuan Mai is approximately 700 ha by the year 2020. The eastern part from NR21A is identified to the flood plain due to its low ground level. In other words, the north of NR6 and the west of NR21A are proposed to be residential zone. The south of NR6 and the west of NR21A are proposed to be

industrial zone. The areas between NR21 Bypass and NR21A are designated as the development area by year 2020. In the Xuan Mai Urban Area, NR21A, NR6, and the other arterial roads are principally structuring a ladder pattern.

The Xuan Mai center is proposed to establish on the surroundings of the intersection of NR21A and NR6. This center is located in the eastern part of the Xuan Mai Urban Area, and after Phase-2 development, two sub-centers should be established in the west and north of the development.

NR6 Bypass planned by the MOC master plan, is not required for the urban development of Xuan Mai. Instead, NR6 should be widened to become the east-west axis to support the Xuan Mai center development. There are many existing villages and small hills in the urban development area, which are principally proposed to be a Village Improvement and Expansion Area and a hill conservation area as they are. Therefore, the major roads mentioned above should be constructed, taking into consideration these given conditions.

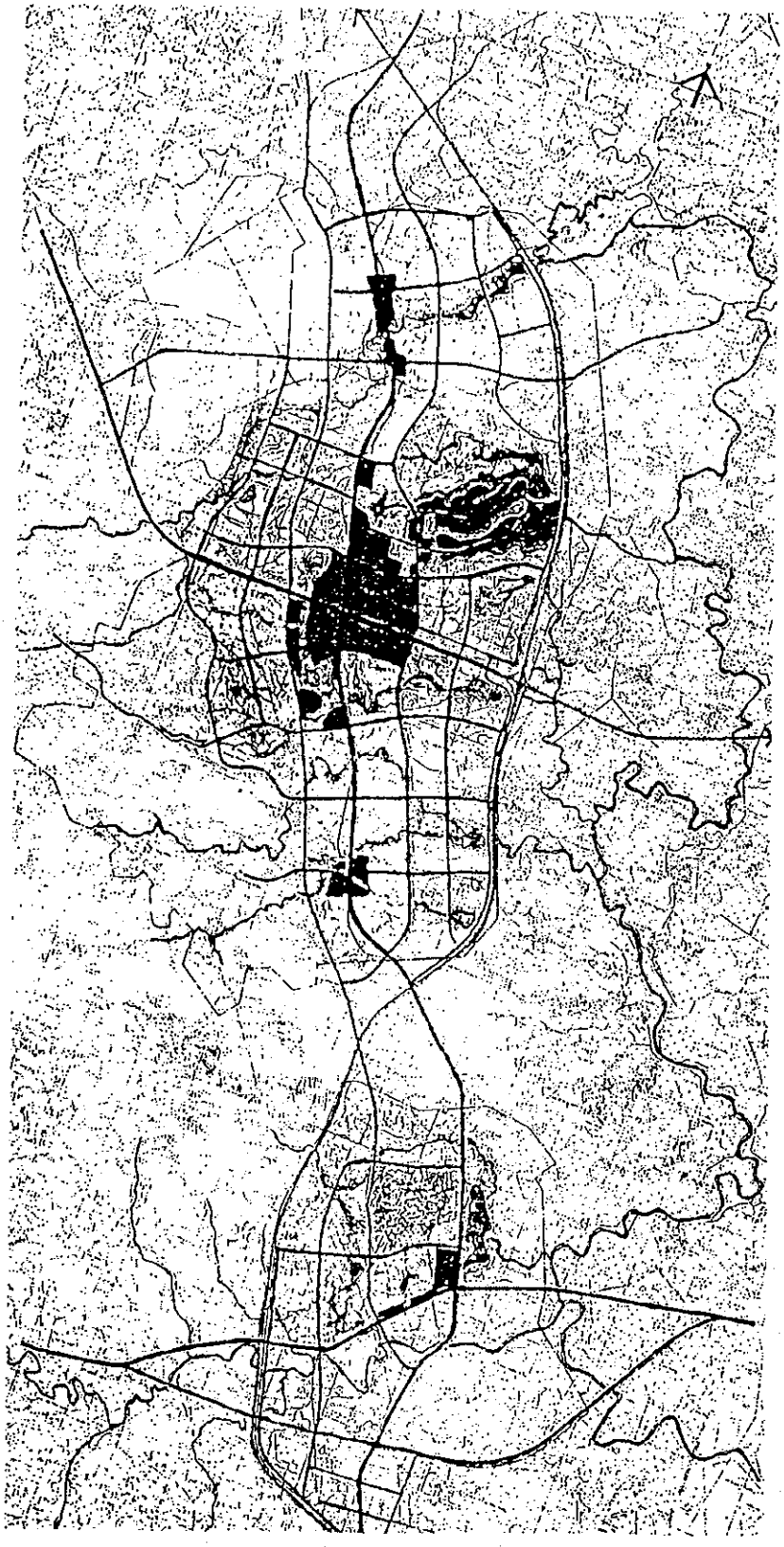


Figure 4.3.1 Structure Plan of the Hoa Lac and Xuan Mai Area

4.3.2 Zoning for the Master Plan Area

For the first step, the Master Plan Area is defined as the Hoa Lac and Xuan Mai Urban Development Zone. Preferably, the Master Plan Area is to be controlled by the Central Government (or the proposed National Steering Committee), or the proposed Corridor 21 Development Authority (C21DA). For the purpose, the Special Economic Zone (SEZ) concept is proposed by the Study Team. The Master Plan Area will be agglomerated and acquired in principle for the purpose of the Urban Development. The target year for the Development is set as 2020. This Area will be expanded in accordance with the future development needs. Within the Area, uncontrolled developments, land speculation, and unfavorable architectural buildings are to be restricted, and incentive measures for investment should be provided to implement the planned development in accordance with the Master Plan.

