FY2024 THEMATIC EVALUATION: SURVEY ON LONG-TERM OUTCOMES OF THE COMPREHENSIVE URBAN DEVELOPMENT PROGRAMME IN HANOI CAPITAL CITY (HAIDEP), VIET NAM

FINAL REPORT

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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

ALMEC CORPORATION
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Abbreviation

略語	英語
ATI	Administration of Technical Infrastructure
BOD	Biological Oxygen Demand
BOT	Build Operate Transfer
BRT	Bus Rapid Transit
COD	Chemical Oxygen Demand
COVID-19	Coronavirus Disease 2019
CP	Counterpart
CUPCUP	The Urban Planning Formulation and Management Capacity Development Project in the Socialist Republic of Vietnam
DO	Dissolved Oxygen
DOAE	Department of Agriculture and Environment
DoC	Department of Construction
DX	Digital Transformation
EIA	Environmental Impact Assessment
EV	Electric Vehicles
FDI	Foreign Direct Investment
FS	Feasibility Study
GHG	Greenhouse Gas
GRDP	Gross Regional Domestic Product
GSO	General Statistics Office
HAIDEP	Comprehensive Urban Development Programme in Hanoi Capital City
HAIMUD	The Project on Integrated UMRT and Urban Development for Hanoi
HAIMUD2	Project for Studying the Implementation of Integrated UMRT and Urban Development for Hanoi in Vietnam
HAPI	Hanoi Authority for Planning and Investment
HAUPA	Hanoi Authority for Urban Planning and Architecture
HPC	Hanoi People's Committee
IC	Information Communication
ICT	Information and Communication Technology
JICA	Japan International Cooperation Agency
KTT	khu tập thể
LEZ	Low-Emission Zone
LVC	Land Value Capture
MOC	Ministry of Construction
MOT	Ministry of Transportation
MP	Master Plan
MRB	Hanoi Metropolitan Railway Management Board
NGO	Non-Government Organization
OD	Origin-Destination
ODA	Official Development Assistance
PDCA	Plan Do Check Action
PPP	Public Private Partnership
RR	Ring Road
SC	Steering Committee
TFP	Total Factor Productivity

ToC	Theory of Change
TOD	Transit Oriented Development
TRAHUD	The Project for Improving Public Transportation in Hanoi
TWG	Technical Working Group
UDA	Urban Development Area
UMRT	Urban Mass Rapid Transit
VCR	Volume Capacity Ratio
VIAP	Vietnam Institute of Architecture, Urban and Rural Planning
VIUP	Vietnam Institute of Urban and Rural Planning
WG	Working Group
WHO	World Health Organization
WTO	World Trade Organization

1. Introduction

1.1 Background

As approximately 57% of the world's population lives in cities, with an expected rise of 70% by 2050, realizing sustainable cities is becoming an urgent task in developing countries.

Toward achieving SDG 11, "Make cities and human settlements inclusive, safe, resilient, and sustainable," JICA has collaborated with government agencies in developing countries under its "Specific Project Strategy (Global Agenda): Urban and Regional Development" to provide support in the "Urban Management and Community Development" cluster, specifically, through technical cooperation. This support includes the formulation of policies and plans for urban development and community building, strengthening administrative functions to implement these plans, establishing development management systems, and promoting development methodologies such as smart cities and transit-oriented development (TOD).

An urban master plan is based on the city's vision and outlines the city's future image, structure, and development policy. It has the effect of improving administrative accountability and promoting understanding and cooperation among citizens and investors. On the other hand, since the effects of urban master plans emerge over the medium to long term, it is challenging to adequately grasp and evaluate their achievements in post-project evaluations (three years after project completion) of technical cooperation projects. Furthermore, measures based on the master plan will be implemented with the support of target countries, local governments, and other donors. In addition, in order to understand the development effects, it is necessary to consider the efforts of various stakeholders and cross-sectoral factors.

This survey focuses on urban development master plans formulated with the support of JICA, which confirm the medium- to long-term development effects of various implemented measures and initiatives based on those master plans and organize the background to the realization of those development effects. In addition, the contribution of the master plan to the city's development from the perspective of collective impact through projects implemented by Hanoi City and other donors will be examined.

1.2 Purpose and scope of the survey

The purpose of this survey is to quantitatively verify the development effects achieved in 2020, which is the target year of the urban development master plan created with support from the "The Comprehensive Urban Development Programme in Hanoi Capital City of the Socialist Republic of Vietnam (HAIDEP)," and to propose methods for confirming the medium- to long-term results of the master plan creation by JICA's technical cooperation (Kaicho Gikyo), as well as methods for setting and measuring monitoring and effect indicators in cluster business strategies in the urban development field.

1.3 Survey Methods and Limitations of the Survey

1.3.1 HAIDEP'S Target Sectors and Setting Priority Themes

HAIDEP has established nine sub-sector programs: "A. Regional Development," "B. Urban Growth Management," "C. Socio-Economic Development," "D. Urban Transportation," "E. Urban Water and Sanitation," "F. Housing and Living Condition," "G. Environmental Management," "H. Urban Design and Landscape," "I. Special Areas," as well as an implementation, operation, and management sub-program: "J. Implementation and Management" to achieve the vision and development goals of HAIDEP. Each sub-sector program has a proposed framework of strategies, actions, and monitoring indicators. Specific actions and target values are mainly suggested in the fields of urban development, urban transport, and the water environment.

This study first reviews the overall development status of Hanoi, focusing on socio-economic indicators, and evaluates with an emphasis on the sub-sector program "C. Socio-Economic Development" (Chapter 3). Subsequently, the study assesses the manifestation of outcomes as a comprehensive urban master plan and examines the overall significance of the master plan. Specifically, the analysis focuses on "B. Urban Growth Management," which is positioned above the sub-sector programs, while also verifying, through the aforementioned sub-sector programs, whether the city has advanced toward a desirable urban form (Chapter 4).

The sector-based evaluation focused primarily on two areas, "D. Urban Transportation" and "E. Urban Water and Sanitation," which include many priority projects realized with support from JICA, mainly through yen loans (Chapters 5 and 6).

Furthermore, among the major sub-sector programs, areas where JICA support is being implemented in multiple sectors and where it is possible to grasp the urban development process across multiple sectors have been designated as "priority themes." The following four key themes were set, and the process of realizing their effects was arranged using the Theory of Change (ToC). In preparing the ToC for support related to the realization of development impacts by sub-sector under HAIDEP, Chapter 7 arranges the causal relationships of subsequent processes—from project implementation to achieving the medium-term outcomes to the realization of long-term impacts—based on the medium- to long-term development impacts and strategic directions proposed in the master plan.

(1) Public Transport-Based Urban Area and Society

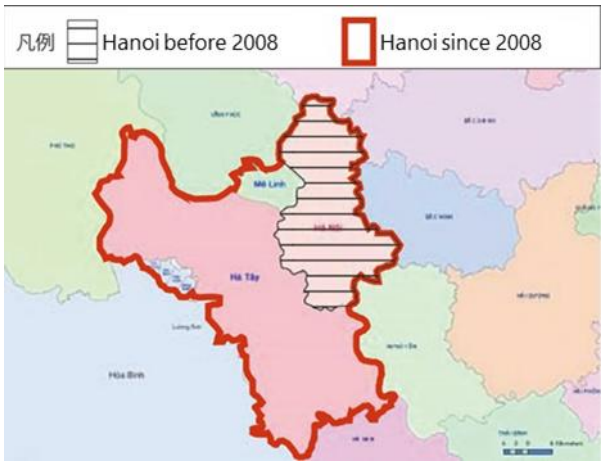
(2) Urban Growth Management through Road Network Improvement

(3) Equitable and Safe Mobility and Accessibility for All

(4) Water Environment Improvement

1.3.2 Expansion of Hanoi City jurisdiction and restrictions based on elapsed years, etc.

In 2008, Hanoi City underwent administrative expansion. The city's area greatly increased from 920 to 3,344 km^2. HAIDEP was implemented from 2004 to 2007 and formulated plans covering the area, excluding the expanded areas (refer to Figure 1.3.1). Since the data on population and other factors were available for each area, a comparison was made between the current values within the former Hanoi City limits and the HAIDEP plan values. It is necessary to note that the scope of the targets differs.



Source: Evaluation Team

Figure 1.3.1 Expansion of Hanoi City Administrative Boundary

In addition to administrative changes, various sectoral plans in Hanoi, including those related to urban planning, are generally reviewed and updated every 5 to 10 years. Therefore, it is difficult to directly assess whether the plans proposed in HAIDEP have been implemented or how they are reflected in the current plans. Moreover, over the roughly 20 years since the formulation of HAIDEP, some statistical indicators have changed in terms of data collection and calculation methods.

Current and former counterpart (C/P) staff involved in the formulation of HAIDEP were also interviewed. However, many have already retired, making it difficult to reach them.

1.3.3 Survey Methodology

The survey was conducted mainly through the review of existing materials and interviews with local stakeholders and beneficiaries.

(1) Interviewing local stakeholders

The list of interviews conducted on site is as follows.

Table 1.3.1 Interviewing Local Stakeholders

Current Position, Organization / HAIDEP Position	Name	Sector / Agenda
HPC		
Head of Architecture & Planning Research Division, **Hanoi Authority for Urban Planning and Architecture (HAUPA)**, Senior Advisor to Vinhome (Retired)	Mr. Le Manh Cuong	**Urban** (Planning and development management)
HAUPA, Head of Technical Infrastructure Planning Division Head of Urban Planning, Architecture and Operations Management Division	Mr. Dao Minh Tam Mr. Trinh Quang Dung	**Urban** (Planning and development management)
Director of **Hanoi Authority for Planning and Investment (HAPI)-PMU,** Senior Advisor to Private Developer (Retired)	Mr. Tran Minh Quang	**Urban** (Planning and development management)
Head of External Economic Division, Hanoi DOF / Counterpart (CP) in **HAPI**	Mr. Tran The Phuong	**Socio-economic** (Financial strategy issues after HAIDEP)
Hanoi Urban Planning Institute (**HUPI**), Deputy Head of R&D, Training and International Cooperation Division	Ms. Vu Tuyet Mai	**Urban** (Planning and development management)
DOC (Deputy Head of Housing Management Division) Participation in WG of HAIDEP	Ms. Hoang Thu Thuy	**Urban** (Housing)
Hanoi DOC, Traffic Safety Committee, Traffic Infrastructure Maintenance Management Committee	Mr. Ta Duc Giang Ms. Tran Thi Chung Mr. Nguyen Dinh Don	**Transport** (Traffic safety)
Hanoi DOC, Traffic Management and Operation Center (TRAMOC)	Ms. Tran Thi Phuong Thao Ms. Tran Thi Van Huong Ms. Dinh Thi Hong Sim Mr. Ha Xuan Thang Mr. Nguyen Xuan Cuong Mr. Pham Dinh Tien Mr. Pham Thanh Lam	**Transport** (Urban Public Transportation Planning)
Hanoi DOC (Sewerage/Drainage/Lake)	Mr. Pham Van Cuong	**Water** (Drainage Project)
Former Deputy Director, **HIZA**	Mr. Nguyen Duc Quang	**Socio-economic** (Industrial zone development)
Hanoi DOF, Deputy Head of Development Policies & Planning, General Affairs Division, Participation in HAIDEP	Mr. Nguyen Thai Dong	**Socio-economic** (Socio-economic Development)
Hanoi Metropolitan Railway Management Board (**MRB**)	Mr. Nguyen Dac Phuoc Mr. Do Duc Hoa	**Transport** (UMRT Development)
Hanoi Metro	Dr. Khuat Viet Hung	**Transport** (UMRT Transportation)
Deputy Director of TUPWS (Former **DOT**), leader of WG (Retired)	Mr. Tran Danh Loi	**Transport** (Urban Transportation)
Government Agencies		
MOC (International Cooperation Dept., Urban Development Authority Planning & Architecture Dept, Vietnam Institute of Urban and Rural Planning [VIUP)])	Ms. Do Nguyet Anh Mr. Nguyen Trung Kien Ms. Dao Thi Nhu Mr. Nguyen Trung Dung Mr. Hoang Dinh Giap	**Urban** (Planning and Development / Urban Planning Administration)

Member of SC, Vice Minister, **MOC** President of **Vietnam Urban Planning and Development Association (VUPDA)** (Retired)	Mr. Tran Ngoc Chinh	**Urban** (Planning and Development / Urban Planning Administration)
MOC Former Director, Department of Housing Management, Member of SC, Senior Expert of GIZ (Retired)	Mr. Nguyen Hong Tien	**Water** (institutional issues, HAIDEP proposed projects)
MOC, Department for Roads of Vietnam (DRVN)	Ms. Phan Thi Thu Hien Mr. Nguyen Van Minh Mr. Tran Xuan Binh	**Transport** (Road Development)
MOC, Vietnam Railway Administration	Mr. Nguyen Tien Thinh Mr. Tuyen Mr. Khang	**Transport** (Railway)
Director, **VIUP,** Director of Center for Training & International Cooperation (Main CP of CUPCUP)	Dr. Hoang Vinh Hung Dr. Nguyen Trung Dung, Mr. Truong Minh Ngoc, Ms. Phan Thanh Bich	**Urban** (Planning and Development/ Urban Planning Administration)
VIUP, Transport Planner	Mr. Nguyen Anh Tuan	**Transport** (Public Transport)
Other related agencies		
Hanoi Univ. of Civil Engineering/Local Consultant of HAIDEP Director of International Training & Cooperation Department Former Deputy Director, National Institute of Architecture	Dr. Ta Quynh Hoa Dr. Pham Thuy Loan	**Urban** (Planning and Development/ Urban Planning Administration)
VinBus Company	Mr. Duong Thien Tuong	**Transport** (Public Transport)
TRANSERCO	Mr. Le Anh Nam Ms. Nguyen Thi Hai Yen Mr. Do Ngoc Thang Mr. Vu Van Cu	**Transport** (Public Transport)
OCG Vietnam Former JICA Vietnam	Mr. Phan Le Binh	**Transport** (Urban Transportation)
Gamuda WWTP Yen So Pumping Station	Site visit	**Water** Implemented the project by the private sector (BT)
Bay Mau WWTP	Site visit	**Water** Implemented the project with Japanese ODA Loan
TEDI, Environmental Center, Planning and Investment Department, International Consulting Center, Road and Airport Center	Mr. Vu Hien Ms. Dao Thi Xuan Ha Mr. Dang Hoang Hiep Mr. Vu Duc Minh	Recent policy on land acquisition and resettlement of Hanoi and Vietnam

Note: Organizational restructuring in 2025
Source: Evaluation Team

(2) Beneficiary Interview

Those who benefited from the project were interviewed to see how it helped with transportation and water. In the transportation sector, 40 public transportation users and 31 road users were interviewed. In the field of water environment, 40 people were interviewed at 15 locations where JICA projects, mainly lake improvement projects, were implemented. Detailed results of each interview are described in sections 5.5 and 6.5.

2. Overview of HAIDEP

2.1 Background and Purpose of HAIDEP[1]

Background: Vietnam has experienced strong economic growth since the mid-1990s. This economic growth has further accelerated in the 2000s, leading to rapid urbanization and motorization. While people have enjoyed the benefits of economic growth, it has caused urban problems that are reaching a critical point, especially in large cities, with worsening traffic congestion, escalating traffic accidents, and a deteriorating living environment.

With JICA's support, master plans for various sectors in Hanoi, including transportation, water supply, drainage, and sewage, have been developed, as well as JPY loan projects. While a review of these sectors has become necessary, comprehensive measures are also needed as the city continues to grow and urban issues become more complex.

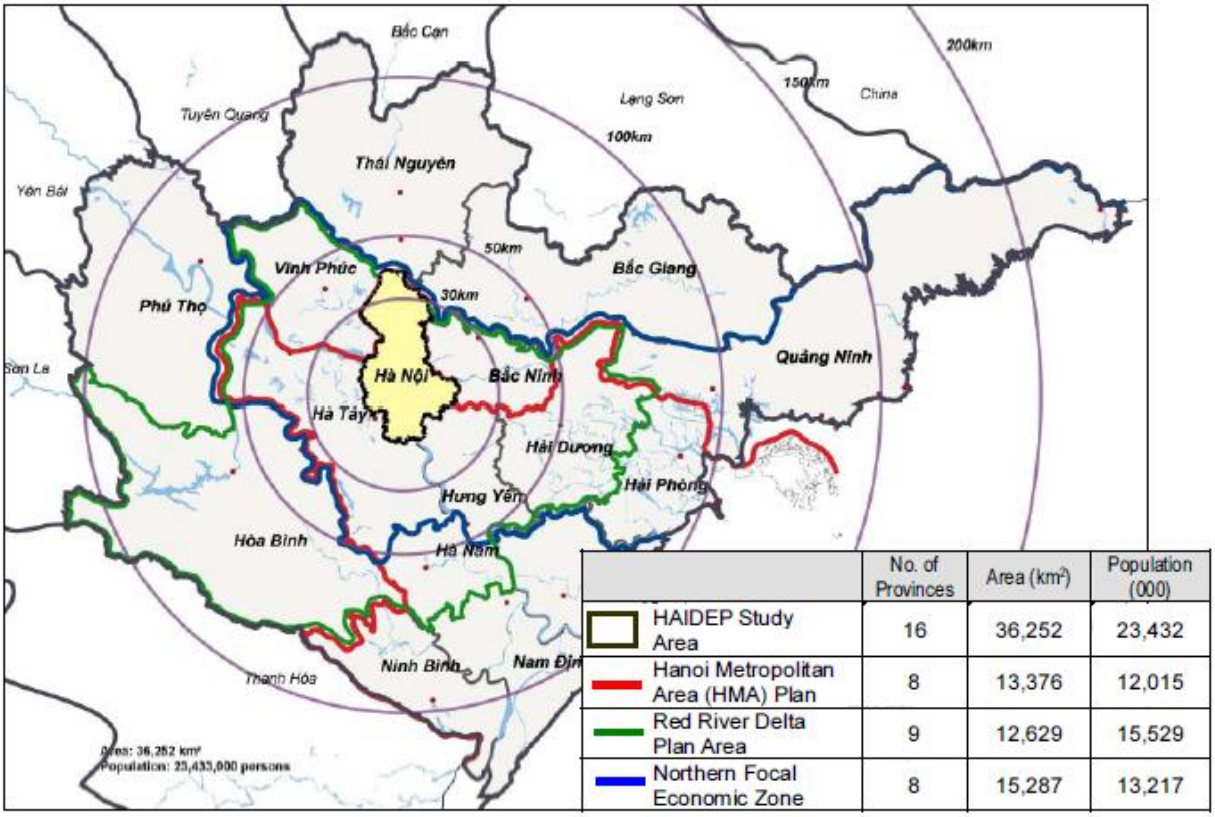
Given these circumstances, the "Comprehensive Urban Development Programme in Hanoi Capital City" was requested for an extensive review of the urban development, urban transportation, water environment, and living conditions, as well as for the revision of the existing urban master plan (General Construction Plan, 1998).

Objectives: HAIDEP has four specific objectives.

- Formulate the Comprehensive Urban Development Program for the Hanoi Metropolitan Area up to 2020.
- Formulate a short-term implementation plan.
- Implement pilot projects and a feasibility study on priority urban transportation projects.
- Strengthen the planning and management capacities of government bodies.

Study Area: Besides Hanoi City, the study area includes 15 provinces in northern Vietnam (Hai Phong City and the northern Red River Delta provinces of Ha Tay, Vinh Phuc, Bac Ninh, Hai Duong, Hung Yen, Ha Nam, Quang Ninh, Hoa Binh, Bac Giang, Thai Nguyen, Nam Dinh, Thai Binh, Ninh Binh, and Phu Tho) in order to consider Hanoi's important role in the wider region and the impact of its development. The study area is 36,252 km^2 and has a total population of 23.4 million people.

[1] See Summary of HAIDEP Final Report.