The land use and zoning system for the Master Plan Area are proposed as the following four categories.

(1) Development Zone: 2020

The zone is used for the development of the proposed urban functions such as the HRD, R&D, high-tech industries, Urban Center, housing, and so on. Based upon the demand for the future spatial expansion as mentioned previously, approximately 3,900 ha for Hoa Lac and 760 ha for Xuan Mai, 4,600 ha in total, are proposed as the designated Development Zone.

A fairly agglomerated existing villages and towns in the M/P Area are in principle excluded from the Development Zone. The minimized for relocation settlement could avoid negative impacts on the existing societies, and minimizing the cost for the land acquisition and resettlement of inhabitants. On the other hand, the existing small farming settlements in the Development Zone, which are dispersal rather than agglomerated, should be resettled in substituted residential areas provided within the Development Zone.

In general, rivers, lowland areas along rivers, and low-lying areas below 10 m (MSL) within the Development Zone are also excluded from the development for preservation.

(2) Village Improvement and Expansion Zone

Minimum infrastructure both inside and outside the agglomerated existing villages and towns, such as roads, water supply, school and other public facilities, is to be provided for improvement of their living environment. The methods and quality levels for the infrastructure development and services in this zone would be different from those applied for the Development Zone. A new village improvement measures, systems and organizations should be considered by the Ha Tay Province, and each district and commune shall take initiatives to implement an improvement plan.

The present land use condition of this zone is typically seen as a lower density settlement including a front and back yard gardens, which can be used for substitute land for the village relocation resulting from the urban development. It is also important and crucial to consider the low-cost housing supply particularly for the people in the low-income group who cannot afford to obtain or rent housing in the Development Zone. This system will create the opportunities of housing and real estate business for the local communities.

(3) Reserved Zone

Although the Development Zone, which covers approximately 4,300 ha in total, is determined on the basis of the demand forecast for development space by the target year of 2020, it is likely to happen that the demand would fluctuate dependent upon the future economic and social situations. Furthermore, new urban functions that cannot be clearly foreseeable might come out in the future besides the currently planned ones. In order to respond to these unexpected needs, it is necessary to reserve some space for the Development Zone.

(4) Preservation Zone

As mentioned previously, the surface of Tan Xa Lake, rivers, lowland along rivers, steep slope hill areas, and low lying area below 10 m (MSL) are excluded from the Development Zone, and they are designated as the Preservation Area.

Rivers and green areas along rivers will be preserved not only due to create a rich urban landscape, but also due to the flood controlling functions. The low-lying area below 10 m (MSL) should be preserved and utilized to the flooding plain to mitigate an inundation. Therefore, it is extremely important to exclude such area from the

aspect of disaster prevention, apart from the reason that such area would result in the higher development cost due to its necessity of landfill.

The proposed zoning for the Master Plan Area based upon the above categories is as follows:

Table 4.3.1 Zoning Area for the Master Plan Area

Area	Development Zone	Village Improvement & Expansion Zone	Reserved Zone	Preservation Zone	Total (ha)
Hoa Lac	3,869	1,416	312 (742)	500	6,097 (6,527)
Xuan Mai	759	335	-	160	1,254
Total	4,628	1,851	312 (742)	660	7,351 (7,781)

Source: JICA Study Team
Note: ( ) the area include 430 ha of the planned expansion area for VNU after the year 2020.