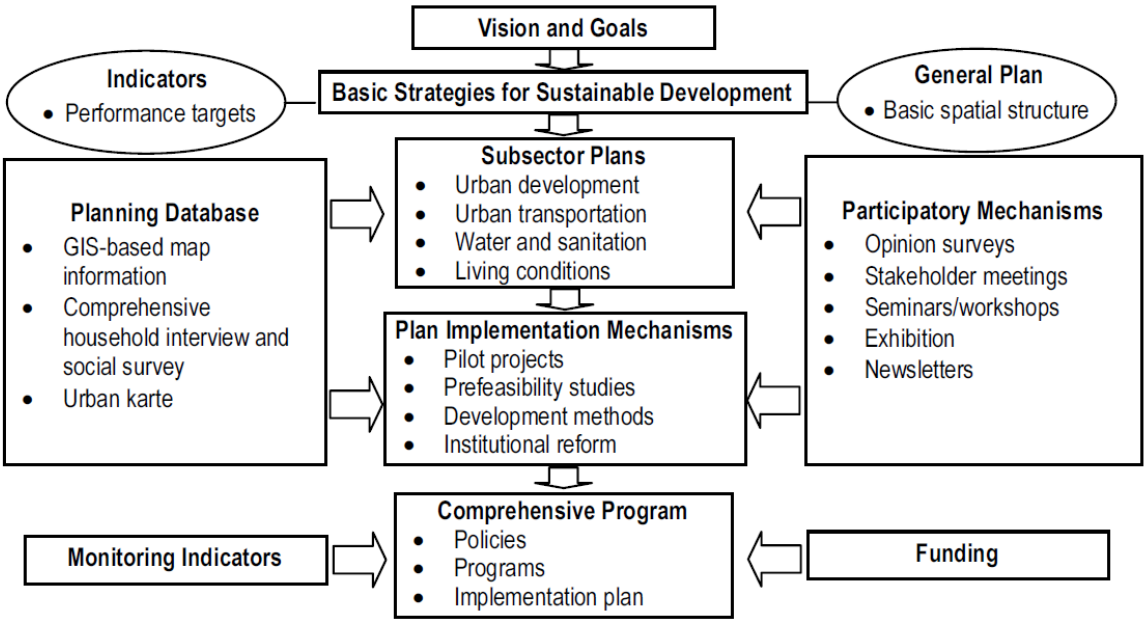
	No. of Provinces	Area (km²)	Population (000)
HAIDEP Study Area	16	36,252	23,432
Hanoi Metropolitan Area (HMA) Plan	8	13,376	12,015
Red River Delta Plan Area	9	12,629	15,529
Northern Focal Economic Zone	8	15,287	13,217

Source: HAIDEP Final Report

Figure 2.1.1 HAIDEP's Target Areas for Planning and Study

2.2 HAIDEP's Proposal

The planning approach of HAIDEP is presented in Figure 2.2.1. After presenting Hanoi City's vision and goals, the strategy for sustainable development and general plan are formulated, providing the basis for the preparation of subsectoral plans. The planning approach adopted planning methods based on the planning database, participatory methods, and a comprehensive approach encompassing urban development, urban transportation, water and sewage, and the living environment. This is further explained in Chapter 4.



Source: HAIDEP final report

Figure 2.2.1 HAIDEP's Planning Approach

The vision and goals of HAIDEP are as follows.

Vision: Based on the vision stated in Government Directive No. 1/2001/L-CTN, "Hanoi must be built as a modern and thriving capital city, symbolizing the shole country and functioning as a national and regional center for policy, culture, science, technology, education, economy, and international trade." A broad consensus was reached to position "water, greenery, and culture" as the primary spatial development strategy.

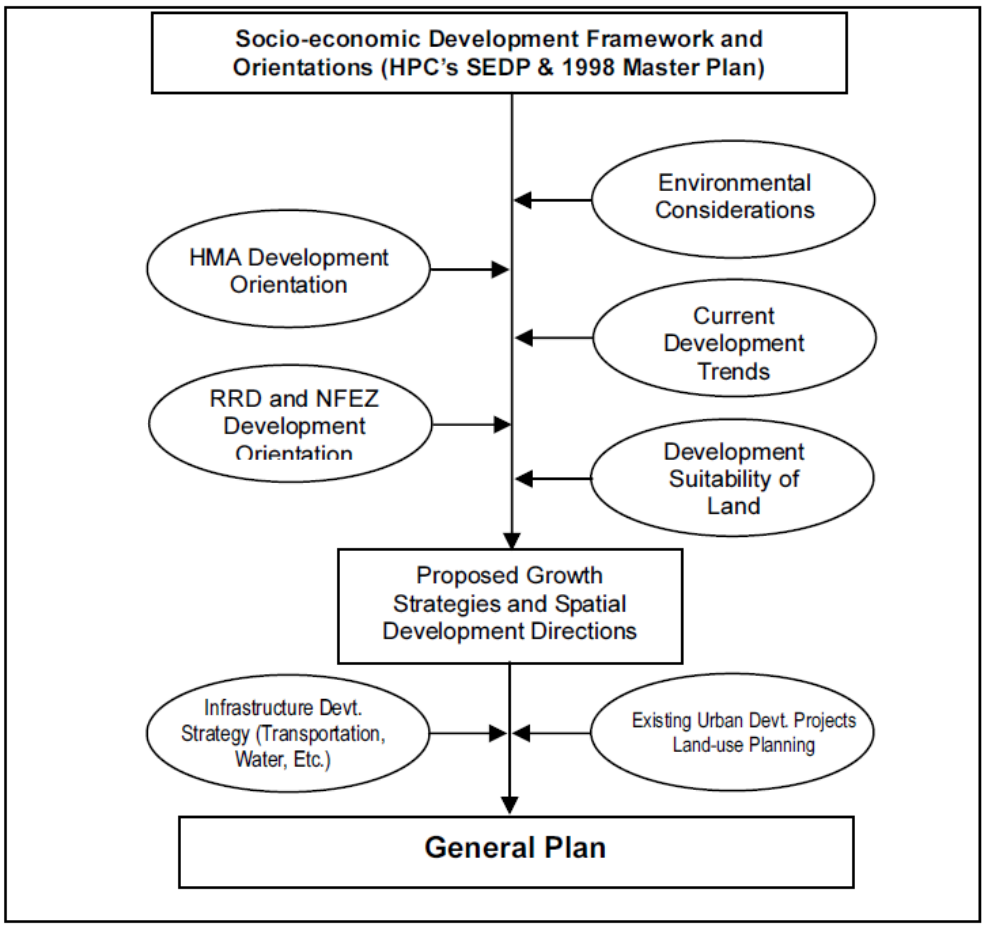
Table 2.2.1 Objectives of HAIDEP's Selected Subsectors

Subsector	Main Objective
A. Regional Development	• Promote high and balanced growth. • Alleviate poverty and promote environmental sustainability. • Enhance regional governance.
B. Urban Growth Management	• Promote integration/coordination among cities/urban areas in the Hanoi metropolitan area. • Promote organized expansion of urban areas. • Promote competitive and livable urban areas.
C. Socio-economic Development	• Achieve sustainable high economic growth through knowledge-based industries, services, and FDIs. • Reduce inequalities and enhance the quality of life of the people, including the poor. • Further improve the investment environment through institutional reform, infrastructure improvement, and human resource development.
D. Urban Transportation	• Promote the development of transit-centric urban areas and society. • Ensure equitable and safe mobility and accessibility for all. • Ensure efficient/effective transportation between Hanoi and the rest of the region.
E. Urban Water and Sanitation	• Safeguard the people's safety and health by improving the water environment. • Promote sustainable use of water resources.

Subsector	Main Objective
	• Enhance the city's image by improving the water environment and sanitation conditions.
F. Housing and Living Conditions	• Provide affordable housing, especially for the poor, through institutional and fiscal support, including upgrading old housing stocks. • Ensure smooth provision of land for housing. • Improve living conditions based on a comprehensive assessment of areas.
G. Environmental Management	• Ensure environmental sustainability and effective land use in Hanoi as well as its metropolitan area. • Safeguard people's health and safety by reducing pollution and improving disaster preparedness. • Conserve and enhance cultural and traditional values.
H. Urban Design and Landscape	• Enhance the image and identity of Hanoi to resonate with the citizens and international society. • Ensure tangible and intangible traditional and cultural values are preserved and enhanced. • Enhance public awareness of the importance of urban design and landscape.
I. Special Areas	• Realize the concept of "water-greenery-culture" to enhance the charm and identity of Hanoi by regenerating historic areas. • Promote opportunities for new urban economic and social development toward the next millennium. • Establish an effective mechanism for sustainable development with the participation of city stakeholders.
J. Implementation and Management	• Improve the institutional framework for more effective urban planning and management. • Strengthening the planning and development capacity of human resources and related organizations. • Strengthen the coordination among related organizations at both the central and local levels.

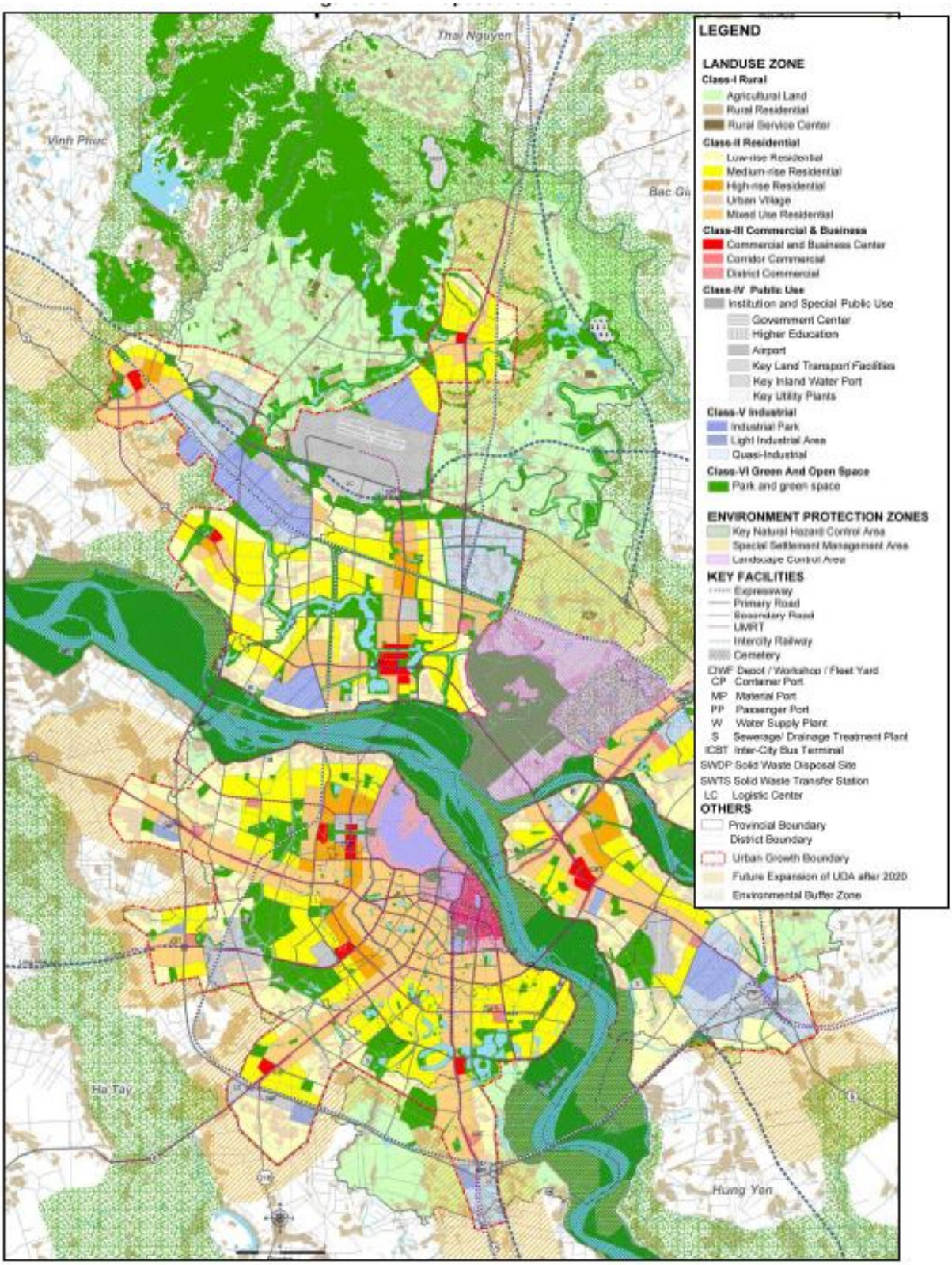
Source: HAIDEP final report

Figure 2.2.3 shows the "General Plan," a master plan for Hanoi City proposed by HAIDEP. At that time, Vietnam had no urban planning laws, and its planning system was based on the Construction Law (2003), which consisted of a General Construction Plan (comprehensive plan) and a District Plan (detailed plan). The urban structure and land use outlined in the general plan did not consider socio-economic planning directions. Furthermore, there were coordination gaps in transportation and water infrastructure, as well as a lack of consideration for coordination with regional plans. Therefore, HAIDEP created a general plan that outlines a spatial development planning framework, taking into consideration the coordination with regional plans, such as the "Hanoi Metropolitan Area Development Plan" and "the Red River Delta Development Plan," the evaluation of suitable development sites, and consistency with infrastructure development strategies.



Source: HAIDEP final report

Figure 2.2.2 HAIDEP's Spatial Development Plan Formulation Framework



Source: HAIDEP Final Report

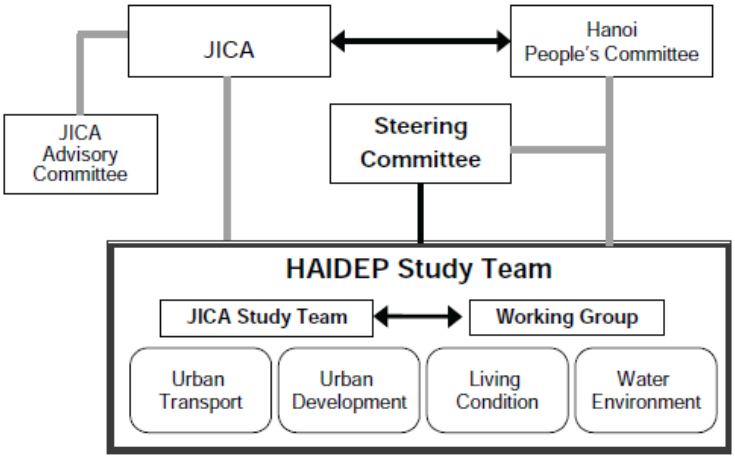
Figure 2.2.3 General Plan Proposed by HAIDEP

To realize the general plan, sector-specific strategies, action plans, and evaluation indicators have been set in alignment with the goals. In particular, for urban transportation/regional transportation, water environment, and living environment, which are major sectors, projects have been proposed, and project costs have been estimated, and project feasibility

evaluations (economic and financial analyses) have been conducted. Detailed plans for each sector are described from Chapter 4 onward.

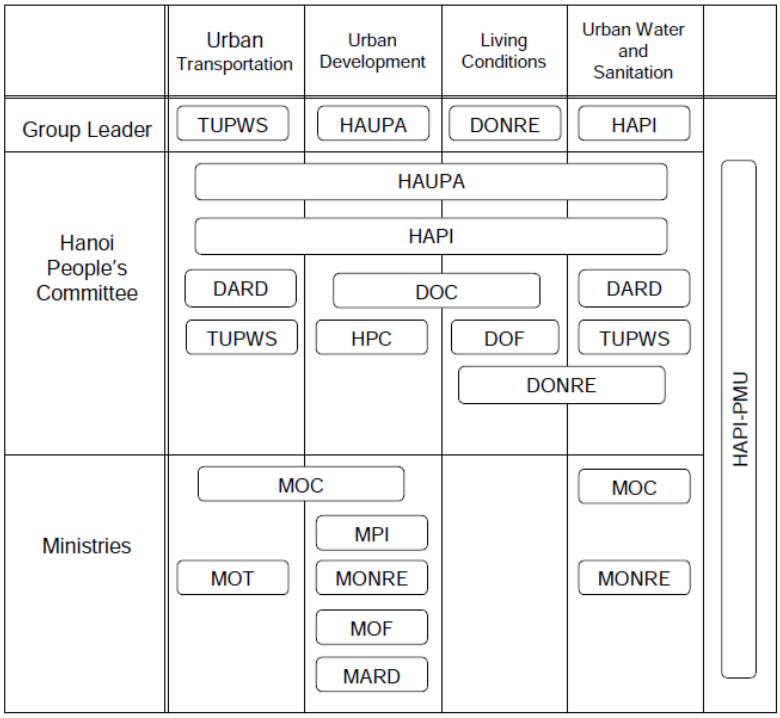
2.3 Study Organization

HAIDEP commenced in December 2004 and was completed in March 2007. The HAIDEP Study Organization is shown in Figure 2.3.1. A Steering Committee (SC) was organized, chaired by the Vice Chairman of the Hanoi People's Committee (HPC), as well as technical working groups (TWG) to discuss each urban subsector. The SC was composed of key ministries, including the Ministry of Construction (MOC), the Ministry of Transportation (MOT), the Ministry of Planning and Investment (MPI), the Ministry of Natural Resources and Environment (MONRE), and the Ministry of Finance (MOF). The TWG was formed mainly by departments of Hanoi City to hold practical discussions on urban development, urban transportation, living environment, and water environment. In addition, the Hanoi Authority for Planning and Investment served as the secretariat, responsible for coordinating the overall project.



Source: HAIDEP Final Report

Figure 2.3.1 HAIDEP's Study Organization



Note: HAUPA: Hanoi Authority for Urban Planning and Architecture, TUPWS: Department of Transport and Urban Public Works Services, DONRE: Department of Natural Resources and Environment, HAPI: Hanoi Authority for Planning and Investment, DARD: Department of Agriculture and Rural Development, DOC: Department of Construction, DOF: Department of Finance, MARD: Ministry of Agriculture and Rural Development.
Source: HAIDEP final report

Figure 2.3.2 Structure of TWG

3. Hanoi City's economic and social development situation

3.1 Economic and social development strategies outlined in HAIDEP

The 2008 HAIDEP stated that Hanoi's future economic growth is essential for the region's sustainable development and requires strategic consideration at the regional and city levels. FDI-driven manufacturing was identified as a driving force for growth throughout Vietnam, and a policy was proposed to promote this through collaboration between Hanoi and surrounding provinces. Meanwhile, at the city level, the HAIDEP report called for promoting knowledge-intensive and service industries, as well as relocating polluting industries to industrial parks on the city's outskirts. Addressing the informal sector and small and medium-sized enterprises was also emphasized, and measures to revitalize these industries were included through mixed land use policies in the city center, transportation corridors, and within communities.

The report set the following basic goals for Hanoi's economic and social development: achieving sustainable and high economic growth based on the knowledge industry, improving people's quality of life through poverty reduction and rectifying disparities, and improving the investment environment through institutional reform, information disclosure, and human resource development. Table 3.1.1 shows the strategies, actions, and monitoring indicators presented in the HAIDEP report, alongside the actual comparable indicators and evaluation perspectives assessed in this project. Although the proposals in HAIDEP were not monitored by the Hanoi City side, this study arranged indicators that could be evaluated.

Table 3.1.1 Strategies, Actions, and Monitoring Indicators proposed in HAIDEP, comparable Indicators, and Evaluation Perspectives

Items Proposed in HAIDEP			Evaluation Perspective Under This Study	
Strategy	Proposed Action	Monitoring Indicators	Comparable Indicators	Evaluation Perspective
(i) Establishment of a competitive economic base	• Establishing a coordination mechanism among central government ministries and agencies to promote new urban economies that involve the private sector and higher education institutions. • Promoting new urban industries that integrate culture, technology, and human resources • Providing strategic infrastructure to strengthen the competitiveness of existing industries	• Share of new urban industries (output value, employment, number of establishments) • Institutional arrangements made	• GDP growth rate • Private investment amount • Jobs created	• Economic vitality and private sector involvement
(ii) Updating of Industrial Development Strategy	• Relocating polluting industries/factories • Developing concrete strategies for industrial and industrial park developments	• Number of polluting industries relocated and satisfaction of	• Number and area of industrial parks • Number of industrial	• Balancing environmental improvement and industrial expansion

	in cooperation with other provinces in the region • Supportive environment in industrial parks, including housing, access and transportation, and amenities for employees	communities • Progress of projects • Satisfaction among industries	locations	
(iii) Further improvement of the investment environment	• Improving Hanoi's competitiveness in Vietnam and Asia to attract FDI • Improving further the investment information systems in Hanoi and the region • Establishing a one-stop center in collaboration with Hanoi City and the local community	• Competitiveness index and ranking • Satisfaction among investors and users • Accessibility to information and the level of business facilitation	• FDI inflow amount • Number of investment projects	• Results of attracting foreign capital and improving the investment environment
(iv) Establishing a support system for low-income groups and urban poverty	• Defining and identifying urban poverty in Hanoi • Developing policies that support the poor in a sustainable way • Establishing an appropriate monitoring mechanism	• Shared definition and indicators of the poor • Satisfaction among the poor • Accessibility to indicators and related information	• Urban poverty rate • Number of homes for the poor • Number of life support programs	• Achievement of social inclusion and improved living standards
(v) Strengthening community capacity	• Identifying issues at the community level • Developing policies to provide necessary support in a sustainable manner • Establishing an appropriate monitoring mechanism	• Available mechanism for public participation • Available plans / programs • Number of meetings and participants	• Number of local collaborative projects • Resident satisfaction survey results • Support budget amount	• Strengthening local autonomy and policy effectiveness

Source: Prepared by the Evaluation Team based on HAIDEP

The following evaluation perspectives based on literature and interviews were explored: (i) economic vitality and private sector engagement, (ii) the balance between environmental improvement and industrial expansion, (iii) the results of foreign investment attraction and investment environment development, (iv) the degree of achievement in social inclusion and living standards improvement, and (v) conducting community-level surveys. Implementing community-level surveys, however, was excluded from analysis, as it was not feasible for the study.

Changes following HAIDEP in terms of population, GRDP, social inclusion, and the environment are detailed hereafter.

3.2 Comparison of Major Socio-economic Indicators from the HAIDEP Survey: 2005 Actual Values, 2020 Target and Actual Values, and 2023 Actual Values

Table 3.2.1 presents the comparable indicators between the base year (2005) and the target

year (2020) or the latest year. These indicators are employment, unemployment rate, poverty rate, GRDP, and foreign direct investment (FDI), which were targets in Hanoi's Socio-Economic Development Plan (2006–2010).

Over the past 20 years, FDI in Hanoi has steadily increased due to improvements in the investment environment and progress in diversifying into the service sector. In terms of social inclusion, it has achieved notable results, including reductions in the unemployment and poverty rates.

Table 3.2.1 Major Socio-Economic Indicators for Hanoi City

	2005		2010	2015	2020		2023
	Former Hanoi City Area	Current Hanoi City Area			Former Hanoi City (HAIDEP target value)	Actual Value	
Total population (thousands)	3,183	5,910	6,618	7,390	4,540	8,246	8,587
Urban population (thousands)	1,990	2,300	2,816	3,640	3,950	4,062	4,213
Urban population (%)	62.5	38.9	42.6	49.1	87.8	49.3	49.1
Total number of people employed (thousands)	1,553	-	3,615	4,005	-	4,125	4,105
Number of unemployed people (%)	-	-	4.7	3.4	<5.0	Approx. 2.4	-About 2.0~2.1
Poverty rate (%)	16.08		<4 (target value)	Approx. 2.45	<1 (target value)	Approx. 1.2	0.10
GRDP (bill VND)	92,425	-	245,749	672,949	-	1,017,596	1,297,134
GRDP growth rate (%/year)	11.2	-	11.0	9.2	11	4.11	6.27
GRDP (%) (① Primary / ② Secondary / ③ Tertiary)	① 1.7	① 6.9	① 5.8	① 2.8	① 1.0	① 2.6	① 2.2
	② 40.8	② 40.8	② 41.8	② 23.6	② 45.0	② 26.0	② 26.4
	③ 57.4	③ 52.3	③ 52.4	③ 73.6	③ 54.0	③ 71.4	③ 71.4
FDI (growth rate)	-	-	15	-	-	5.6	10.2
Cumulative FDI (million USD)	9,241						41,000

Source: HAIDEP; Hanoi City documents; *Report on labour force survey 2023*. (2023). National Statistics Office of Vietnam. https://www.nso.gov.vn/en/default/2025/03/report-on-labour-force-survey-2023/; *Viet Nam - Labour force survey 2023*. (2024, September 22). International Labour Organization; National Statistics Office of Viet Nam. https://webapps.ilo.org/surveyLib/index.php/catalog/8656.

3.2.1 Population

According to the census conducted every 10 years, Hanoi's population increased from 6.45 million in 2009 to 8.05 million in 2019, approximate rise of about 1.6 million, showing an annual growth rate of 2.22%. As an economic, political, and cultural center, Hanoi has

attracted many immigrants from neighboring provinces, and the presence of approximately 17 universities offering diverse academic programs, along with the concentration of industrial parks, has attracted an influx of young people.

Hanoi's urban area expanded in 2008, but the urban population was 42.6% in 2010, but is expected to reach roughly half that figure, 49.1%, by 2023. Comparing the census from 2009 to 2019, the average urbanization rate is 4.1% per year. However, it is not the center of Hanoi, the former city limits, that is experiencing urban population growth, but rather the suburbs, where the population is rapidly increasing. In these newly urbanized areas, population density has doubled in 10 years. In particular, there are areas where the establishment of industrial parks and universities has driven growth.

3.2.2 GRDP and FDI Transition

(1) Gross Regional Domestic Product (GRDP)

Before Vietnam joined the WTO in 2005, the country had active investment and production centered on manufacturing. However, since the expansion of the administrative district in 2008, demand for urban development has increased, and inflows of FDI accelerated. Growth peaked around 2015 and has since gradually declined. Although there was a subsequent slowdown due to COVID-19, manufacturing and real estate recovered by 2023. Additionally, even when the growth rate was slightly lower at 6.27% due to the global economic downturn, it remained stable.

Examining the composition changes in GRDP by sector from 2005 to 2023, agriculture, forestry, and fisheries experienced a sharp decline due to the progress of urbanization. Manufacturing production has remained stable, but its proportion is declining, likely due to remarkable progress in the service industry, particularly in finance, ICT, and tourism. The initial target of 54% for the service industry in the old city area has been exceeded, as it reached 70%. In 2023, the service industry was to grow by 7.26%, contributing 4.69 points to GRDP, while industry and construction were to grow by 5.29%, contributing 1.18 points.[1]

(2) FDI

Hanoi's FDI inflows are expected to grow from approximately USD 650 million per year in 2005 to approximately USD 3,000 million by 2023. The total is expected to quadruple from approximately USD 924.1 billion in 2005 to approximately USD 41 billion in 2023.

Since 2010, investments in diversified manufacturing, real estate, and services have increased, resulting in a more sophisticated economic structure within the city.

[1] Sơn, H. (2023, December 28). *GRDP của thành phố Hà Nội năm 2023 tăng 6,27%*. Hanoimoi. https://hanoimoi.vn/grdp-cua-thanh-pho-ha-noi-nam-2023-tang-6-27-654421.html

Table 3.2.2 Hanoi FDI Flow Composition

Unit: Million USD

Year	Total FDI	Manufacturing Industry	Real Estate Industry	Service Industry	Construction Industry	Education, Medical Care, etc.
2005	~650	~420 (64.6%)	~120 (18.5%)	~80 (12.3%)	~25 (3.8%)	~5 (0.8%)
2010	~2,365	~1,300 (55.0%)	~700 (29.6%)	~250 (10.6%)	~65 (2.8%)	~50 (2.1%)
2023	~3,000	~1,200 (40.0%)	~650 (21.7%)	~150 (5.0%)	~80 (2.7%)	~50 (1.7%)

Source: HAIDEP; Hanoi Department of Planning and Investment (HAPI) Annual Report; Comparison of society, economy and investment in Hanoi, Ho Chi Minh and Da Nang. (2024, December 12). B&Company. https://b-company.jp/ja/a-comparison-between-hanoi-ho-chi-minh-and-da-nang-in-social-economic-and-investment/.

The analysis of changes in FDI composition (2005 to 2023) can be summarized as follows:

Reduction in the proportion of manufacturing and a change in quality

In 2005, the manufacturing industry, which is mainly low-value-added, such as electronic components and garment processing, accounted for nearly 65% of FDI. In 2010, while manufacturing still maintained its majority, its share declined due to the rise of real estate and services. By 2023, its share has shrunk to 40%. However, there has been a shift toward high technology, precision parts, and green manufacturing, which is seen as a sign of industrial upgrading and a transition to a knowledge-based economy.

Rapid expansion and restructuring of real estate investment

A rapid expansion and restructuring of real estate investment is expected mainly due to speculative development following the administrative district expansion in 2008. Although it decreased slightly (to 21.7%) in 2023, it will be restructured, shifting from commercial and residential development to infrastructure and innovative urban development. There is a shift from the bubble period to sustainable urban redevelopment.

Services sector is expected to grow further

The service industry experienced a downward trend, decreasing from 12.3% to 5.0% between 2005 and 2023. Investment in potential fields such as tourism, logistics, and ICT is increasing but remains limited. In the future, non-physical services, such as finance, insurance, and information and communications, will be key.

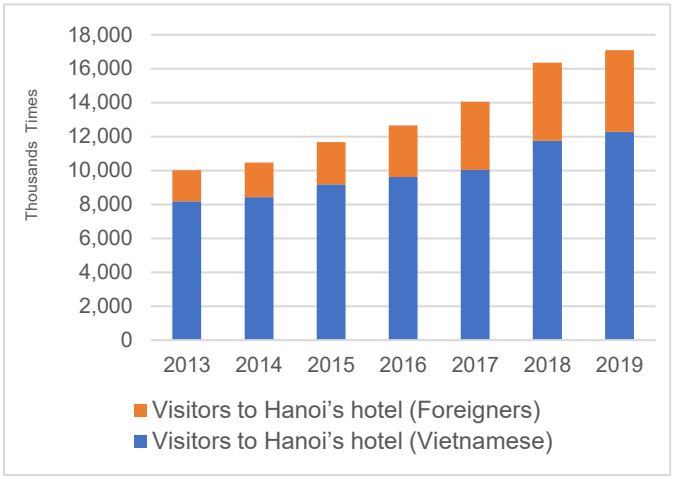
Education, medical care, and science and technology are in their infancy

While the proportion of FDI in education, medical care, and science and technology has consistently remained below a few percent, the future focal point is on strengthening FDI in public services. Investment in EdTech, medical equipment, and R&D centers was reported for 2023.

Regarding industrial location, details on the number and area of industrial parks are provided in Chapter 4, Section (2) of the Hanoi Metropolitan Area's Urban Expansion: Urban Development Directions Proposed by HAIDEP and Actual Urban Development.

(3) Tourism

Between 2005 and 2010, the number of foreign tourists steadily increased owing to the development of tourism infrastructure and the expansion of international flights with the construction of a new Noi Bai International Airport terminal. Since 2015, domestic tourism has also surged, as urban tourism, cultural heritage, and gourmet experiences have been popularized. While the number of tourists plummeted between 2020 and 2021 due to the impact of COVID-19, it was expected to return to 2019 levels by 2022. In 2023, the number of foreign visitors increased[2] by approximately 4.7 million, while domestic visitors reached 20 million. In 2024, the number of foreign visitors was 6.35 million and domestic visitors reached 21.5 million.

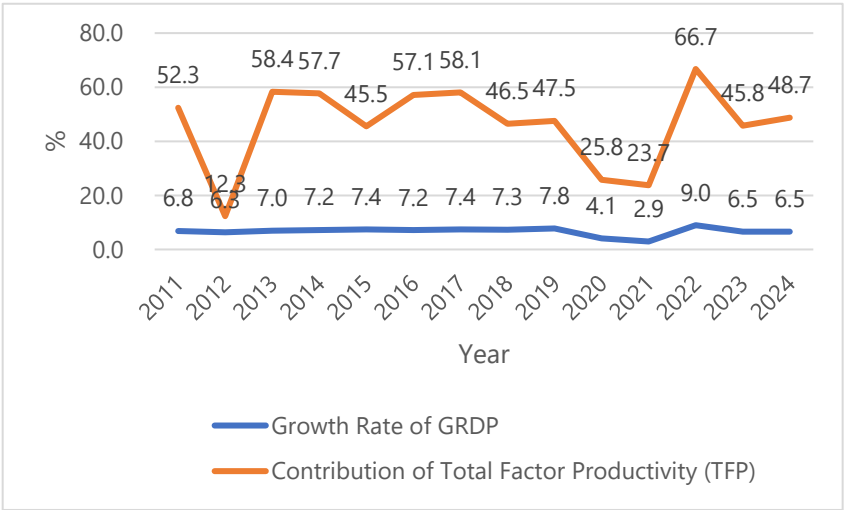


Source：Hanoi Statistics Yearbook 2014, 2019

Figure 3.2.1 Number of Visitors (Hotel Users) in Hanoi

(4) Improving Total Factor Productivity (TFP)

TFP measures the "quality" of economic growth that cannot be explained solely by inputs such as capital and labor. It indicates the extent to which intangible factors such as technological innovation and efficiency improvements have contributed to production. According to data obtained from Hanoi City, the contribution of TFP can be summarized as follows:



Source：Hanoi Department of Finance

Figure 3.2.2 TFP and GRDP Trends

- The contribution from 2011 to 2016 was low, at around 30–60%, and economic growth during this period was primarily driven by capital accumulation and labor input.
- Between 2017 and 2021, the contribution of TFP has gradually increased, indicating that technological innovation and efficiency improvements are beginning to contribute to

[2] Du lịch Hà Nội hồi phục mạnh mẽ sau đại dịch COVID-19. (2023, December 27). Vietnam.vn; Việt Nam News. https://www.vietnam.vn/du-lich-ha-noi-hoi-phuc-manh-me-sau-dai-dich-covid-19

economic growth.

- With TFP's contribution rate surging to approximately 67% in 2022, it marked the beginning of recovery from the impact of COVID-19. It is believed that most of the growth is due to improved productivity through the advancement of digitalization and a shift in industrial structure. Specific actions include improving operational efficiency through smart city initiatives, introducing digital transformation, and adopting e-government, as well as decarbonization and energy-saving technologies, which contribute to resource utilization efficiency.

3.2.3 Changes in Unemployment and Poverty Rates

(1) Unemployment rate

Due to the 2009 global financial crisis, Hanoi's unemployment rate temporarily worsened to around 4–5%. It had improved by around 2.2% in 2019, roughly the same level as the national average (2.17%). In 2020, due to the impact of COVID-19, the unemployment rate rose slightly, but Hanoi maintained a stable employment environment compared to other cities. Furthermore, the unemployment rate is higher among those with higher levels of education, with women tending to be 0.3–0.5 percentage points higher than men across all educational levels. Meanwhile, due to high demand for skilled jobs in FDI companies and the manufacturing industry, those who have completed professional and short-term technical education (TVET) programs enjoy relatively stable employment. According to the General Statistical Office (GSO) Annual Report, unemployment rates for urban and rural areas are reported separately. Hanoi boasts a relatively low unemployment rate, even among urban areas, due to its abundant employment opportunities.

According to GSO's 2023 report, the national labor force is estimated to be approximately 52.4 million, of which approximately 1.06 million (2.03%) are unemployed. Hanoi, an urbanized area, offers numerous employment opportunities. Its unemployment rate is estimated to be nearly the same as the national average or slightly lower (approximately 2.0%). The recovery of FDI, particularly in the service, manufacturing, and real estate industries, is thought to contribute to employment stability.

(2) Poverty rate

Urban poverty rate fell dramatically from an estimated 5.1% in 2005 to approximately 0.1% (2,100 households) in 2023. Social policies (cash transfers, vocational training, and housing support) worked with job creation through FDI, contributing to poverty reduction. Indicators show satisfactory results in terms of social inclusion. However, qualitative challenges remain in the high rate of non-regular employment and youth unemployment.

3.2.4 Challenges in the Education Sector

Rapid population growth has led to a shortage of school facilities, and existing schools are considered overcrowded. Public high schools, with government-subsidized tuition fees,

impose less financial burden. However, over-enrolment is a chronic problem in urban areas.

There are also significant disparities in the quality of educators and educational facilities between urban and suburban/rural areas. Suburban areas have limited access to electronic whiteboards and IT equipment. This has been identified as a constraint in the modernization of education.

Under the Hanoi Capital Construction Master Plan to 2030, Vision to 2050, securing land for educational facilities has become an issue. Land use adjustments for relocating existing facilities and establishing new schools are being considered.

Plans are underway to relocate major universities, including Hanoi National University (VNU), from the city center to the suburbs to alleviate congestion, enhance the educational environment, reduce the burden on education in urban areas, and promote suburban development through improved access to educational facilities.

Given this context, the revised Capital Law, approved by the National Assembly in 2024, included provisions strengthening regulations concerning the development and management of educational facilities in Hanoi City. It positioned the qualitative improvement of educational services and their integrated advancement with urban development as key policy objectives.

3.2.5 Recognition of Environmental Issues and Policy Responses

HAIDEP conducted a scientifically based assessment of environmental issues. Air quality, water quality, and solid waste were identified as urgent issues, and specific indicators such as PM2.5 and biochemical oxygen demand (BOD) should be used to prioritize improvement measures. Establishing a unified management system is essential to effectively address the deteriorating urban environment. Additionally, it emphasized the need for an integrated GIS and environmental monitoring data management and recommended a coordinated approach with urban planning and transportation policies. It also called for stricter Environmental Impact Assessment (EIA) procedures for development projects and promotion of public participation.

(1) Air quality

In 2005, an environmental survey conducted as part of HAIDEP aimed to understand the current state of traffic-related pollution. It measured delicate particulate matter (PM2.5, PM10), NO_2, SO_2, CO, and O_3 at five intersections and one residential area. The survey is among the first comprehensive urban environmental studies to assess traffic-related air pollution in Hanoi. Results showed that PM2.5 measurements exceeded the then-WHO guideline (annual average of 10 μg/m^3) by approximately 40%, averaging 40–90 μg/m^3 daily at intersections. This demonstrated the significant impact of traffic-related pollution, leading to recommendations for improvements, such as promoting public transport and reducing motorbike traffic.

However, concrete measures to implement these recommendations were not undertaken for

a long time, resulting in delays in public transportation development. The popularity of automobiles and motorcycles also increased, as the number of registered vehicles exceeded 8 million. Furthermore, a combination of factors, including dust emissions from construction activities associated with urban development, continued open burning of agricultural waste, and emissions from coal-fired power plants, contributed to the increase in air pollution. As a result, the annual average concentration of PM2.5 exceeded 50 μg/m³ in 2015 and continued to rise, reaching a maximum of 266 μg/m³ by early 2025.[3]

In response, Hanoi City and the central government gradually implemented environmental policies. Hanoi City proposed phasing out motorbike traffic by 2030 in its draft transport strategy in 2017. The central government enacted the National Environmental Protection Strategy (2021–2030) in 2021, which clearly stated its commitment to reducing emissions in urban areas and promoting the use electric vehicles (EVs). Furthermore, in 2023, the Prime Minister's Directive No. 20 (20/CT- TTg)[4] was enacted to promote electricity conservation and environmental protection.