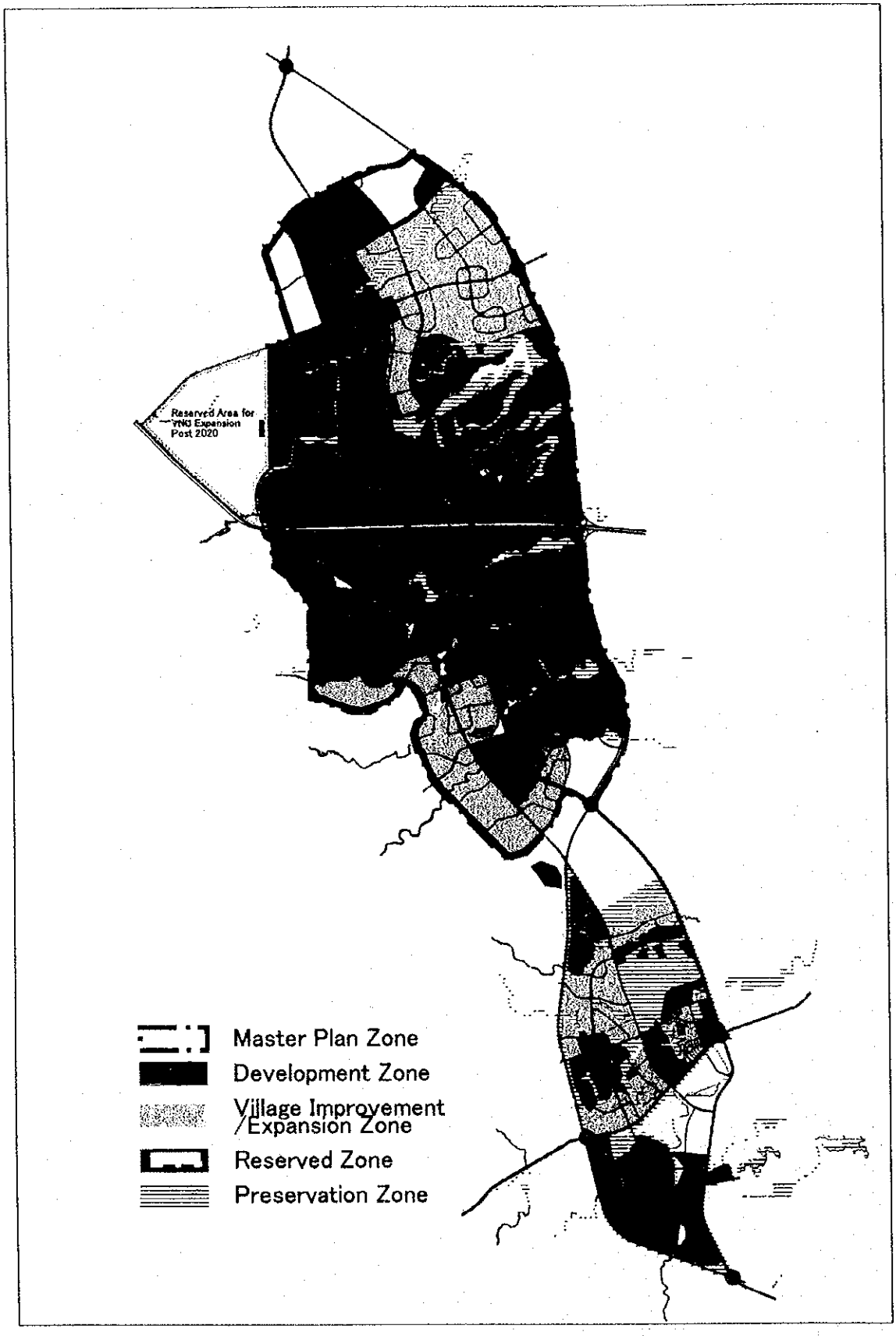


Figure 4.3.2 Proposed Zoning Plan for the M/P Area

4.3.3 Land Use Structure

The Urban Center, which is not only for Hoa Lac, but also the center for the whole C21, should be concentrated and developed in the area of 300 ha surrounding the intersection of NR21A and the Lang Hoa Lac Highway.

The other proposed major urban facilities and functions are principally distributed along NR21A to create the north-south Urban Central Axis through the above Urban Center. Within the Urban Axis, the north and south sub-centers and Xuan Mai center, social service functions of VNU (such as a library, museum, and RIST), R&D functions of HHTP, and other major urban functions are concentrated along NR21A. Furthermore, residential areas should be also laid out along the Urban Central Axis in a belt shape.

The proposed major industrial development areas are allocated along NR21 Bypass, which is planned to lay out along the eastern and western perimeter of the Hoa Lac and Xuan Mai Urban Development Zone respectively. Those industrial development areas should be properly separated for the areas of residential and urban center functions from the view points to avoid an environmental pollution and to avoid the through traffic of heavy goods vehicle in the residential and urban center areas and urban axis.

While the principal land use for the five areas planned by the MOC master plan are basically to be maintained. The proposed land use for each area needs to diversify and mix the land use in each areas to avoid a popular urban issue of "monolithic land use."

4.3.4 Community Structure

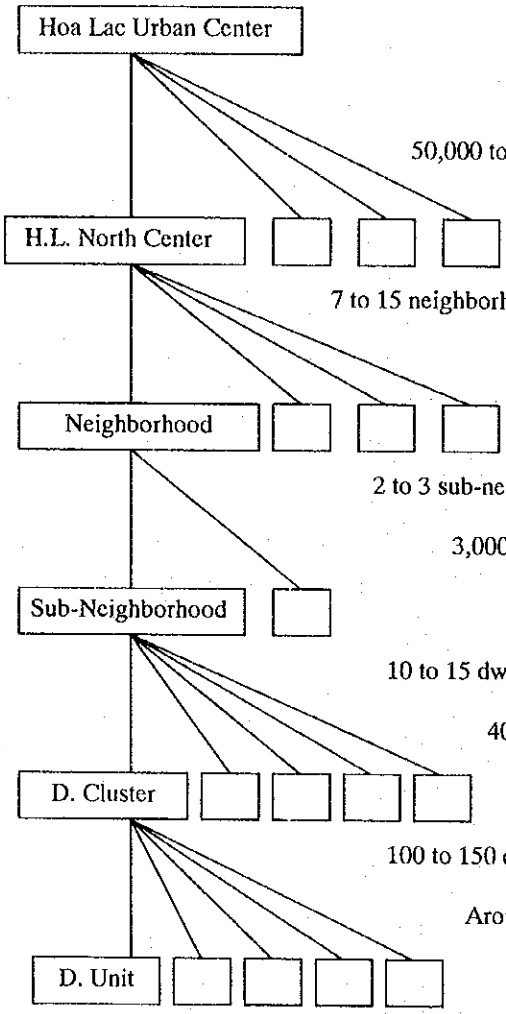
(1) Community Structure and Hierarchy

The neighborhood unit (each unit accommodates approximately 7,000 residents), which corresponds to one primary school zone, is proposed to be the basic community unit for the residential development planning. Based on the neighborhood unit, public and community facilities are planned so as to facilitate the comfortable and convenient urban environment, which will in turn lead to the attractive new city as a whole.

A few to tens of neighborhood units gathering together to compose the four residential district, which are Hoa Lac North, Hoa Lac Central, Hoa Lac South and Xuan Mai in the Hoa Lac and Xuan Mai M/P Area. In each residential district, an urban sub-center provides a highly qualified, diversified various urban services to residents and

visitors. The above community hierarchy is proposed for the Hoa Lac and Xuan Mai Urban Development as follows,

Hierarchy	No. of Units, Population/unit
• M/P Area	1 center/C21
	One million pop./C21
• Residential District	4 sub-centers/C21
	50,000 to 100,000 pop./R.D.
• Neighborhood Unit	7 to 15 neighborhood centers/R.D.
	7,000 pop./N.U.
• Sub-Neighborhood	2 to 3 sub-neighborhoods/N.U.
	3,000 to 5,000 pop./S.N.
• Dwelling Cluster	10 to 15 dwelling clusters/S.N.
	400 to 600 pop./D.C.
• Dwelling Unit	100 to 150 dwelling units/D.C
	Around 4 persons/D.U.



The urban center, which functions as a center of the urban community, is established. This urban center often has functions of a sub-center, and it applies for the case of Ha Lac and Xuan Mai. A sub-center for a residential district should be located in a place to which people inside and outside the district has easy access.

The urban residential community is structured at three hierarchical levels, i.e. neighborhood unit, district, and city. The detail of community hierarchy is described in Section 4.5.3: Community Plan for the Residential Area. The Hoa Lac/Xuan Mai

Urban Area is composed of 37 neighborhood units, and the following 4 residential districts.

- Hoa Lac North Residential District: 42,000 persons
- Hoa Lac Central Residential District: 112,400 persons
- Hoa Lac South Residential District: 49,000 persons
- Xuan Mai Residential District: 45,600 persons

(2) Hoa Lac

The planned 30 neighborhood units are to be developed and grouped into three residential districts, which are the central residential district close to the Urban Center, southern part, and northern part of Hoa Lac. Besides, several student centers are constructed in the dormitory areas within the VNU campus. By the year 2020, it is estimated that the VNU students and their families will grow to 65,000 altogether. A service center to support the daily life of the students and staffs are planned to locate in the dormitory areas.

The Urban Center of Hoa Lac is the center for the Hoa Lac Area as well as the whole C21. The Development should start from the surrounding areas of the Urban Center in order to make it more cost-effective with minimum investment in infrastructure. The development of the sub-centers for the residential districts will be followed by the development of the south center along NR 21A in Phase-1B, and then the north center along NR21A in Phase-2.

(3) Xuan Mai

The development of residential zones in Xuan Mai by the year 2020 includes the northwestern area surrounded by NR21A, NR21 Bypass, and NR6. The Xuan Mai center is expanded and established near the area surrounding the intersection of NR21A and NR6, where small center functions exist at present. After 2020, the area located on the west of NR21 Bypass and the north of NR6 are designated as the residential development zone. For the residential development, small supporting centers are proposed to establish in the new western residential area as well as the northern part of the residential area. Therefore, Xuan Mai will consist of one district by 2020, and thereafter three districts.

4.3.5 Transportation Structure and System

The structure of the arterial road network is as follows:

(1) Regional Road

- Lang-Hoa Lac Highway: This is the east-west inter-city expressway, which is one of major regional radial highway for HMA. It has been built with 2 lanes highway linking with central Hanoi and Hoa Lac.
- NR6: This is also one of major radial trunk highway for HMA, which serve and link the central Hanoi, Ha Dong, Xuan Mai, Hoa Binh, and the beyond.
- NR21 Bypass: This is proposed for the north-south regional highway, which connects Mieu Mon, Xuan Mai, Hoa Lac, and Son Tay. The bypass should take to substitute the regional road function of NR21A. It will compose the western part of the Outer Ring Road of HMA in Phase-3 (after Phase-2).

(2) Urban Arterial Road

- NR21A: This is an urban arterial road forming the north-south central axis of the city and a symbol of the Corridor 21, in the form of a boulevard.