In 2024, the Hanoi People's Council passed a resolution introducing the Low-Emission Zone (LEZ).[5] This system is based on a European city model and involves restricting traffic or charging fees for vehicles that do not meet emission standards. In introducing this system, the Hanoi government has indicated its intention to gradually promote support for the transition to EVs, infrastructure development, and residents.

(2) Water quality

HAIDEP quantified the magnitude of water pollution in Hanoi's major rivers and lakes using representative water quality indicators such as BOD and dissolved oxygen (DO). The To Lich River, which runs through the city, significantly exceeded almost all of Vietnam's river water quality standards, confirming a chronic state of organic pollution. Observations include an abnormal increase in BOD and coliform counts, as well as a significant drop in DO due to the inflow of domestic wastewater.

The leading causes of deteriorating water quality are underdeveloped sewage treatment facilities and insufficient treatment capacity. As of 2005, the limited sewage treatment facilities in Hanoi struggled to meet the demands of rapid urbanization. Development has been carried out through Japanese yen loans and private funds; however, despite the igh installation rate of septic tanks at the household level, the wastewater treatment is inadequate, and wastewater is discharged directly into drainage channels and rivers. The connection and treatment rates to the urban sewerage network were extremely low, and the actual sewerage coverage rate was estimated to be less than 30%, or even 10% or less.

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[3] Wells, B. (2025, June 25). Hanoi's Air Quality: A City Choking *on* Pollution. ShunWaste. https://shunwaste.com/article/how-polluted-is-hanoi

[4] *On Promoting Electricity Conservation During 2023 - 2025 and the Subsqueqents Years*. (2023, June 8) https://vepg.vn/wp-content/uploads/2023/07/20_CT-TTg_569302.pdf

[5] Thanh, T. (2024, December 12). *Regulations on low emission zones approved in Hanoi*. Hanoitimes; HanoiTimes. https://hanoitimes.vn/regulations-on-low-emission-zones-approved-in-hanoi-328738.html

In response, HAIDEP recommended drastic improvements to the sewerage infrastructure, reconstruction of water circulation systems, and strengthening of pollution source management from households, industries, livestock, and others. In particular, HAIDEP stated that suppressing organic pollution and controlling microbial contamination are urgent issues to improve river water quality in urban areas, emphasizing the need for strengthened sewage treatment and river restoration.

(3) **Common Agenda**

The environmental policies of Hanoi are gradually progressing from recognizing issues through HAIDEP to institutionalizing and implementing them. However, the deteriorating air and water quality, caused by rapid urbanization and delayed response, continues to threaten the city's sustainability and residents' quality of life.

3.2.6 Achievements Toward Strategies Derived from Key Indicators and Future Challenges

Since 2022, Hanoi's economic growth has shifted toward a high-efficiency and sustainable model, driven by technological innovation and institutional reform alongside the introduction of foreign investment. Socioeconomic development has been observed in various areas, including the expansion of GRDP, increased growth rates, the advancement of industrial structure, improved labor productivity, revitalized domestic and international trade, and strengthening Hanoi's position as a tourism hub. These results suggest notable progress in: (i) establishing a competitive economic base, (ii) updating industrial development strategies, and (iii) further improving the investment environment.

Backed by the growth of GRDP and FDI, Hanoi is transitioning from a manufacturing-centered economy to one led by services and knowledge industries, thus enhancing urban competitiveness.

In recent years, the significant rise in TFP has particularly highlighted the outcomes of qualitative growth, including technological innovation, institutional reform, and the advancement of digitalization. These achievements have been supported by an improved investment and production environment, as described in the next chapter, such as the development of industrial parks and industry clusters. Additionally, infrastructure improvements, such as ring roads and railways, have enhanced intercity connectivity and reduced congestion, contributing not only to industrial development but also to the broader logistics and distribution base.

Furthermore, unemployment and urban poverty rates have significant improvements, and the establishment of support systems for low-income groups has shown tangible results. However, challenges such as strengthening community-level local ownership and addressing disparities in educational environments across regions remain.

In addition, the rapid pace of urbanization has led to growing environmental burdens, particularly in air and water quality, threatening the sustainability of the city. Issues such as air pollution (as measured by PM2.5) and river pollution due to insufficient wastewater

treatment infrastructure were identified during the HAIDEP process, and fundamental countermeasures remain an urgent priority. While institutionalization of environmental policy has only recently begun to progress, effective implementation and broader behavioral change across society will be essential moving forward.

4. Status of Comprehensive Urban Development Plan and HAIDEP's Output

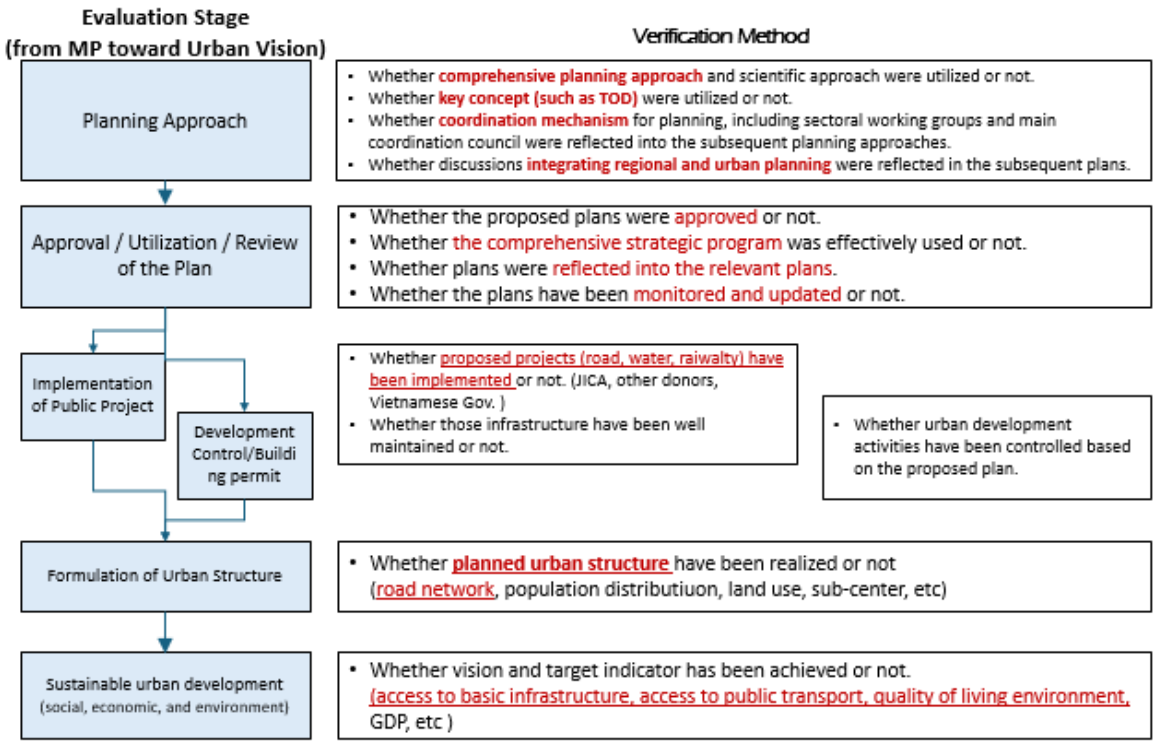
4.1 Target Setting in HAIDEP and Process to Realize the Outcome

HAIDEP proposed a comprehensive urban development plan. With urban spatial planning at its core, it set out Hanoi's vision and goals incorporating regional development directions and socio-economic development. As described in Chapter 2, HAIDEP sets the main objectives for each urban sub-sector, considering Hanoi's vision for future development. Furthermore, based on the main objectives of each sub-sector, specific strategies, actions, and monitoring indicators are presented for each sub-sector. For example, in the case of the urban development sector, which is responsible for urban spatial planning, the following objectives are set under the framework of strategic urban development.

- Promote integration coordination among cities in Hanoi Metropolitan Area
- Promote organized expansion of urban areas
- Promote competitive and livable urban areas

On the other hand, HAIDEP is a technical cooperation aiming to formulate a comprehensive urban development plan. Although HAIDEP is a plan targeting 2020, the vision for Hanoi City and the goals set for each sub-sector as described above cannot be directly achieved from the output of HAIDEP. Appropriate urban plans are formulated, based on which infrastructure projects are implemented. The expected urban structure is formed through those infrastructure networks. With that urban structure, sustainable cities or livable cities are formed. Furthermore, the vision of Hanoi pursed by HAIDEP is to be realized not only through the implementation of the proposed projects but also through various urban activities such as industrial development, private housing initiatives, and community-based social engagement. Therefore, assessing only the achievement status of the objectives set in each sub-sector is insufficient to evaluate the outcomes of HAIDEP as a technical cooperation project for formulating a comprehensive urban master plan.

In this study, based on the above recognition, the process leading to the manifestation of HAIDEP's outcomes is organized as illustrated in Figure 4.1.1, in order to clarify how the outputs of HAIDEP have been utilized and how the development effects have emerged in Hanoi.



Source: Evaluation Team

Figure 4.1.1 The Process of Outcome Development from HAIDEP

Table 4.1.1 outlines HAIDEP's proposed strategies, actions, and monitoring indicators for the urban sector. The action and monitoring indicators include goals to achieve during the urban planning stage, the realization of major infrastructure projects such as transportation, the implementation of private development activities through urban development permissions based on urban planning, and the subsequent formation of the urban structure. Each step of Figure 4.1.1 includes these goals.

Table 4.1.1 HAIDEP's Proposed Strategy and Actions for Urban Development Sector

Strategy	Action	Monitoring Indicator
B1 Establish metropolitan growth and development strategies for areas within 30–50 km radius of Hanoi	B11 Complete a coordinated and integrated metropolitan development plan for areas within a 30–50 km radius B12 Establish an interjurisdictional coordination mechanism B13 Develop corridors by integrating all aspects, including socio-economy, land use, infrastructure, etc.	• Progress of plan preparation and consensus on the plan • Establishment of organizations/institutions
B2 Establish strategies for mass transit-oriented urban development	B21 Develop concrete physical and institutional concepts of transit-oriented development (TOD) in Vietnam's context B22 Establish a preparatory unit to promote TOD in Hanoi B23 Implement pilot projects to operationalize the development mechanism	• Development of plans and institutions • Length of mass transit lines
B3 Develop competitive subcenters	B31 Develop concrete concepts and strategies for subcenter development B32 Identify projects and establish specific	• Understanding of strategy • Establishment of the

Strategy	Action	Monitoring Indicator
	project management units for project implementation B33 Implement pilot projects to operationalize development mechanism	project implementation organization • Development of subcenters • Location of enterprises and size of workforce
B4 Upgrade/ Redevelop existing urban areas	B41 Diagnose existing conditions, problems, and formulate improvement plans and strategies B42 Establish concrete mechanisms to upgrade existing urban areas, including Ancient Quarter, French Quarter, outside-of-dyke areas, public housing areas, urban villages, etc. B43 Implement pilot projects to operationalize the development mechanism	• Progress of institutional arrangements including preparation of plans/ guidelines • Establishment of the project implementation organization • Beneficiaries due to improvement/ redevelopment

Source: HAIDEP Final Report, 2007

4.2 Application of HAIDEP's Urban Planning Approaches

4.2.1 HAIDEP Major Planning Approach

HAIDEP is a development study-type technical cooperation that formulates a comprehensive urban development plan for Hanoi and strengthens the planning and management capabilities of counterpart agencies. HAIDEP's primary output is the planning approach itself, as shown in Figure 4.1.1. The planning approach is as follows.

- Data-based Planning Approach: In addition to existing statistical information, HAIDEP conducted a Household Interview Survey (HIS) for 20,000 households, a series of traffic surveys, and interviews with multiple users. Based on the analysis of this data, the current issues were identified, future scenarios were established, demand was forecasted, and infrastructure development plans were formulated.

Table 4.2.1 Data Utilized in the HAIDEP

	Subjective Data	Objective Data
Existing Data	• Population census • Existing plans • Infrastructure data: Road inventory, utility infrastructure capacity • Traffic statistics: Public transportation use	
Survey Data	• HIS - Socioeconomic information (gender, age, vehicle ownership, income) - Trip information (basis for daytime population, traffic demand analysis) • Traffic survey (traffic count, speed, parking) • GIS database preparation: Land use, infrastructure, water and green areas, hazard maps (flooding, land subsidence)	• HIS - Assessment on living conditions, including daily trips, water supply, sanitation, flood conditions, access to parks, etc. • Public transport user interview survey • Green and park space user interview survey

Source: Evaluation Team

- Participatory Planning Approach: Vietnam had no mechanisms for reflecting residents'

opinions in urban planning. Therefore, HAIDEP introduced feedback methods, such as HIS, to assess satisfaction with urban services by interviewing users of public transport and parks (see Table 4.2.1). To identify priority issues, objective service levels were compared with subjective satisfaction and needs. The interviews determined key planning issues in public transportation and lake management and assessed user satisfaction and needs.

- Holistic and Integrated Planning: In Vietnam, the Construction Plan (urban plan), transportation plans, water supply plans, sewage plans, and housing plans were being formulated separately. HAIDEP aimed to formulate a coherent plan by comprehensively considering the relevant sectors.
- Organizational Structure for Planning: HAIDEP established a steering committee (SC) and working groups (WGs) as a comprehensive planning structure. Four WGs were established for urban planning, transportation, water environment, and living environment, and relevant organizations participated in each WG. Each WG held regular meetings during the planning process. HAUPA reported that a total of five SC meetings, three plenary WG meetings, four urban development WGs, eight urban transportation WGs, eight water environment WGs, and five living environment WGs were held. In addition to these meetings, various other forms of consultation were held as needed.

4.2.2 TOD

HAIDEP set the promotion of urban development based on public transportation as a basic strategy for spatial development and proposed an integrated urban structure with the proposed urban mass rapid transit (UMRT) network. As a strategy for the urban development sector, along with the necessary actions, TOD was proposed, including formulating its concept, developing specific plans, and establishing an implementation framework. At the time of HAIDEP implementation, public transportation itself was not yet widely adopted, and awareness of TOD was also low. HAIDEP can be an advanced plan incorporating the TOD concept.

(1) The Project on Integrated UMRT and Urban Development for Hanoi

Following HAIDEP's proposal, UMRT development was considered a yen loan project. To promote urban development along the UMRT lines, the "Urban Development and Improvement Plan Survey for the Construction of UMRT in Hanoi City (HAIMUD), 2011" was conducted to formulate district plans along the UMRT and improve transportation hubs at stations. Furthermore, to enhance convenience on the urban railways (Line 1 and Line 2) in Hanoi City, the "Project to Support the Implementation of the Urban Development and Improvement Plan Survey Integrated with UMRT Construction in Hanoi City (HAIMUD2), 2015" was carried out. Specifically, a concept plan including traffic improvement and integrated urban development was created for the 18 stations in the Phase 1 section of Lines 1 and 2, and a pre-feasibility study (pre-F/S) was conducted for the integrated transportation hub development of priority stations.

(2) Data Collection Survey on Urban Planning and Transit Oriented Development in Ho Chi Minh City and Hanoi[1]

Following the implementation of HAIDEP and HAIMUD and HAIMUD2, awareness of the need to promote TOD increased. Vietnam's plans and relevant legal documents have outlined the promotion of TOD or integrated transportation development, in conjunction with regional and urban planning. On the other hand, it is necessary to organize related legal systems and clarify the legal status of TOD plans and projects, as well as examine implementation mechanisms, secure funding for their realization, and establish mechanisms for returning development benefits to the public. Accordingly, the "Data Collection Survey on Urban Planning and Transit Oriented Development in Ho Chi Minh City and Hanoi, 2022" was conducted.

According to Decision 519/QD-TTg/2016 on Approval for Transportation Planning of Hanoi Capital by 2030 with a Vision to 2050, which established the urban transportation master plan for Hanoi City, stated that public transportation and TOD should be "integrated with residential development, commercial centers, and other services, and connecting them at stations." The Railway Law also indicates that "urban railways shall comply with regional plans, provincial development plans, and urban plans, and promote urban development." This demonstrates that TOD is referenced in Vietnam's planning and legal frameworks.

This study identifies challenges in urban development systems related to urban planning and transportation planning when promoting TOD, as well as challenges in returning UMRT development benefits to the public. It proposes actions in three areas: urban and district planning, development project mechanisms for integrated mixed-use development around stations, and mechanisms for returning development benefits to the public and promoting investment.

(3) TOD Promotion by the Vietnamese Government

Through a series of technical cooperation projects by JICA after HAIDEP, the concept and necessity of integrated urban development with urban railways as TOD has become firmly established in Vietnam (based on interview results). However, as will be discussed later, urban railway development has been significantly delayed; therefore, TOD has not yet been realized. In February 2025, Resolution No. 188/2025/QH15 by the National Assembly was adopted to promote urban railway development integrated with urban railways. The National Assembly resolution defined TOD as follows. Additionally, the construction of 15 urban railway lines over the next 10 years was set as a governmental goal. It was decided to formulate TOD Zone Planning and to proceed with redevelopment as a special zone within that area.

1. TOD is an urban planning, investment, renovation, and development solution that takes urban railway transit hubs as the core for residential areas, commercial services, and office spaces within a walkable distance to public transport. This approach aims to enhance land

[1] JICA. 2022. Final Report of Data Collection Survey on Urban Planning and Transit Oriented Development in Ho Chi Minh City and Hanoi

use efficiency, optimize public infrastructure, improve public health, reduce private motor vehicle usage, lower environmental pollution emissions, and integrate cultural heritage conservation and promotion.

2. TOD zone planning refers to specialized planning that prioritizes public transit-oriented mobility in areas that include urban railway stations or depots and their surrounding areas, facilitating the construction of urban railway lines in conjunction with urban renovation and development.

3. Urban railway projects under the TOD model are investment projects that integrate urban railway construction with urban development within the TOD zone.

4.2.3 Reflection into the Urban Planning Administration

(1) The Urban Planning Formulation and Management Capacity Development Project in the Socialist Republic of Vietnam (CUPCUP)

The planning approach introduced by HAIDEP did not necessarily conform to Vietnam's planning system, but rather included proposals for improving the planning system itself. Therefore, after concluding HAIDEP, a technical cooperation project titled "The Urban Planning Formulation and Management Capacity Development Project in the Socialist Republic of Vietnam (CUPCUP)" was implemented with the Vietnam Institute of Architecture, Urban and Rural Planning (VIAP)[2] under the MOC. CUPCUP, implemented from 2009 to 2012, provided mid-sized cities officials the opportunity to learn urban planning formulation through training courses based on Vietnam's new urban planning law, as described below.

According to the post-project evaluation (internal) of CUPCUP,[3] the existing department within VIAP is responsible for the training since the initially planned Vietnam Urban Planning Training Centre (VUPTC) was not established. Even after the CUPCUP's conclusion, the training continued using materials development. While the training structure differs from the original plan, it has been confirmed that the capacity for planning and implementing training has improved to some extent.

(2) Posing Challenges to the Construction Law

During HAIDEP, urban planning in Vietnam was based on the Construction Law (2003). The urban plan consisted of a hierarchical structure of a General Construction Plan and a District Plan. The Construction Law governs all construction activities, but its urban planning system was inadequate without zoning standards in place to regulate land use. HAIDEP indicated the issues with the Construction Law and proposed a planning system that would introduce zoning and establish urban planning areas for urban growth management.

[2] VIAP refers to the current VIUP.

[3] *The Urban Planning Formulation and Management Capacity Development Project in the Socialist Republic of Vietnam*. (2017).

(3) **Enactment of Urban Planning Law, 2009**

Even after concluding HAIDEP, revision discussions on the urban planning system for Vietnam continued. By 2009, the Urban Planning Law was enacted. Under this revision, a Zoning Plan was established as an intermediate level between the General Construction Plan and the District Plan. Each Zoning Plan specifies regulations on land use functions, floor area ratio, building coverage ratio, and the layout of public facilities. Development permits and building permits are reviewed in alignment with the Zoning Plans and Detailed Plans. Therefore, a development permit and building permit system linked to urban planning was established.