The above four highways, arterial roads and other proposed arterial roads form a grid network pattern as a whole. All the arterial roads in the M/P area except for NR21 bypass consist of a traffic mode segment lane system such as automobile lanes, motorcycles lanes, and pedestrians, which are physically separated by medians and shoulders to keep a safety and smooth traffic. In addition, reserve space for the future development of public transportation systems such as a MRT, and LRT are proposed on the Lang-Hoa Lac Highway and NR21A. The alignment of NR21 Bypass is proposed to build along the eastern boundary of Hoa Lac, which will be the physical boundary of the urban development and the preservation area of agricultural production area. In the Xuan Mai Urban Area, the alignment of NR21 Bypass is proposed to shift to the western hillside in order to avoid the low flood plain in the east of NR21A.

4.3.6 Open Space Network System

The green areas and open space system is formulated and networked by mainly parks and public open space development along rivers and water network, which make a skeleton of "green matrix" for the M/P Area. Due to flood control, wider flooding plains are required along each river, which can be utilized as a recreational green network such as park and

sports field, promenade, and so on. The large-scale central parks, which is located at the nodes of the recreational green network, is proposed in each area.

4.4 Urban Center Development Plan

4.4.1 Development Orientation of the Urban Center

The orientation to establish the Urban Center and its urban functions are formulated on the consideration of the urban development direction and formation of urban functions for the M/P Area.

(1) Roles and Functions for the Urban Center

1) The Urban Center should be the core of socio-economic urban activities in the M/P Area. The role of the Urban Center is to support the main urban functions for Hoa Lac/Xuan Mai Development Project which are identified as HRD, R&D, international exchange of technology and cultural. It should also provide high-standard urban service functions for the whole Corridor.

2) The Urban Center should symbolize the urbanity of the Hoa Lac and the whole C21. The Urban Center should be the place to gather, exchange, and enjoy the urban life and cultural attraction for the residents and visitors to the New Town.

3) The Urban Center should represent the identity of the C21. The Urban Center creates unique urban atmosphere as a scientific research city, international city, and green city.

4) The roles of the Urban Center for Hoa Lac and the C21 are: 1) to encourage the convenient urban life, 2) to attract the urban life, and 3) to support a successful project implementation of the VNU relocation and HHTP. The required supporting functions of scientific research and exchange in the Urban Center are important to encourage the smooth relocation of VNU and attracts companies to come in HHTP.

5) The urban services, scientific research, exchange, and supporting functions have to be considered as the urban infrastructure of the C21, which is the scientific research city. Although these urban functions are not prepared until the future urbanization becomes matured enough to develop them, some basic urban functions should be developed from the beginning. Therefore, it is necessary

to organize a management system to support the front-heavy investment for urban center facilities in the early period.

(2) Triad Linkage of the Urban Center, VNU, and HHTP

Linkages among the Urban Center, VNU, and HHTP are an extremely important factor to enhance the Hoa Lac and Xuan Mai Development Project. The following figure shows the concept of their interrelation.