(4) **Enactment of Planning Law, 2017**

While the urban planning system had been improved, the urban, transportation, and water sector plans were formulated separately, resulting in inconsistent and overlapping plans. Therefore, in 2017, the Integrated Planning Law was enacted to ensure consistent plans across sectors, where an Integrated Plan was formulated that encompasses socio-economic development, urban, transportation, and other sector plans. This allows for simultaneous consideration of economic, social, and environmental factors, with a consistent PDCA cycle for strategy, planning, and investment clearly defined. Urban planning is positioned as one aspect of spatial planning under the Planning Law, consistent with other plans. Urban plans, including the General Plan and Zone Plans, based on the Urban Planning Law, continue to be formulated.

The Integrated Plan embodies the cross-sectoral and comprehensive planning approach that HAIDEP pioneered. As described later, HAIDEP's cross-sectoral and comprehensive planning approach is still highly regarded by relevant agencies in Vietnam. Even 18 years later, the approach HAIDEP pioneered has been incorporated into Vietnam's planning administration.

4.2.4 Evaluation of HAIDEP’s Planning Approach

According to interviews with relevant agencies, the planning approach adopted by HAIDEP was highly appreciated. Mr. Le Manh Cuong, a key CP member of HAIDEP and a technical expert at the HAUPA, pointed out that the planning approach, particularly the comprehensive plan covering all sectors, was the first challenge in Hanoi. Mr. Tran Ngoc Chinh, a SC member and former Deputy Minister of Construction (now the Chair of VUPDA), also highly praised the planning approach and noted that the subsequent CUPCUP was beneficial for VIUP.

TOD is a widely regarded proposal for forming an urban structure centered on public transport in Hanoi, where public transport awareness is very low. Since HAIDEP covers the entire city of Hanoi, it proposes the integrated consideration of urban planning and transport planning at both city and regional levels. HAIMUD and HAIMUD2, which were implemented after HAIDEP, also significantly contributed to promoting urban development integrated with urban railways. In the HAUPA, which served as CP for both HAIDEP and HAIMUD, many staff members involved in HAIMUD2 are still in active service.

VIUP, the implementing agency for CUPCUP, considered that the comprehensive planning approach was introduced first and a breakthrough in Vietnam's urban planning administration. It highly evaluated HAIDEP's planning framework in vision setting, strategy, planning, and projects. Furthermore, even after the completion of CUPCUP, the importance of conducting supplementary surveys to understand current issues as well as to diagnose socio-economic conditions and urban issues was strongly recognized. However, it was noted that without institutionalized surveys, the local governments themselves lacked the budget or time to undertake supplementary surveys.[4]

The working group (WG), established as a planning framework, continued even after the conclusion of HAIDEP, with consultants and relevant agencies sustaining discussions through sub-sector meetings.

4.3 Reflections on the Urban Plan and Other Sector Plans

4.3.1 Expansion of Hanoi City's Administrative Boundary

HAIDEP was established in 2007, but the administrative boundary expansion of Hanoi City occurred in 2008. All areas of Ha Tay Province except for Va Vi and Tan Duoc Commune, Me Linh District of Vinh Phuc Province, Don Xuan District, Tien Xuan District, Yen Binh District, and Yen Trung District of Luong Son Province in Hoa Binh Province were incorporated into Hanoi City. As a result, the city's area increased 3.5 times from the original 929.72 km^2 to approximately 3,359.8 km^2, and the population expanded 1.8 times from the original 3.54 million to approximately 6.35 million.

Source: VN Express

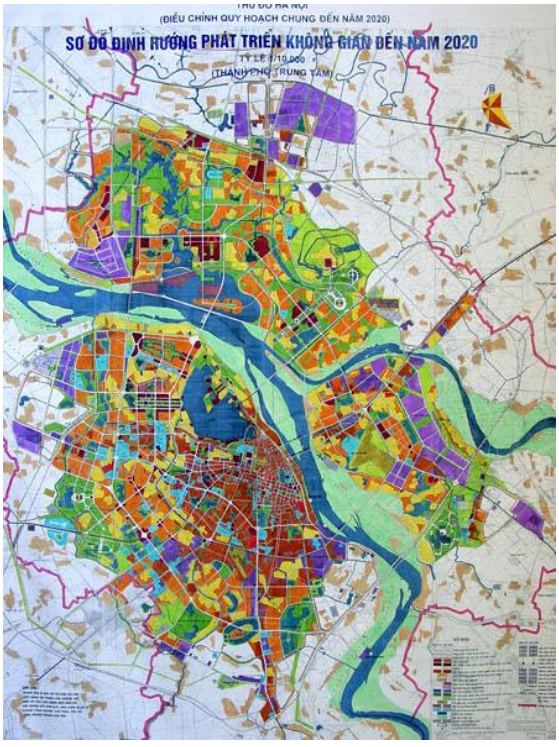
Figure 4.3.1 Hanoi City Boundary, Before and After

[4] Under the current planning system, conducting additional surveys is not clearly stated in the planning guidelines, and consultants are required to formulate plans within two years, including bidding, making it impossible to conduct surveys in reality (based on VIUP interview results).

4.3.2 Reflections on the Revised General Construction Plan and Subsequent Changes in Planning

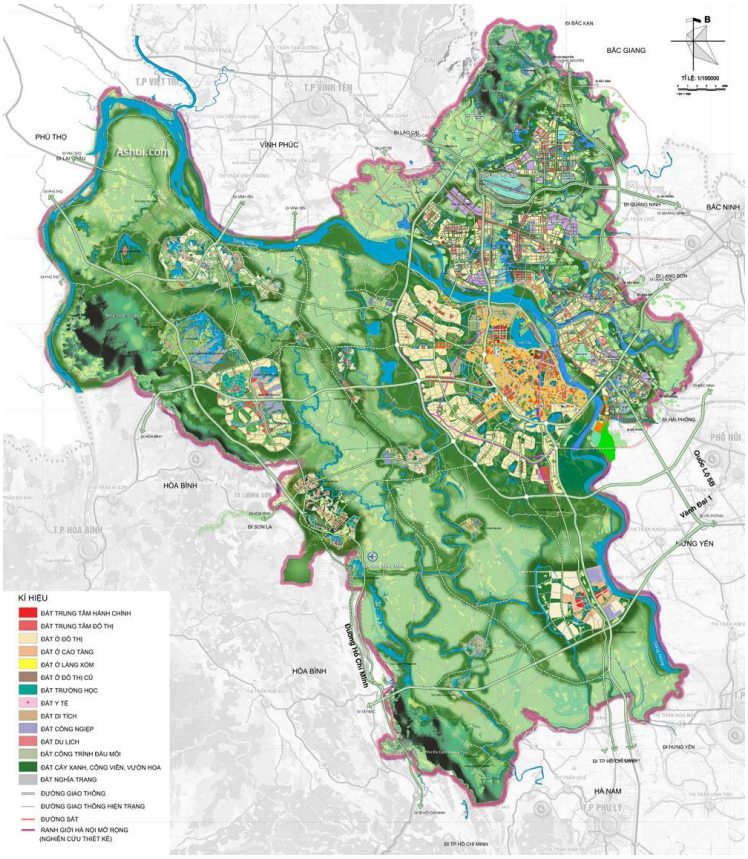
Formulation of the Revised Hanoi General Construction Plan 2011: In line with the administrative boundary expansion, the Revised Hanoi General Construction Plan was approved in 2011 by Decision 1259/QD-TTg. The Urban Planning Law, established in 2009, is the basis for its creation. Since this revision process covered areas outside the former Hanoi boundary, rather than the HAUPA, the MOC assumed responsibility for creating the plan. On the other hand, all the findings and outputs of HAIDEP were submitted from Hanoi City to the MOC as reference materials to create the revised general construction plan, and the contents of HAIDEP were reflected in the planning for the area within the former Hanoi City boundary (according to interview results). The report on the revised plan listed the Construction Plan (formulated in 1998 and approved in Decision 108, 1998) and HAIDEP (2007) as basic references in devising the plan (Hanoi Capital City General Construction Plan by 2030 with Vision to 2050, approved in Decision 1259 in 2011).

A comparison of the 2011 revised plan and the urban structure proposed under HAIDEP shows significant expansion of the urban area to the west and south, reflecting the 2008 administrative boundary revisions. As a result, urban development has progressed toward the western and southern parts of the city, diverging from HAIDEP's proposed urban structure, particularly in the delayed promotion of development north of the Red River and the implementation of supporting infrastructure. Additionally, to mitigate overcrowding in the central area, five satellite cities (Son Tay, Hoa Lac, Xuan Mai, Phu Xuyen, and Soc Son) have been designated within Hanoi City.



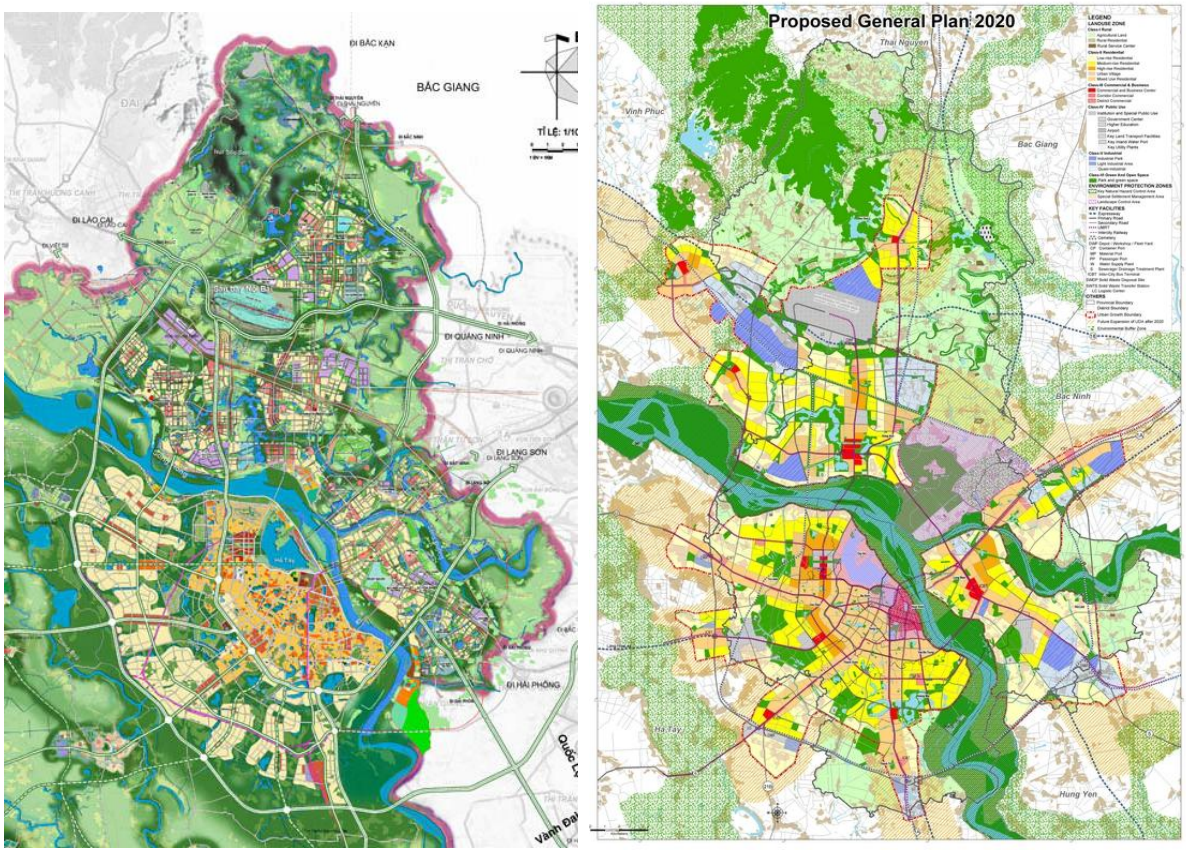
Source: Decision 108/1998/QD-TTg

Figure 4.3.2 Hanoi General Construction Plan, 1998



Source: Decision 1259/QD-TTg. 2011

Figure 4.3.3 Hanoi General Construction Plan, 2011

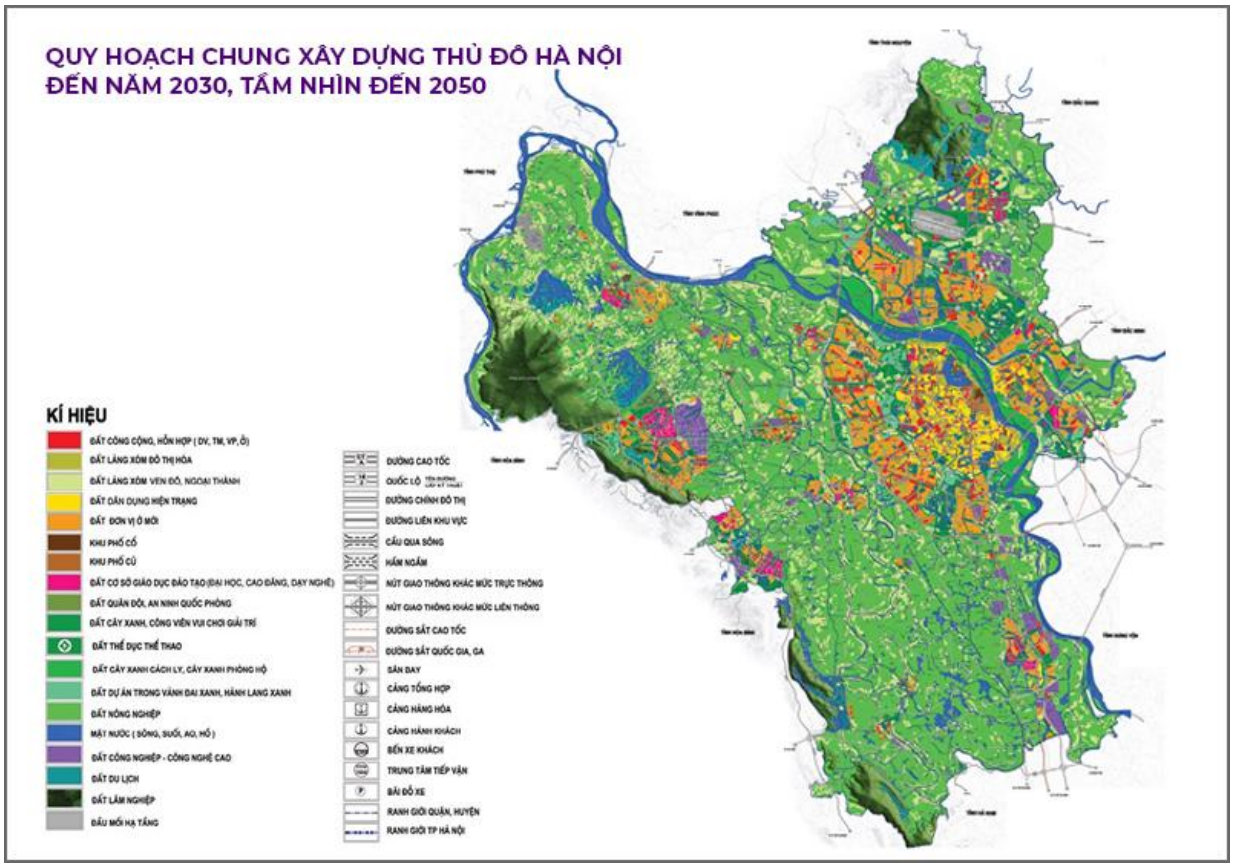


Source: Decision 1259/QD-TTg. 2011, HAIDEP Final Report

Figure 4.3.4 Comparison of Hanoi's General Construction Plan 2011 and HAIDEP

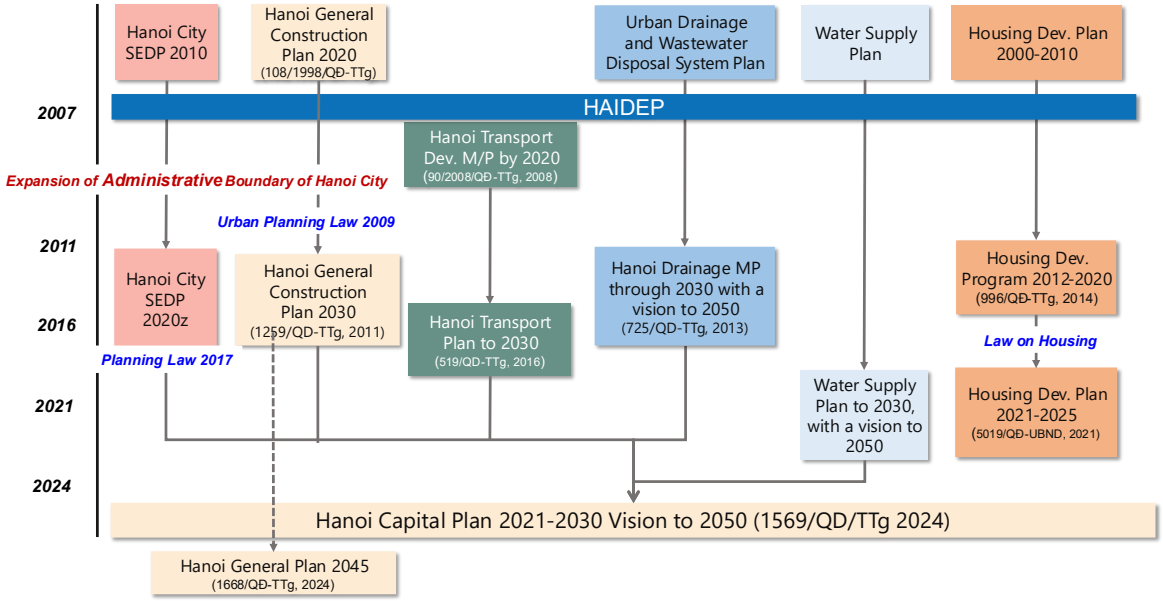
Subsequently, as mentioned above, in 2017, the Integrated Plan Law was newly formulated, requiring the integrated planning of socio-economic development plans (SEDP), urban plans (General Construction Plan), transportation plans, and infrastructure plans such as water supply and sewage systems. In Hanoi City, the Integrated Plan was prepared in 2024 as the Hanoi Capital Plan 2021–2030 Vision to 2050 (Decision 1569/QD/TTg 2024). In response to the Integrated Plan, the Hanoi General Construction Plan has been revised by the end of 2024 with 2045 as the target year (Decision1668/QD-TTg, 2024).

The 2024 formulated plan aims to curb the concentration of population in the city center and promote TOD with urban railway development to realize a multi-polar urban structure. It calls for urban railway development, the strengthening of sub-centers, and the promotion of TOD by optimizing areas surrounding stations. It can be said that the core urban development strategy proposed in HAIDEP has been successfully carried forward as a guiding concept for urban development through subsequent technical cooperation.



Source: Hanoi's General Construction Plan

Figure 4.3.5 Hanoi's General Construction Plan



Source: Evaluation Team

Figure 4.3.6 HAIDEP Coverage and Changes of Relevant Sector Plans

4.3.3 Utilization as a Comprehensive Urban Development Plan and Reflection into the Other Sector Plans

While HAIDEP centered on spatial development planning as the General Construction Plan, it also proposed a comprehensive urban development program that encompassed regional planning, socio-economic and industrial development, transportation, water environment, as well as landscape and urban design. Since HAIDEP's proposals are diverse and involve multiple relevant agencies, a strategic program approach was formulated for an integrated implementation and management, in accordance with the priorities agreed upon among stakeholders.