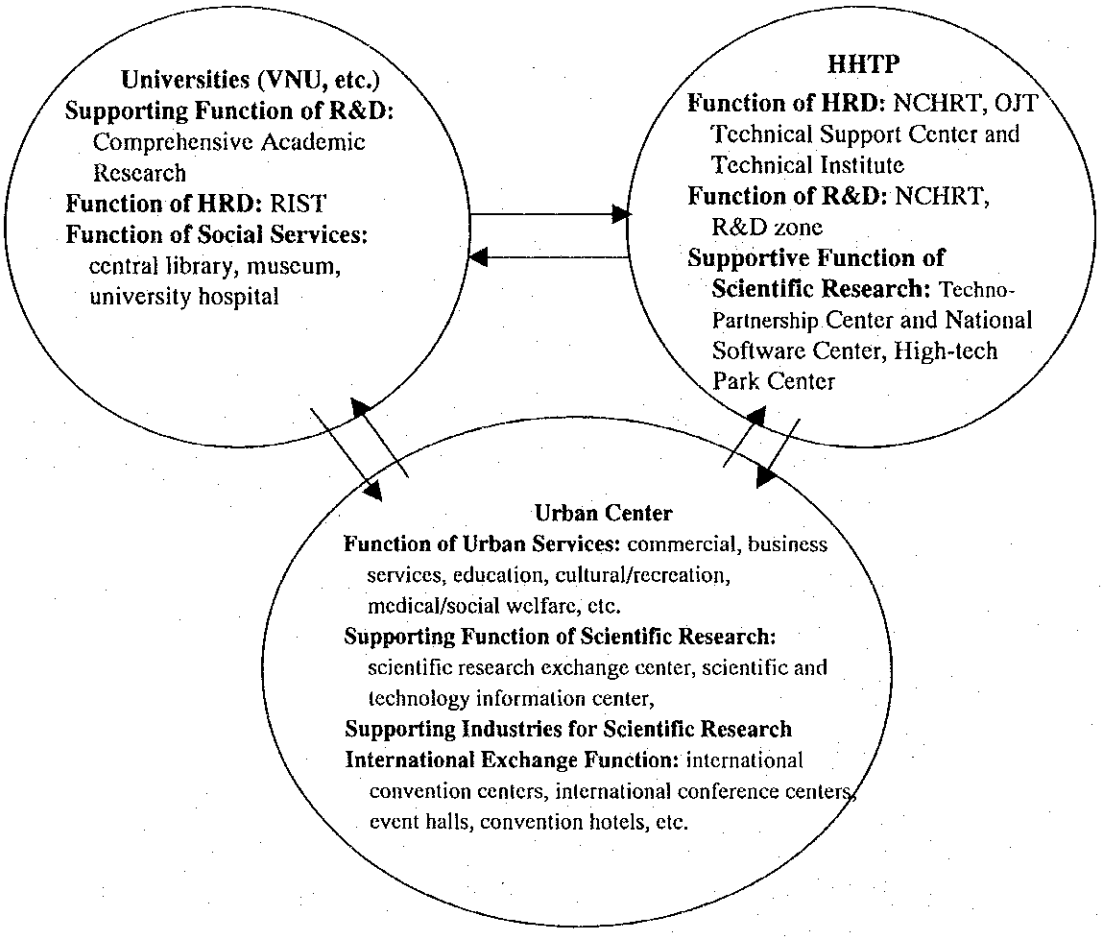


Figure 4.4.1 Triad Linkage of the Urban Center, VNU, and HHTP

(3) The Plan of Core Urban Functions by Phase

The development program of the core urban functions in the Urban Center, VNU, and HHTP by each development phase are formulated as shown in Table 4.4.1.

Table 4.4.1 Development Program for Core Urban Functions by Phase

	-2005	2006 - 2010	2011 - 2020
HRD	● RIST (VNU), NCHRT/OJT Technical Support Center/ Technical Institute (HHTP), Vocational Training Center (Phu Cat)	● Establishment of new core functions of HRD such as NCST and HUT(HHRP), Vocational Training Center (Xuan Mai)	○ Expansion and reinforcement
R&D	● R&D Zone/NCHRT/Techno-Partnership Center/ National Software Center (HHTP)	● Establishment of new core functions of R&D such as NCST(HHTP)	○ Expansion and reinforcement
Information of Scientific Research	● Science Museum/Central Library (Urban Center: U.C.)	● Information Center for National Science and Technology (U.C.)	○ Expansion and reinforcement
Supporting Industries for Scientific Research	● Supportive Industries of Scientific Research (U.C.)	○ Expansion of Supportive Industries for Scientific Research (U.C.)	○ Expansion
International Exchange and S&T Information Exchange	● Hotel, etc. (U.C.)	● Exchange Center for Scientific Research (U.C.)	● International Conference Hall, International Exhibition Hall, Event Hall, etc. (U.C.)
Commercial and Business Services	● Commercial and Business Center (U. C.)	● Large Scale Shopping Complex/ Business Centers (U. C.)	○ Expansion of commercial and business functions
Cultural and Recreation	● Theater, cinema, circus, cultural center, etc. (U.C.)	● Theme park, zoo, botanical garden, library, art museum, cultural center for children (U.	● Olympic Game Complex (Phu Cat), Concerthall (U. C.)
Medical and Health Care	● General Hospital and Clinic Center (U. C.)	● Medical University with Hospital (VNU)	○ Expansion and reinforcement
Public Administration	● New town center or Cityhall (U. C.)	● Ha Tay People's Committee and National Institutes(U.C.)	○ Expansion and reinforcement
Transportation Terminal	● Transportation Terminal (U. C.)	● Expansion of Terminal (U. C.) /Bus Terminals (South Center/Xuan Mai Center)	● Expansion of transportation Terminals/Railway St.(U. C.), Bus Terminal (North Center)

4.4.2 Formulation of the Urban Center Area

The two approaches and methodologies are utilized to formulate the Urban Center in the past. The first is to divide the area into different functional zones and develop each of them on a stage basis, and the second is to develop a multi-functional and compact core area and expand it on a stage basis.

Although the development scale is quite different, the first case is the Tama New Town, and the second case is the Senri New Town in Japan. The first one can create a center in a more completed pattern when it is fully developed, but during the long development period, major facilities are to be dispersed and vacant spaces are to remain, which creates the following disadvantages.

(a) Front-heavy investment of infrastructure such as roads and utilities will be required to link each major facilities,

(b) Inconvenience for users for facilities in terms of accessibility,

(c) Lack of the image of a modern urban center due to its dispersal appearance, and

(d) Lack of the flexibility of changing the original plan to cope with changing needs and circumstances.

The first approach may be called as the "infrastructure-oriented" or "normative approach", in which infrastructure and major facilities are developed as planned without major changing during the implementation process.

The second approach can create a compact urban space from the beginning, thus ensuring more attractive urban atmosphere and users' convenience, as well as minimizing the infrastructure development cost. This approach may be called as the "urban space-oriented" or "behavioral" approach, which can ensure more flexible development during its implementation by utilizing the vast reserved area. Disadvantages of this approach are, however, risks to create the mixture of small and inadequate quality facilities in rather confined area particularly in the beginning phase, which may require its renewal or redevelopment in the future when more urban functions will need to be attached to the urban center in future.

The Study Team is of the opinion that the proposed Hoa Lac and Xuan Mai Urban Development Project should adopt the second urban space-oriented approach in order to

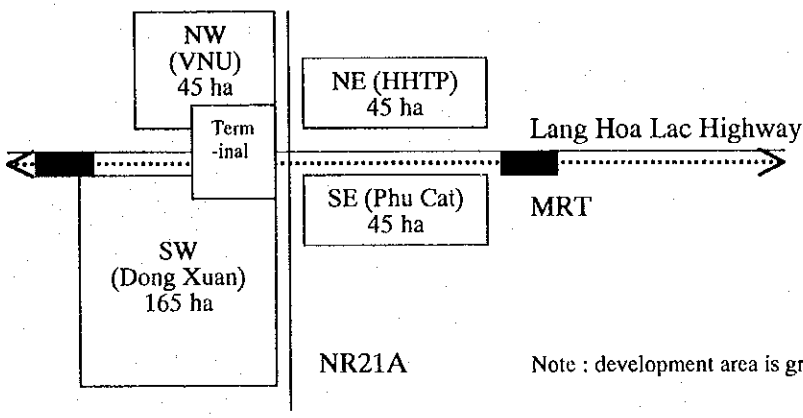
ensure the future flexibility for development in the vast area (ultimate more than 200 ha, excluding roads and green space), thereby avoiding massive investment in infrastructure developments. But important and strategic facilities such as parks, cultural facilities, international convention hall, hotels, hospitals, commerce and business complex, can be developed in an early stage if required, thus supplementing the above-mentioned disadvantages of the approach.

4.4.3 Structure and Functional Layout for the Urban Center

(1) Structure of the Urban Center

Among the functions to be introduced in the Urban Center, the functions of commerce and business, and transport are most important and require larger areas. Commercial functions support the daily life of people and the quality urban life as well, business functions are per se active entrepreneurial activities, and transport functions support these urban life and economy.

The Urban Center in the Hoa Lac is composed of the four zones surrounding the intersection of NR21A and the Lang-Hoa Lac Highway. In terms of the urban center land distribution to the four zones, more than a half of the area (55%) are proposed to locate in the southwest (Dong Xuan) zone. The remaining 45% are proposed evenly to distribute to the northwest (VNU), northeast (HHTP), and the southeast (Phu Cat) zones (each 15%) as shown below. The main transport terminal is proposed to locate in the Dong Xuan and VNU zones, which assumes the terminal functions for inter-urban traffic with Hanoi and other 3 urban areas in the C21, as well as intra-urban traffic within the Hoa Lac Area. In Phase-2, a MRT system is proposed to link the central Hanoi and Hoa Lac Area. Three railway stations will be required for MRT within the Hoa Lac, which will be laid out with the coordinated passenger traffic demand in the future.



Phase-1 development of the Urban Center should include compact commerce and business functions, as it will surely contribute to induce more people and investments. Some hotels, movie theaters, and amusement facilities will also be required in the phase. In the northwest (VNU) zone, the major park (on and surrounding the Muc hill that can be used as an observation spot for Hoa Lac), impressive pedestrian mall towards the gate of VNU, and other public facilities such as a university hospital, music hall, and theater will be provided. In the southwest (Dong Xuan) zone, Commerce and business, hotels, and medium to high-rise apartments will be mainly provided along the Lang-Hoa Lac Highway and its extension to the Don Mo Cultural Village.

In the northeast (HHTP) zone, science and cultural facilities, international convention facilities, and high international standards hotels, commerce and business facilities are proposed along NR21A. In the southeast (Phu Cat) zone, the functions of recreation and amusement are proposed along with some space for events such as international exhibition and wholesale markets for foodstuffs and sundry commodities.

(2) Distribution of Urban Functions to Each Zone

The urban center of the Hoa Lac consists of the Northwest Zone (VNU area), Northeast Zone (HHTP area), Southwest Zone (Dong Xuan area), and Southeast Zone (Phu Cat area). The basic policy for the urban center is that various functions are mixed and located close each other, and also the diversification of the Urban Center, with essential urban characteristic, can be created. Under the policy, characteristics of urban functions in each zone and development program for the major urban functions targeted by 2020 (urban population for C21: 670,000 and Hoa Lac and Xuan Mai area: 500,000) are set as follows:

1) Northwest Zone (around 70 ha): Academic and Cultural Center

- Extension services of VNU for the citizen: central library and science museum
- Supporting functions to scientific research: information centre for science and technology (include national library and rental laboratory)
- Function of scientific research exchange: communication and information industries, service industries, publishing/printing industries, translation, book stores, stationary stores, and so on
- Cultural functions: library, museum, exhibition hall, theater, concert hall, and cultural center

- Commercial, business, and service functions (construct facilities which make the urban center look like a college town)

2) Northeast Zone (around 50 ha): Research and International Exchange Center

- International convention center (international conference center)
- International exhibition hall
- Event hall
- Convention hotel
- World trade center (office, showroom, shopping, and restaurant)
- Supporting industries for scientific research: sales and maintenance of experimental materials and machinery, experimental factory, import industry of materials and machinery, communication and information industry, convention industry
- Commercial, business, and service industry