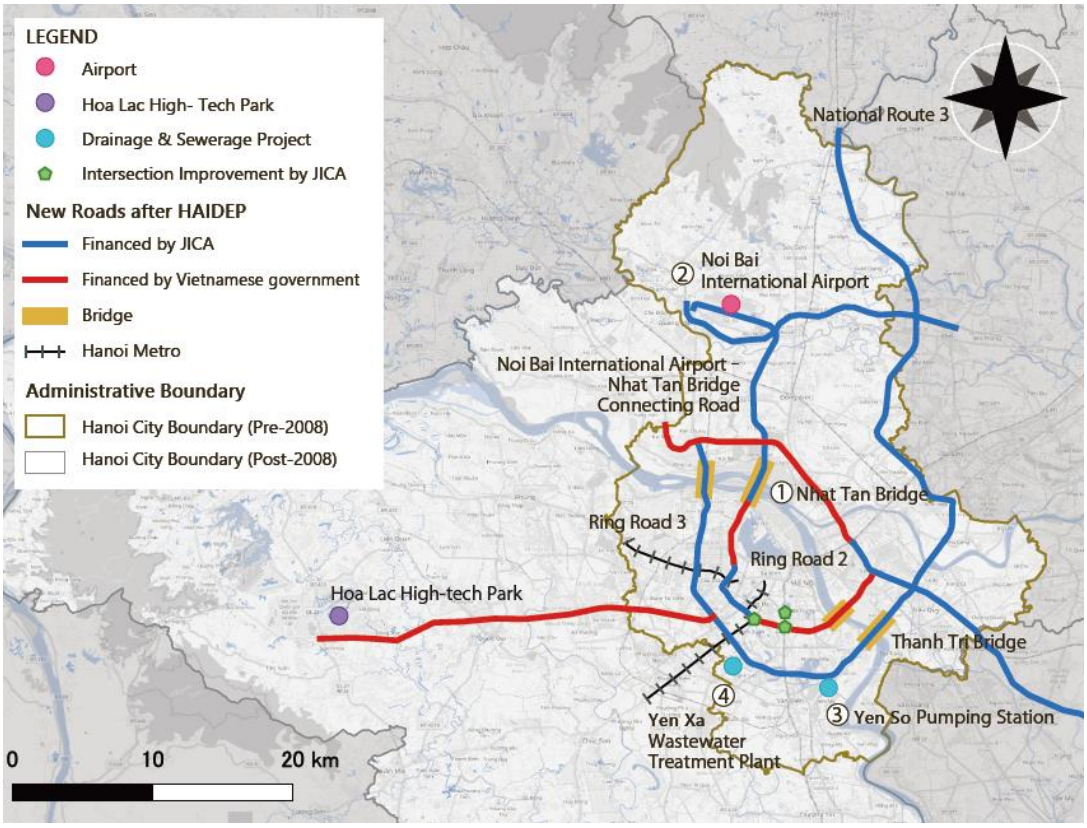
The HAPI was designated as the main counterpart, rather than HAUPA (responsible for the General Construction Plan), expecting that coordination and management across multiple sectors would be required. Since HAIDEP's proposed cross-sectoral programs did not align with Hanoi's planning framework at the time, they were not reflected in the city's subsequent planning documents. Within the scope of interviews conducted for this Study, the actual utilization of these programs could not be confirmed.

On the other hand, it was confirmed that HAIDEP's proposals were reflected in each relevant sector's plans, as shown in Figure 4.3.6. As mentioned in Chapter 2, HAIDEP proposed an integrated plan for urban planning, urban transportation, water supply, and sewage and wastewater, each of which was planned separately, and compiled into the "Hanoi City Comprehensive Development Plan." Consequently, the contents of HAIDEP have been reflected in the plans of other sectors and have served as the basis for the subsequent implementation. Details of each sector are described in their respective chapters.

4.4 Infrastructure Development to Formulate the Urban Structure

Based on the aforementioned urban plan, the implementation of the development project is summarized by sector. The overview is as follows. Details of each sector are provided in succeeding chapters.

- **Roads. (transportation).** Road infrastructure has been implemented based on the revised sector plans in accordance with HAIDEP. In particular, the road network has been greatly improved with the completion of Ring Road No. 3, Ring Road No. 2, the Nhat Tan Bridge, and Tay Ninh Bridge through JPY loan projects and projects undertaken by the Vietnamese government. At major intersections in the city center, several grade-separated intersections, including JPY loan projects, have been constructed, and efforts are underway to eliminate bottlenecks.
- **Railway (transportation).** The UMRT network proposed by HAIDEP is considered to have served as the basis for Hanoi's urban railway development plan. However, compared to the network envisioned by HAIDEP (101 km in 2020), the development of the UMRT network, comprising UMRT 2A line (13.1 km), which opened in 2021 and the 3rd line (8.5 km) in 2024, is behind schedule. Accelerating urban railway development has become a major challenge for the nation.



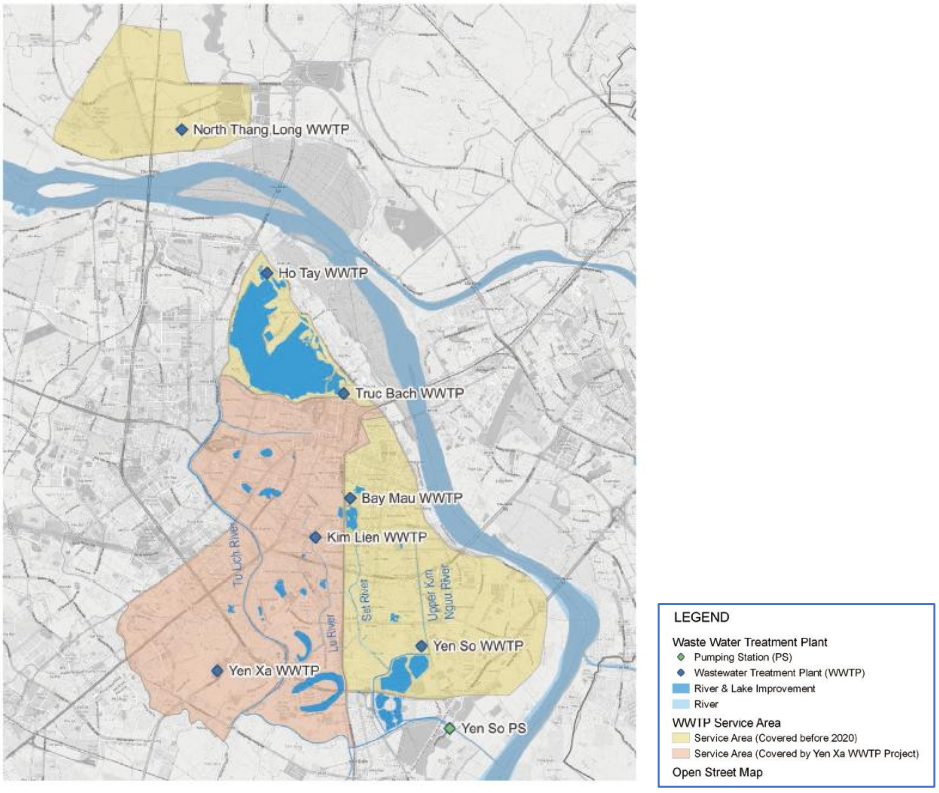
Source: Evaluation Team

Figure 4.4.1 Location of Major Infrastructure Projects after HAIDEP

- **Water supply (water sector):** In addition to improvements on the HAIDEP-based water supply master plan, the expansion of water supply pipes to the western area is underway

to accommodate the growing urban area. As of 2024, there are 33 water purification plants (total capacity of approximately 1.32 million m^3/day) and 92 km of water pipes.

- **Drainage and Lake Management (water sector):** Drainage facilities with pumps and reservoirs have been developed mainly on the left banks of the To Lich and Nhue Rivers. The improved drainage facilities have prevented flooding damage even during heavy rainfall. On the other hand, the drainage facilities on the right bank of the Nhue River and the opposite bank of the Red River must be improved since these areas are undergoing rapid urbanization. Lake purification projects are also progressing, resulting in improved water quality and greening.
- **Wastewater Management (water sector).** With the completion of the Yen Sa treatment plant in 2025, 60% of the HAIDEP plan would have been implemented, significantly contributing to the improvement of the city's sanitary environment. On the other hand, sewage pipes have not been installed, and sewage is discharged directly, so there are areas where the sanitary environment has not improved.



Source: Evaluation Team

Figure 4.4.2 Location of Drainage and Sewerage Improvement

4.5 Urban Development Management Based on Urban Plans

Vietnam's urban plans consist of the General Construction Plan (1:10,000), the Zone Plan (1:2,000), and the Detailed Plan (1:500), after the enactment of the Urban Planning Law in 2007. The General Construction Plan outlines the direction of urban development, while the Zoning Plan establishes land use regulations, such as floor area ratio, building coverage ratio, and height restrictions for each zone. Development permits for urban development projects and building construction permits are issued based on the Zone Plan and Detailed Plan. Depending on the size of the building or development plan, the District Office handles the building permits for small buildings.[5]

HAIDEP proposed a general plan not intended to be used directly as a tool for urban development management. The 2009 Urban Planning Law regulates the urban development management in Vietnam. Furthermore, since zoning plans did not exist when HAIDEP was first proposed, the coordination between general plans and zoning plans was not considered in HAIDEP.

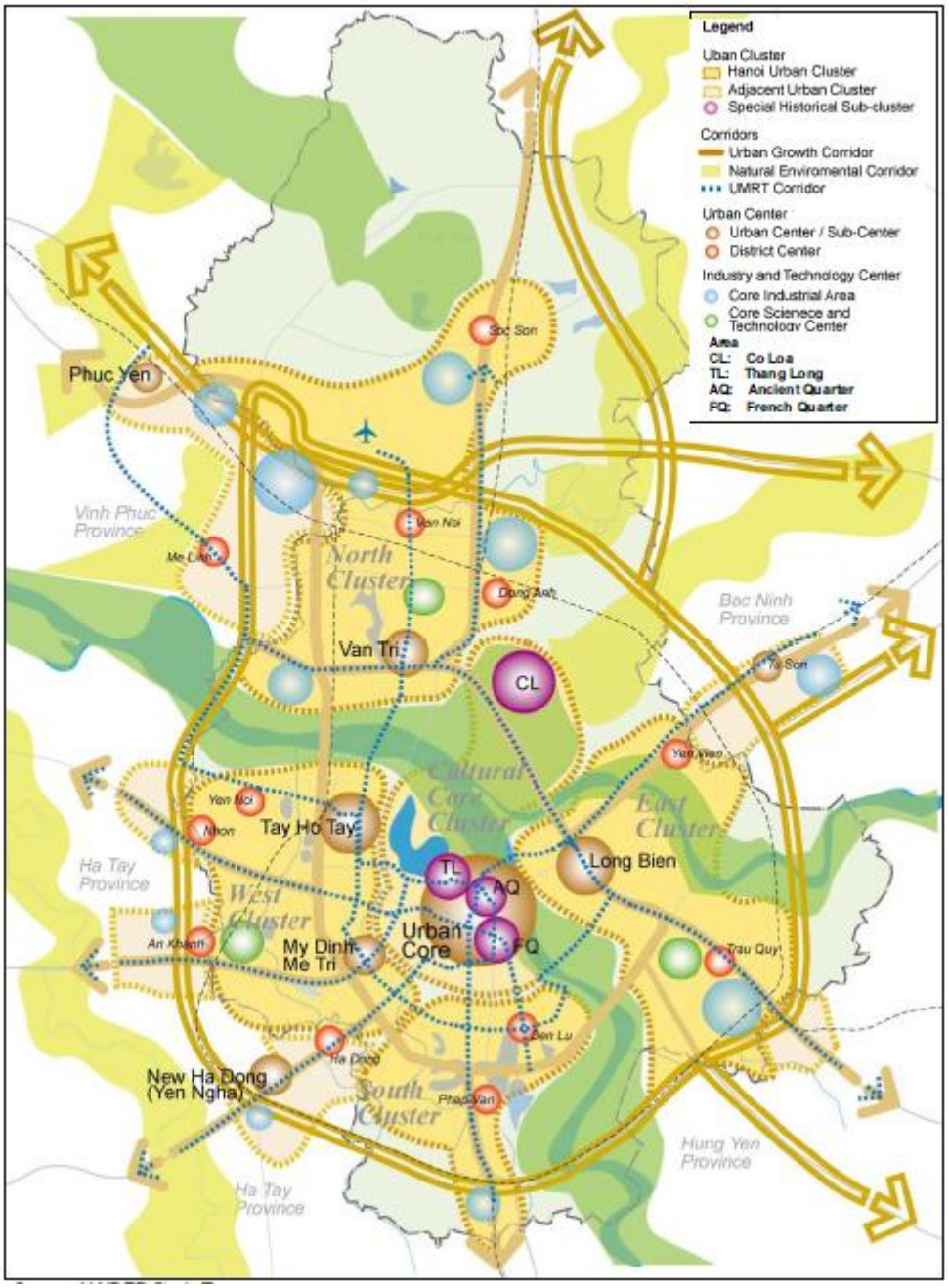
On the other hand, numerous issues were identified regarding development management, specifically in the issuance of building permits and granting planning approvals based on the Zoning Plan. The limited capacity of lower-level government organizations makes it difficult to issue approvals and permits based on the plan. Insufficient post-development checks could not control developments that deviate from the plan (based on interview results). To materialize the desired urban structure proposed in the General Construction Plan, a regulatory framework based on the urban planning system is essential, in parallel with infrastructure development. Ensuring an institutional framework and its implementation remains a major challenge.

[5] Following the administrative reorganization in July 2025, this authority will be delegated to the Commune-level People's Committees.

4.6 Formation of Urban Structure

4.6.1 Changes in the Urban Structure of Hanoi

In anticipation of the future population growth accompanying Hanoi's economic development, HAIDEP proposed appropriate urban growth management to prevent uncontrolled urban sprawl and worsening traffic congestion. HAIDEP proposed developing sub-centers in the peripheral area of the city center at the metropolitan level and constructing an urban railway network to support these developments (see Figure 4.6.1).



Source: HAIDEP Final Report, 2007

Figure 4.6.1 Basic Structure of the Proposed General Plan

In the 2011 Revised Plan, five satellite cities were proposed within the expanded Hanoi area with the aim of decentralizing urban functions from the city center. However, the development of those satellite cities did not progress as planned. The expected urban functions have not been accumulated. Furthermore, sub-centers surrounding the city center have not been formed due to significant delays in the planned railway development. As a result, the mono-concentration of urban functions in the city center persists to the present day.

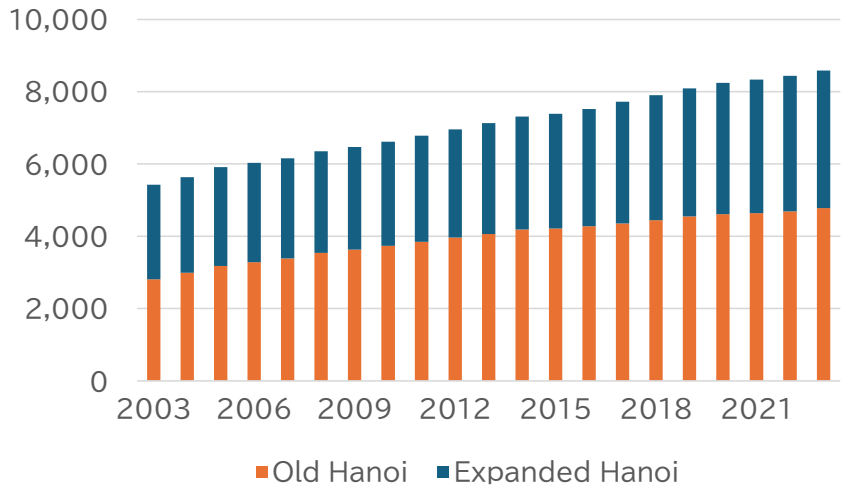
In contrast, with economic growth and population increase, residential development has advanced, and the urban area of Hanoi has continued to expand. As a result, residential areas have expanded, commuting distances to the city center have increased, and traffic congestion during morning and evening peak hours has worsened. It has further revealed the adverse effects of monocentric urban concentration. In addition, another issue is that insufficient development management caused urbanization and development in environmentally protected areas (green spaces and water systems).

In the following sections, the changes in the urban structure will be analyzed, focusing on population distribution, employment distribution, and the expansion of the urban area.

4.6.2 Changes in the Population Distribution of Hanoi

(1) Historical Change of Overall Population and Population by District

The population of Hanoi City has continued to grow over the past 20 years, exceeding 8.24 million in 2021. Before the city's expansion, its population continued to increase, but the rate of increase had been declining, especially since 2010, reaching 4.61 million in 2020. This is roughly the same scale as HAIDEP's planned scenario of 4.51 million people. The expanded Hanoi city area has seen accelerated population growth since 2010.



Source: Prepared by Evaluation Team based on the Statistical Book

Figure 4.6.2 Historical Change of Population in Hanoi

Table 4.6.1 Population Growth Rate by Period (Old Hanoi and Expanded Area)

	'03-'08	'08-'13	'13-'18	'18-'23
Old Hanoi	4.8%	2.8%	1.8%	1.4%
Expanded Area	1.4%	1.8%	2.4%	2.0%
Total Hanoi	3.2%	2.3%	2.1%	1.7%

Source: Prepared by Evaluation Team based on the Statistical Book

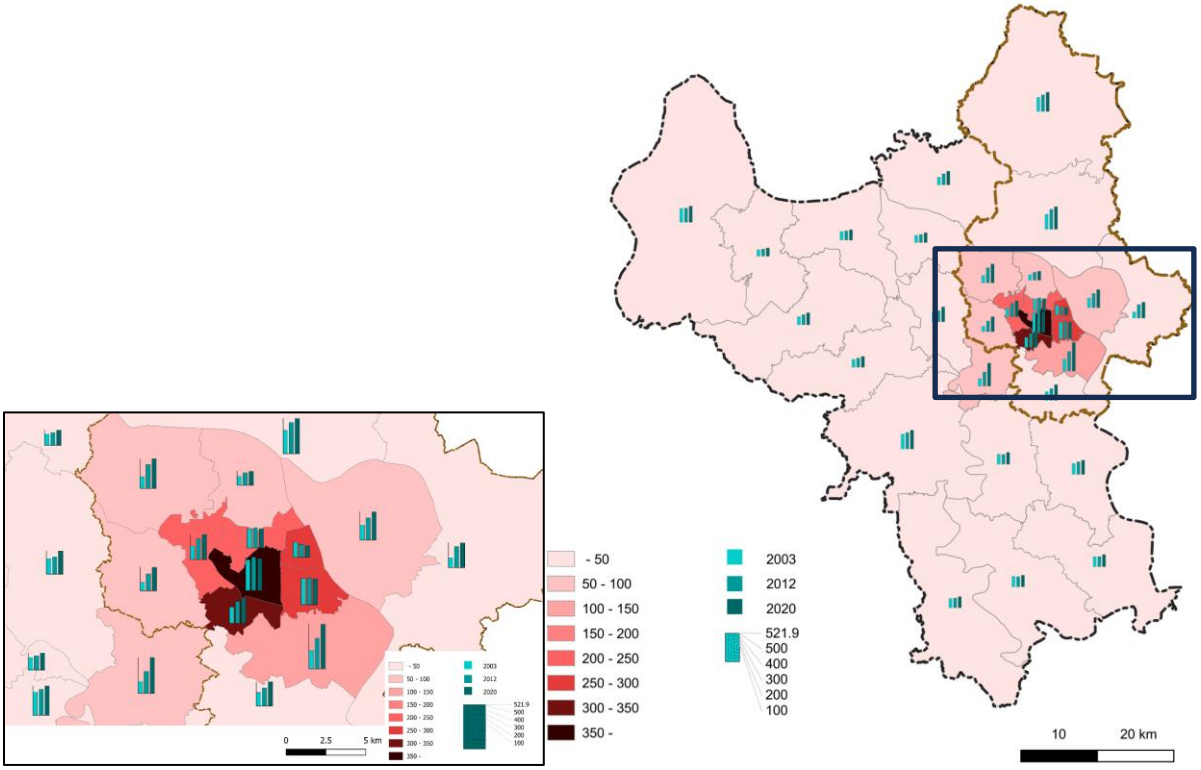
Analysis by district shows that population growth in Hoang Mai, Thanh Tri, Tu Liem, Ha Dong, Hoai Duc, and Thanh Oai, in the southwestern direction, continues. Population growth is also seen in Long Bien District, located across the Red River, but is limited in Dong Anh District.