3) Southwest Zone (around 150 ha): Civic Center and Commercial Center

- Civic center (public management) function: C21DA and Hoa Lac city hall, new town centre (management and construction organizations), Ha Tay People's Committee and national institutions, district office, police station, fire station, and post office
- Commercial function: retail shops (department store, supermarket, market, specialized store, stores for foreigner, and open market), restaurant (ethnic food restaurant, club, and bar)
- Business and service function: finance and insurance, transportation service, communication and information service, specialized service, showroom, rental shops, housing and real estate service, maintenance service, airline and tour agent/operator
- Hotel and event function: urban hotel (hall, wedding hall, conference, membership sports club), mini-hotel, ceremony center
- Education and training function: vocational schools, cultural schools
- Cultural function: library, exhibition hall, center for children, theater, cinema, gallery
- Amusement function: amusement center, bowling, game center,

- Medical and social welfare function: general hospital, maternity hospital, clinic, health center, welfare center
- Transportation function: multi-transportation terminal (railway station, long distance bus terminal, city bus terminal, car parking, motorcycle/bicycle parking)

4) Southeast Zone (around 60 ha): Recreation and Amusement Center

- Theme park
- Amusement park
- Circus
- Zoo and botanical garden
- Theatre, cinema, bowling, play ground

The proposed large-scale amusement park and theme park can be temporally used for 10 to 15 years. The land will be redeveloped to the more productive use for a core urban function when one million city comes in Phase-3.

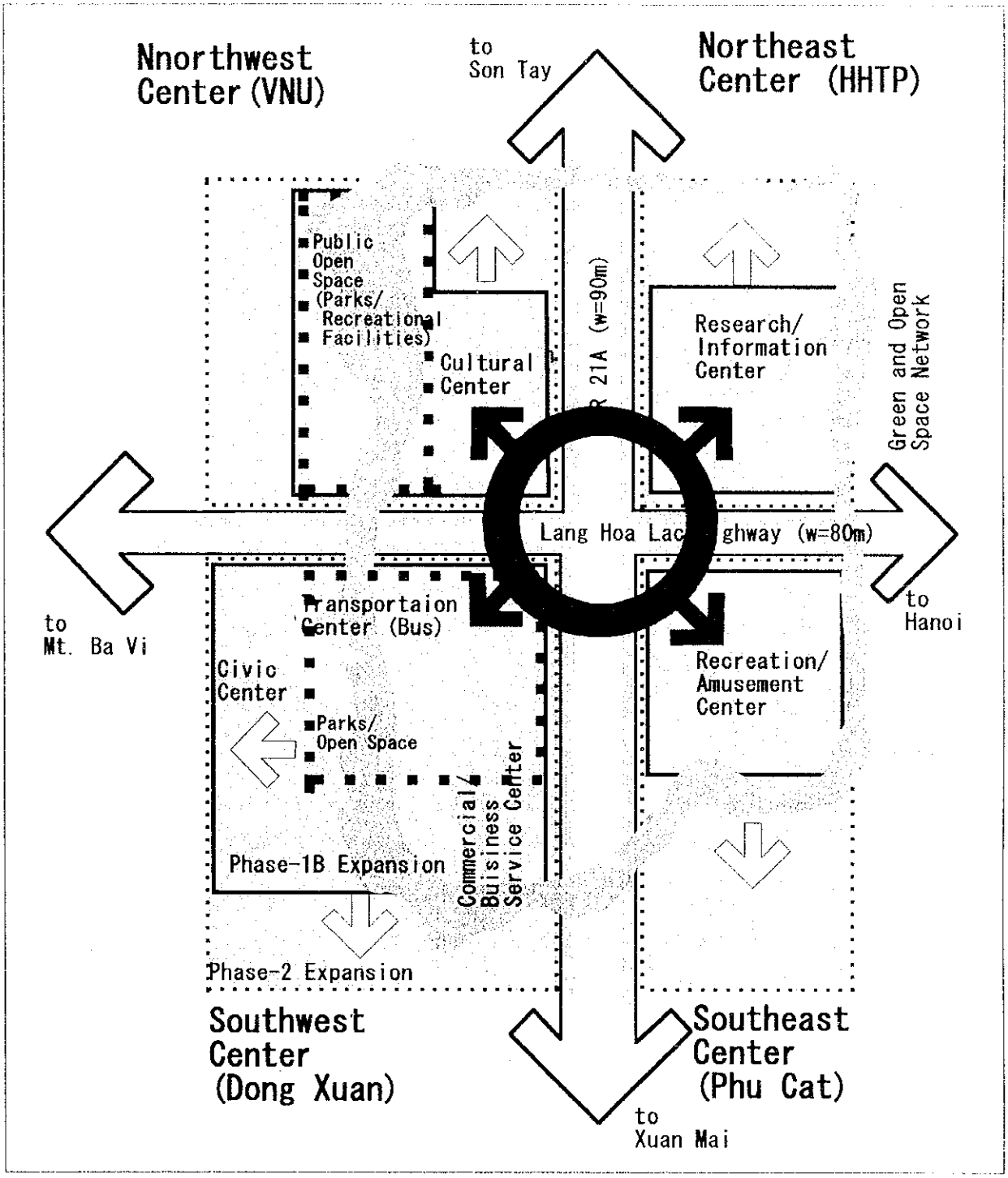


Figure 4.4.2 Conceptual Land Use for Urban Center