Table 4.6.2 Puoplation by District

		Population (000')					Population Annual Growth Rate (%)			
Category [1)]	District	'03	'08	'13	'18	'23	'03-'08	'08-'13	'13-'18	'18-'23
Urban Core	Ba Dinh	222	224	241	243	222	0.2%	1.5%	0.2%	-1.8%
	Hoan Kiem	177	149	155	153	141	-3.4%	0.8%	-0.2%	-1.6%
	Dong Da	359.8	366	398	422	379	0.3%	1.7%	1.2%	-2.1%
	Hai Ba Trung	392	310	315	312	296	0.3%	0.3%	-0.2%	-1.1%
Urban Fringe	Tay Ho	103	125	150	167	170	4.0%	3.8%	2.1%	0.3%
	Long Bien	-	221	267	295	351	-	3.9%	1.9%	3.6%
	Cau Giay	158	216	250	281	297	6.3%	3.0%	2.4%	1.2%
	Hoang Mai		331	362	444	554	11.1%	1.8%	4.1%	4.5%
	Thanh Xuan	185	222	263	287	296	3.6%	3.4%	1.8%	0.6%
Suburban	South Tu Liem[1)]	239	355	504	241	307	8.6%	7.3%	3.1%	5.0%
	North Tu Liem		0	0	334	366	-	-	-2.0%	1.9%
	Thanh Tri	266	190	219	267	302	-6.5%	2.9%	4.0%	2.5%
Rural	Soc Son	259	279	312	341	366	1.6%	2.2%	1.8%	1.4%
	Dong Anh	276	330	374	385	416	3.6%	2.6%	0.6%	1.6%
	Gia Lam	174	225	251	277	315	-	2.3%	2.0%	2.6%
Old Hanoi Total		2,806	3,541	4,063	4,446	4,777	**4.8%**	**2.8%**	**1.8%**	**1.4%**
Urban	Ha Dong	136	221	274	376	449	10.2%	4.4%	6.5%	3.6%
	Son Tay	118	125	135	147	158	1.2%	1.6%	1.7%	1.5%
Rural	Ba Vi	253	246	265	284	313	-0.6%	1.5%	1.4%	2.0%
	Phuc Tho	156	159	171	183	198	0.4%	1.5%	1.4%	1.6%
	Dan Phuong	133	140	153	171	189	1.0%	1.8%	2.4%	2.0%
	Hoai Duc	183	190	210	254	293	0.8%	2.1%	3.9%	2.9%
	Quoc Oai	148	161	173	192	207	1.7%	1.4%	2.1%	1.5%
	Thach That	150	174	191	210	227	3.1%	1.9%	1.9%	1.6%
	Chuong My	272	288	307	333	356	1.1%	1.3%	1.6%	1.4%
	Thanh Oai	183	165	184	206	231	-2.1%	2.2%	2.3%	2.3%
	Thuong Tin	201	217	234	250	266	1.6%	1.6%	1.3%	1.2%
	Phu Xuyen	184	181	186	213	236	-0.3%	0.5%	2.7%	2.1%
	Ung Hoa	193	183	191	207	217	-1.1%	0.9%	1.6%	1.0%
	My Duc	171	170	182	196	213	-0.1%	1.3%	1.5%	1.6%
Old Hatay Total		2,480	2,619	2,856	3,223	3,552	**1.1%**	**1.7%**	**2.4%**	**2.0%**
Rural (Old Vinh Phuc)	Me Linh	141	190	209	234	258	**6.1%**	**1.9%**	**2.3%**	**1.9%**
Whole Hanoi City		5,427	6,350	7,128	7,903	8,587	**3.2%**	**2.3%**	**2.1%**	**1.7%**

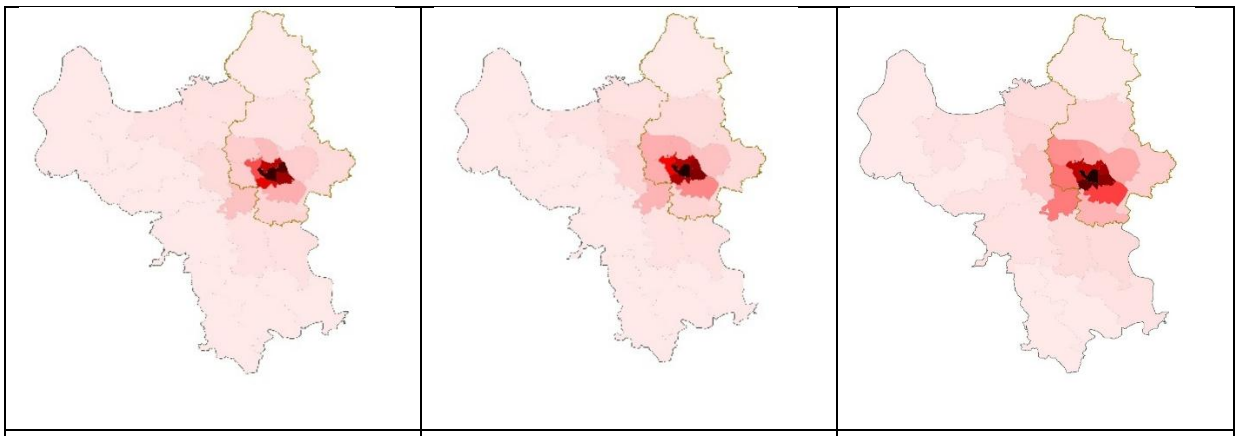
Notes: [1)] Category in Hanoi identified in HAIDEP
[2)] Tu Liem was split into North and South in 2013. (Number of 2003 is sum of South Tu Lie and North Tu Liem)

Source: Prepared by Evaluation Team based on statistics.



Source: Prepared by Evaluation Team based on Statistics

Figure 4.6.3 Poulation Change by Distirct and Population Density in 2020 in Hanoi



2003	2010	2024

Source: Prepared by Evalution Team based on Statistics

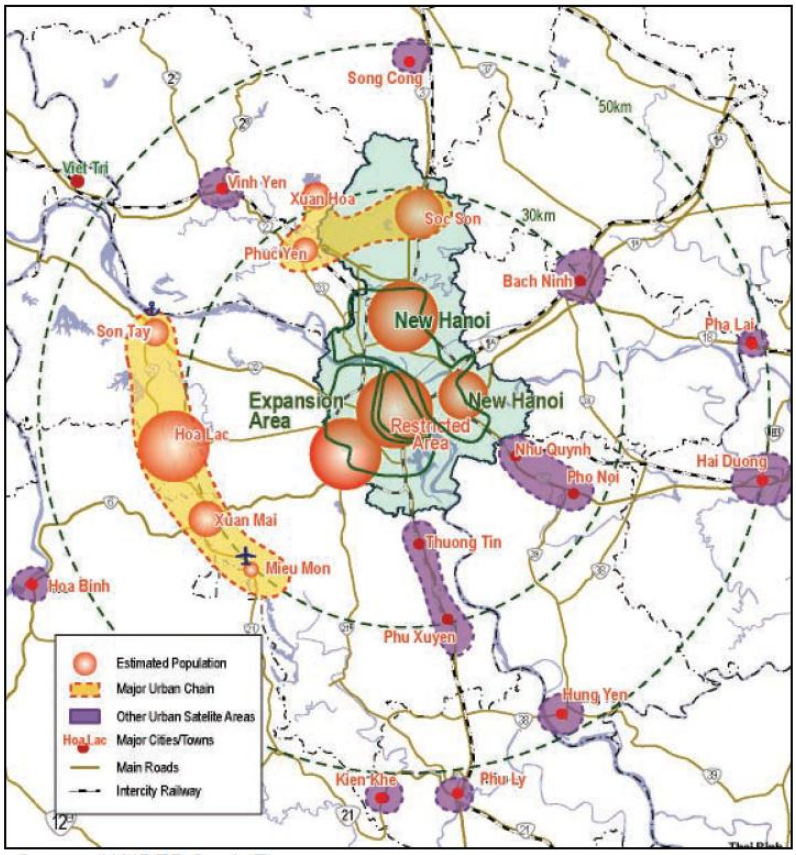
Figure 4.6.4 Changes of Poulation Densigy by Distirct in Hanoi

(2) Comparison of the HAIDEP-proposed Scenario and the Current Urban Structure

HAIDEP proposed a target urban structure (HAIDEP scenario) derived from predicted directions of Hanoi's development (trend scenario), assuming past trends continue and considering the population distribution in the Hanoi metropolitan area. The following assumptions were made regarding urban development trends in Hanoi through 2020.

- Existing urban areas are expected to experience a decline in population as well as improvements in living environments.

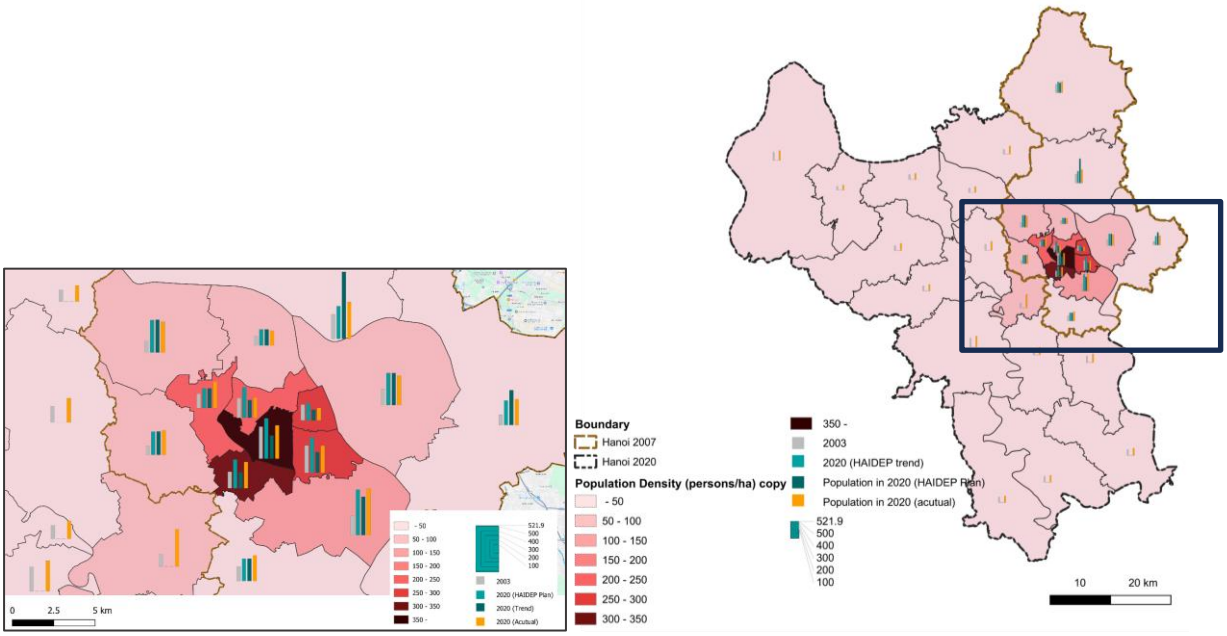
- The areas surrounding the city center are expected to continue to see population growth. Thanh Xuan and Cau Giay districts are expected to reach a certain level of population density, after which population growth will slow down. Population growth in Long Bien and Hoang Mai districts is projected to continue.
- In suburban areas, Tu Liem is expected to face rapid population growth. In Dong Anh district, population growth is projected to accelerate as the UMRT system is developed.
- Based on the Hanoi Metropolitan Area Plan formulated by MOC, satellite cities within a 30–40 km radius are envisioned, and urban areas connected to Hanoi City will be formed within the adjacent Ha Tay Province (currently part of Hanoi City).



Source: HAIDEP Final Report

Figure 4.6.5 Urban Structure of Hanoi Metropolitan Region

The urban structure envisioned by HAIDEP is compared with the current urban structure based on the population of each district.



Source: Prepared by Evaluation Team based on HAIDEP and Statistics

Figure 4.6.6 Comparison of Population by District (2003, 2020 Years Production)

Table 4.6.3 Comparison of HAIDEP Framework with Actual Population, 2020

		2003		HAIDEP Framework (000)		A. 2020		Trend-Actual	HAIDEP Actual
		Pop. (000')	Pop. Density (pax/ ha)	A. Trend	B. HAIDEP MP	C. Pop.	Pop. Density (pax/ha)	A-C	B-C
Urban Core	Ba Dinh	221	238.3	342	200	225.6	245.0	116.4	-25.6
	Hoan Kiem	175	333.8	191	120	139.3	260.4	51.7	-19.3
	Dong Da	358	361.2	453	260	375.0	376.9	78.0	-115.0
	Hai Ba Trung	301	267.8	396	230	303.5	295.8	92.5	-73.5
Urban Fringe	Tay Ho	102	42.8	155	180	164.2	67.4	-9.2	15.8
	Long Bien	172	29.7	275	360	330.2	55.0	-55.2	29.8
	Cau Giay	158	131.8	338	220	295.2	238.4	42.8	-75.2
	Hoang Mai	209	54.9	510	430	521.9	129.9	-11.9	-91.9
	Thanh Xuan	185	203.5	321	180	295.9	322.7	25.1	-115.9
Suburban	South Tu Liem [1)]	239	31.1	624	630	274.2	85.2	349.8	10.2
	North Tu Liem					345.6	76.4		
	Thanh Tri	154	27.1	219	250	285.5	45.0	-66.5	-35.5
Rural	Soc Son	259	8.4	333	310	351.6	11.5	-18.6	-41.6
	Dong Anh	276	15.1	365	750	411.7	22.2	-46.7	338.3
	Gia Lam	201	21.5	274	390	290.9	24.9	-16.9	99.1
Old Hanoi Area		2806	32.2	4,796	4,510	4610.3	49.6		

Note: [1)] The number of 2003 is sum of South Tu Liem and North Tu Liem.
Source: HAIDEP Final Report, Statistical Book

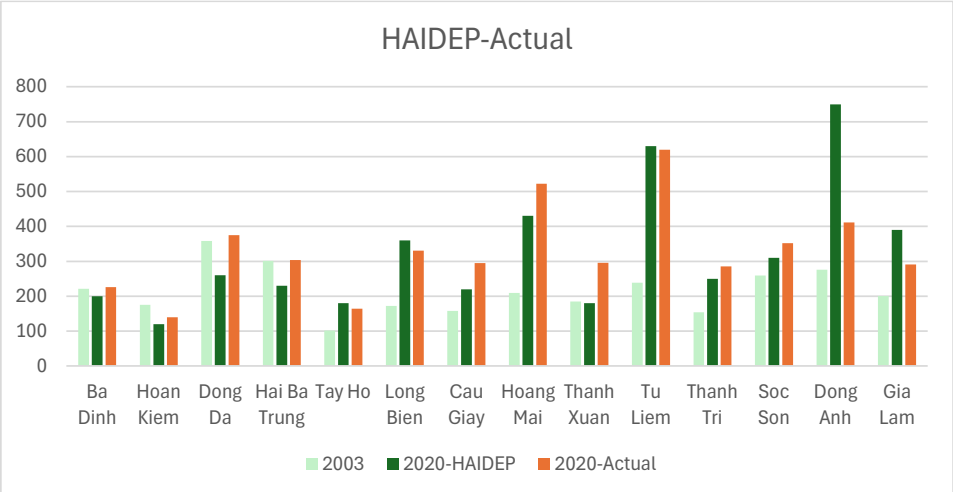
The **urban core area** includes four urban districts. From 1990 to 2003, the population was growing, and based on such past trends, the trend scenario predicted that the population would continue to grow and become even more crowded after the 1990s. On the other hand, since areas with a population density of over 800 people per hectare had already formed by

2003, the HAIDEP MP proposed reducing the population to improve the living environment in the central area. Examining actual population trends, all districts in the urban core showed lower population growth than the trend scenario, indicating that the increasing trend toward overcrowding has been mitigated.

The **urban fringe areas** comprise five districts on the western and southern outskirts of the city center and have seen rapid population growth since the 1990s due to urban expansion. Among these fringe areas, HAIDEP predicted that the Tay Ho and Long Bien districts would experience population growth, similar to the trend scenario prediction. But in fact, the population did not increase to that extent. The Cau Giay, Hoang Mai, and Thanh Xuan districts are projected to experience significant population growth in the trend scenario. HAIDEP proposed advancing urban development eastward and northward across the Red River, aiming to mitigate overcrowding in these districts. However, population influx continued, including new developments, resulting in population growth exceeding HAIDEP's proposals.

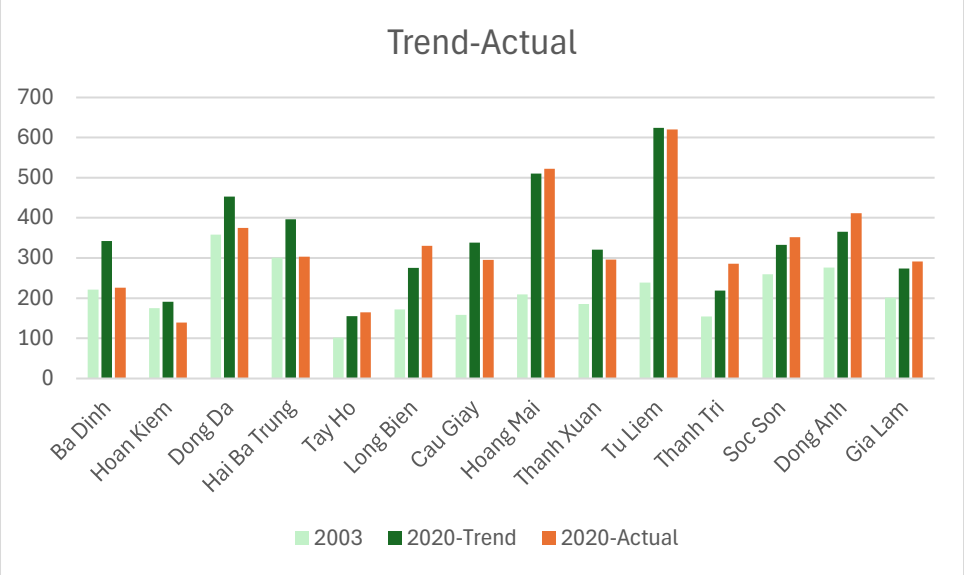
The **suburban area** is located on the outskirts of the former limits of Hanoi City. As of 2003, this area had not undergone urbanization, but rapid urbanization was expected due to the pressure of urbanization in Hanoi. With the expansion of the city limits in 2008, urbanization progressed further, and the population of both districts has clearly doubled.

The three districts in the **rural area** included in the plan were not yet urbanized in 2003, particularly the two northern districts. Therefore, the trend scenario did not anticipate population growth, but rather the construction of the Hong River Bridge, the road networks, and future public transportation systems. In contrast, HAIDEP projected rapid population growth in the Dong Anh and Gia Lam districts. In the Dong Anh district, population growth did not progress due to the lack of public transportation development. In the Gia Lam district, population growth is expected to progress due to recent urban development.



Source: Prepared by Evaluation Team based on HAIDEP and Statistics

Figure 4.6.7 Compariton of HAIDEP Scenario and Actual Population, 2020



Source: Prepared by Evaluation Team based on HAIDEP and Statistics

Figure 4.6.8 Comparison of Trend Scenario and Actual Population

4.6.3 Employment Framework

(1) Distribution of the working population

To evaluate the formation of urban structures, the residential population as well as the distribution of employment, i.e., the working population, must also be considered. In Vietnam, it is difficult to ascertain the current situation without statistics on the distribution of the working population. However, in the JICA survey, the resident population and working population around the planned railway stations were estimated. The figures show the concentration of the working population in the central area, indicating the formation of a monocentric urban structure.

Examining the figures for Tu Liem District, Long Bien District, Hoang Mai District, and Thanh Tri District, where the resident population has been increasing in recent years due to large-scale urban development, the working population is limited compared to the resident population. This observation highlights that new urban development projects are not adequately allocating space for business purposes.

Table 4.6.4 Estimated Residential and Working Population Within 500 m of the Stations

District	Area, 500 m from the station (ha)	Population	Population Density	% in Old Hanoi[1)]	Employ-ment	Employment density (pax/ha)	% in Old Hanoi[1)]
Ba Dinh	947	98,644	104	7%	62,614	66	8%
Hoan Kiem	522	69,242	133	5%	86,913	167	12%
Hai Ba Trung	974	135,970	140	10%	65,118	67	9%
Dong Da	992	232,992	235	17%	141,041	142	19%
Core Areas	**3435**	**536,848**	**156**	**40%**	**355,688**	**104**	**48%**
Cau Giay	1,241	206,590	166	15%	155,607	125	21%
Thanh Xuan	920	176,573	192	13%	109,128	119	15%
Hoang Mai	3,982	160,065	40	12%	44,240	11	6%
Tay Ho	2,365	17,384	7	1%	6,420	3	1%
Long Bien	6,025	49,415	8	4%	21,530	4	3%
City Peripheries	**14,533**	**610,027**	**42**	**45%**	**336,926**	**23**	**45%**
Gia Lam	11,688	15,224	1	1%	2,131	0	0%
Tu Liem	7,709	139,428	18	10%	30,165	4	4%
Dong Anh	18,588	39,856	2	3%	13,082	1	2%
Soc Son	30,544	1,773	0	0%	247	0	0%
Thanh Tri	6,319	15,107	2	1%	2,976	0	0%
Old Hanoi Area[1)]	**92,816**	**1,358,263**	**14.6**	**100%**	**741,212**	**8.0**	**100%**
Hoai Duc	8,501	40,819	5		3,300	0	
Ha Dong	4,959	74,871	15		24,050	5	
Me Linh	14,158	6,252	0		1,477	0	
Quoc Oai	14,593	2,099	0		144	0	
Dan Phuong	7,770	4,598	1		363	0	
Thach That	18,579	3,637	0		454	0	
Rural and Suburban	**143,408**	**343,664**	**2**		**78,389**	**1**	
Total	**161,376**	**1,490,540**	**9**		**771,002**	**5**	

Note: [1)] Within the old Hanoi City
Source: Data Collection Survey on Urban Planning and Transit Oriented Development in Ho Chi Minh City and Hanoi

(2) Comparison between HAIDEP's Development Plan and the Current Situation

HAIDEP estimates the employed population by sector, specifically for the primary, secondary, and tertiary sectors. Although a direct comparison with the abovementioned estimates is difficult, the assumed employment population in business districts was used to conduct a comparative analysis of the distribution of the tertiary sector.

4.6.4 Urbanization Trend in the Hanoi Metropolitan Region

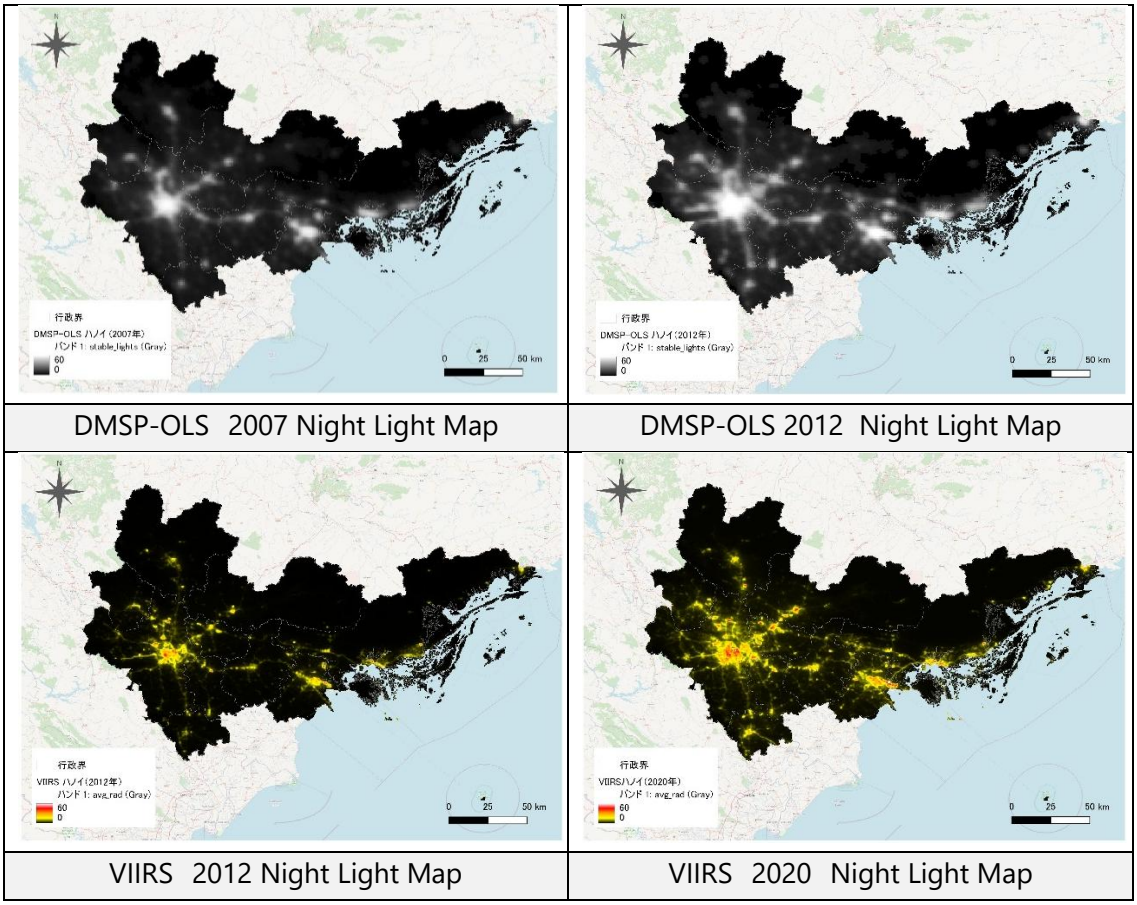
(1) Actual Urbanization Status

To understand the expansion of Hanoi City and its surrounding urban areas, satellite images from Google Earth Engine were used to examine changes in nighttime light. The following images show the average nighttime light for Hanoi City and its surrounding urban areas in 2007, 2012, and 2020.

The 2007 nighttime light data are obtained from the Defense Meteorological Satellite Program Operational Linescan System (DMSP-OLS) with a resolution of 2.7 km, the 2020 data from the Visible Infrared Imaging Radiometer Suite (VIIRS) with a resolution of 500 m, and

the 2012 data from DMSP-OLS and VIIRS satellite images.[6]

A comparison of nighttime lights in white between the 2007 and 2012 DMSP-OLS images shows an increase, thus confirming the expansion of the urban area around Hanoi between 2007 and 2012. Similarly, the VIIRS images show an increase in nighttime light indicated by yellow, orange, and red colors, indicating that the urban area has expanded further between 2012 and 2020. The areas with high light intensity, indicated by red and orange colors, have expanded in Hanoi's central area. Furthermore, the light levels have increased along major regional trunk roads from Hanoi to surrounding cities (Hai Phong, Ha Long City, Hai Duong, Bac Ninh City, Bac Giang City, Thai Nguyen City, Vinh Yen City, and Phu Ly City) and in the areas of those surrounding municipalities.

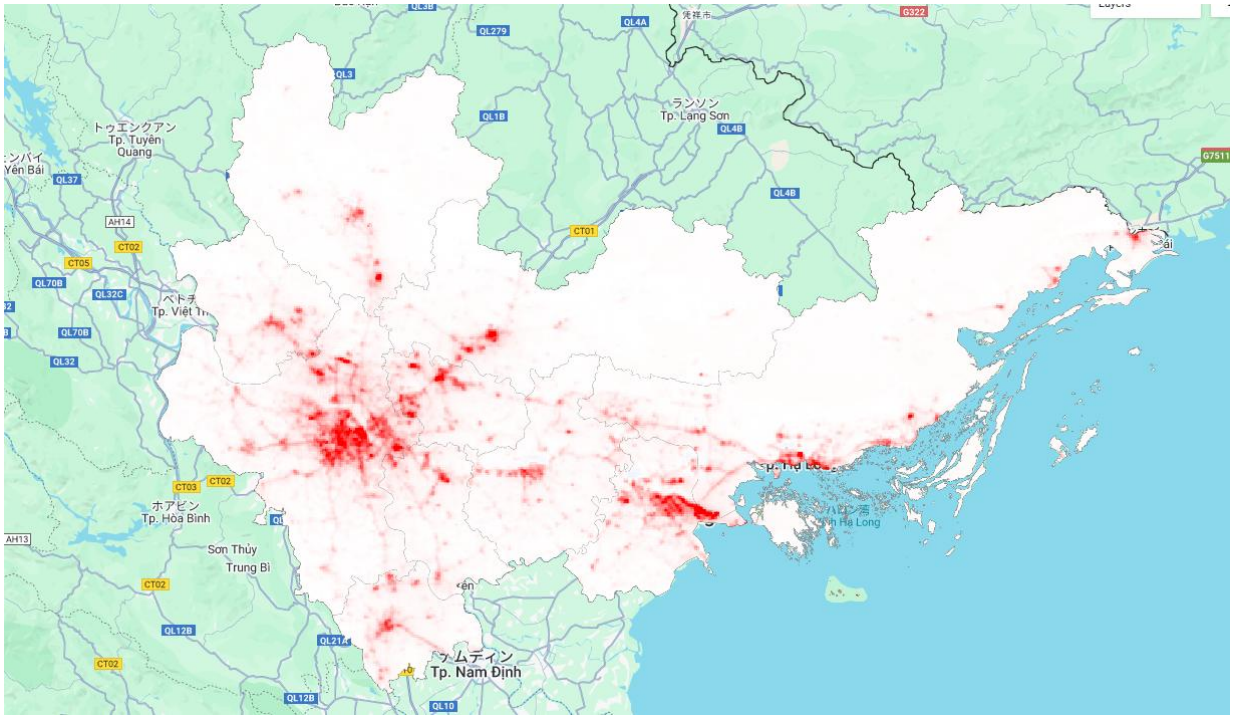


Source: Prepared by the Evaluation Team based on DMSP-OLS and VIIRS Images from Google Earth Engine

Figure 4.6.9 Night Time Mapping (2007, 2012, 2020）

The 2007 and 2020 nighttime light data in Hanoi and its surrounding areas were also compared. The red-colored areas shown in the following figure show the increase in nighttime light from 2007 to 2020.

[6] According to the "Satellite and GIS Data List" posted on JICA's website, "Use of Satellite and GIS Data in Project Evaluation," DMSP-OLS: Nighttime Lights Time Series Version 4 covers nighttime light data from 1992 to 2014, while VIIRS Nighttime Day/Night Band Composites Version 1 covers nighttime light data from 2012 to the present. For data between 2007 and 2020, we used data from 2012, which includes both DMSP-OLS and VIIRS data.



Source: Prepared by the Evaluation Team based on DMSP-OLS and VIIRS Images from Google Earth Engine

Figure 4.6.10 Changes of Nighttime Light in the Hanoi Metropolitan Region (Comparison of 2007 and 2020)

The nighttime light increase/decrease map is compared with the urban growth management policies outlined in HAIDEP to examine (i) urbanization promotion areas (UDAs) and (ii) urban clusters and urban activity centers.

(2) Urban Structure based on HAIDEP's Urban Clusters

1) HAIDEP Proposed Urban Cluster and Urban Structure

To facilitate effective planning and management, HAIDEP classified Hanoi City into six distinct urban clusters. This approach will help realize urban structure and improve the urban functions and identity of each cluster (see Figure 4.6.11). The six urban clusters are as follows.

(i) Urban Core Clusters: Traditional culture, including old towns.

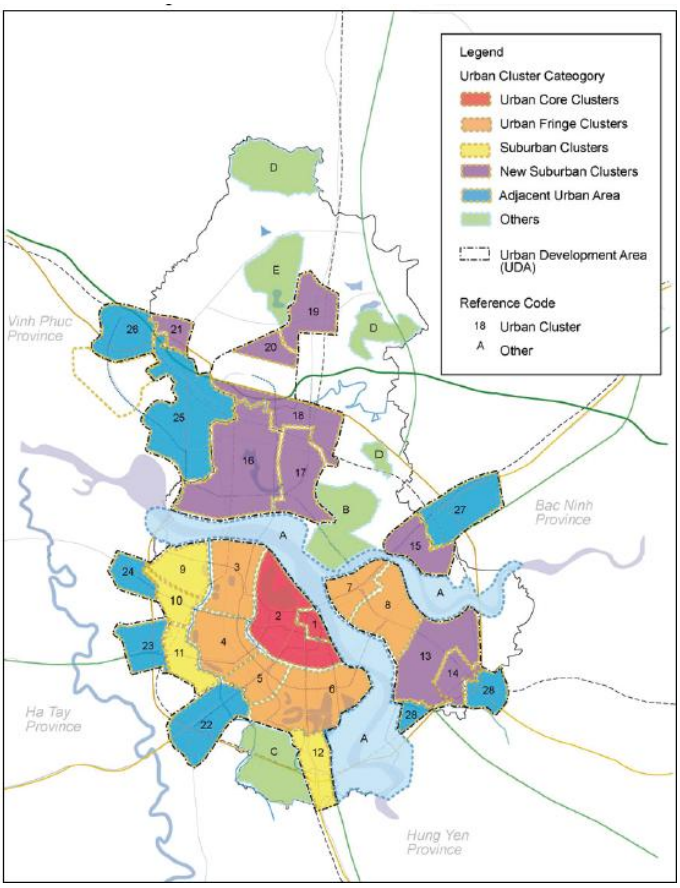
(ii) Urban Fringe Clusters: New administrative centers, CBDs, etc.

(iii) Suburban Clusters: New residential developments, higher education centers, etc.

(iv) New Suburban Clusters: Export processing zones, sub-centers, etc.

(v) Adjacent Urban Area: New residential development, industrial park development, export processing zones, historical heritage, etc.

(vi) Others: Green tourism, recreation, etc.



Source: HAIDEP Final Report

Figure 4.6.11 Location of Identified Urban Clusters

2) **Distribution of Industrial Areas**

As shown in Figure 4.6.11, HAIDEP proposed situating industry and logistics in the New Suburban Cluster. The plan recommends industrial parks in the Long Bien/Gia Lam and Dong Anh/Soc Son, light industry in urban fringe and suburban areas, and logistics services along Ring Road 4, National Highways 2, 5, 6, and 18.

The industrial parks in Hanoi City for 2024 are shown in the table below. Within the old Hanoi City area, two new industrial parks are under construction in Soc Son/Dong Anh, in line with the policy outlined by HAIDEP. Additionally, outside the old Hanoi City area are two new industrial parks under construction and operational along National Highway 2.

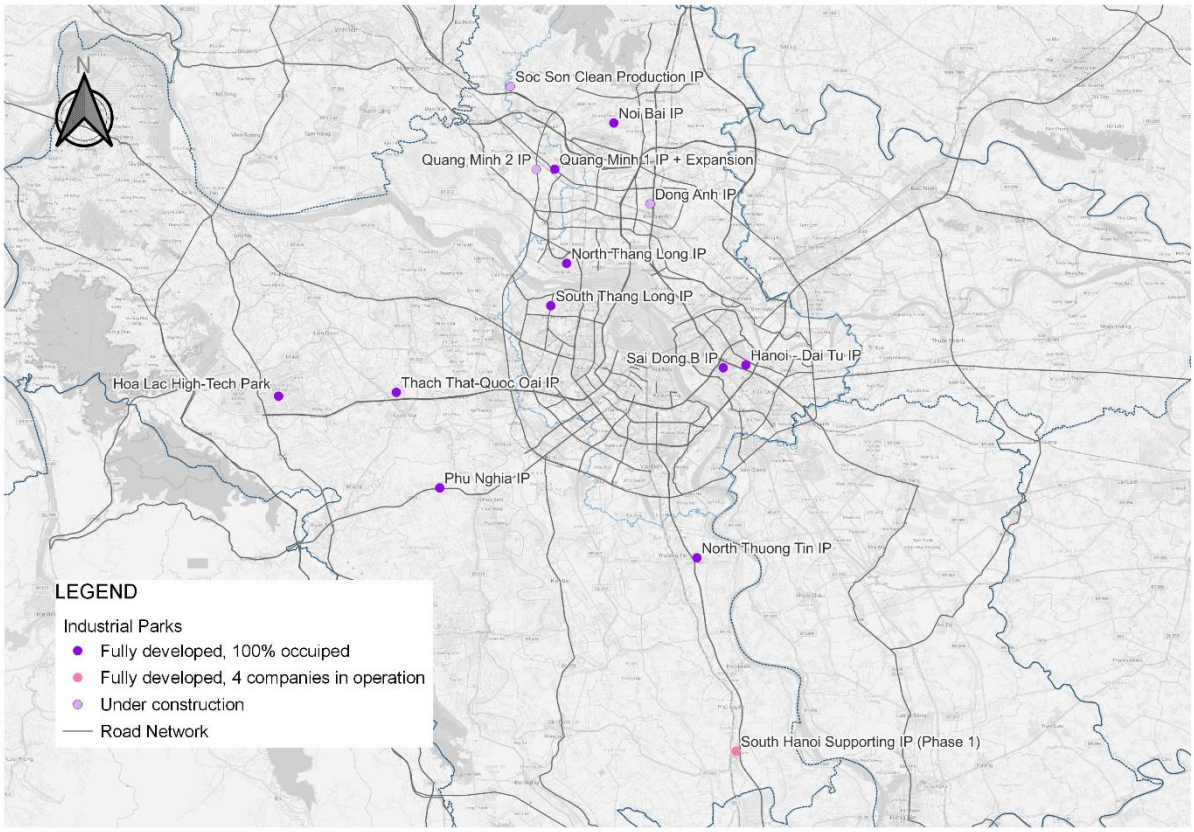
Table 4.6.5 List of Industrial Parks in Hanoi City

	Name	Area (ha)	Location	Operation Period	Status
1	Noi Bai Industrial Park	114.1	Soc Son	1994	A
2	Hanoi - Dai Tu IP	40	Long Bien	1995	A
3	Sai Dong B IP	40	Long Bien	1996	A
4	North Thang Long IP	274.3	Dong Anh	1997	A
5	South Thang Long IP	31.5	Bac Tu Liem	1999	A
6	Quang Minh 1 IP + Expansion	407.9	Me Linh	2004	A

	Name	Area (ha)	Location	Operation Period	Status
7	Thach That-Quoc Oai IP	150.78	Thach That	2007	A
8	Phu Nghia IP	170.7	Chuong My	2007	A
9	North Thuong Tin IP	112	Thuong Tin	2007	A
10	South Hanoi Supporting IP (Phase 1)	76.9	Phu Xuyen	2013	B
11	Soc Son Clean Production IP	302	Soc Son	2021	C
12	Dong Anh IP	300	Dong Anh	2024	C
13	Quang Minh 2 IP	160	Me Linh	–	D

Note: Status A: Fully developed, 100% occupied; Status B: Fully developed, four companies in operation; Status C: Under construction, and Status D: Under construction, plan to be changed.
Source: Prepared by Evaluation Team based on the JETRO

Figure 4.6.10 illustrates Hanoi's industrial parks and road network. Industrial parks are being developed along major regional trunk roads, including National Highway 5, which links to Hanoi and Haiphong Port, Highway 3, which has access to Noi Bai Airport, and the Hoa Lac Expressway.



Source: Prepared by the Evaluation Team Based on Relevant Information

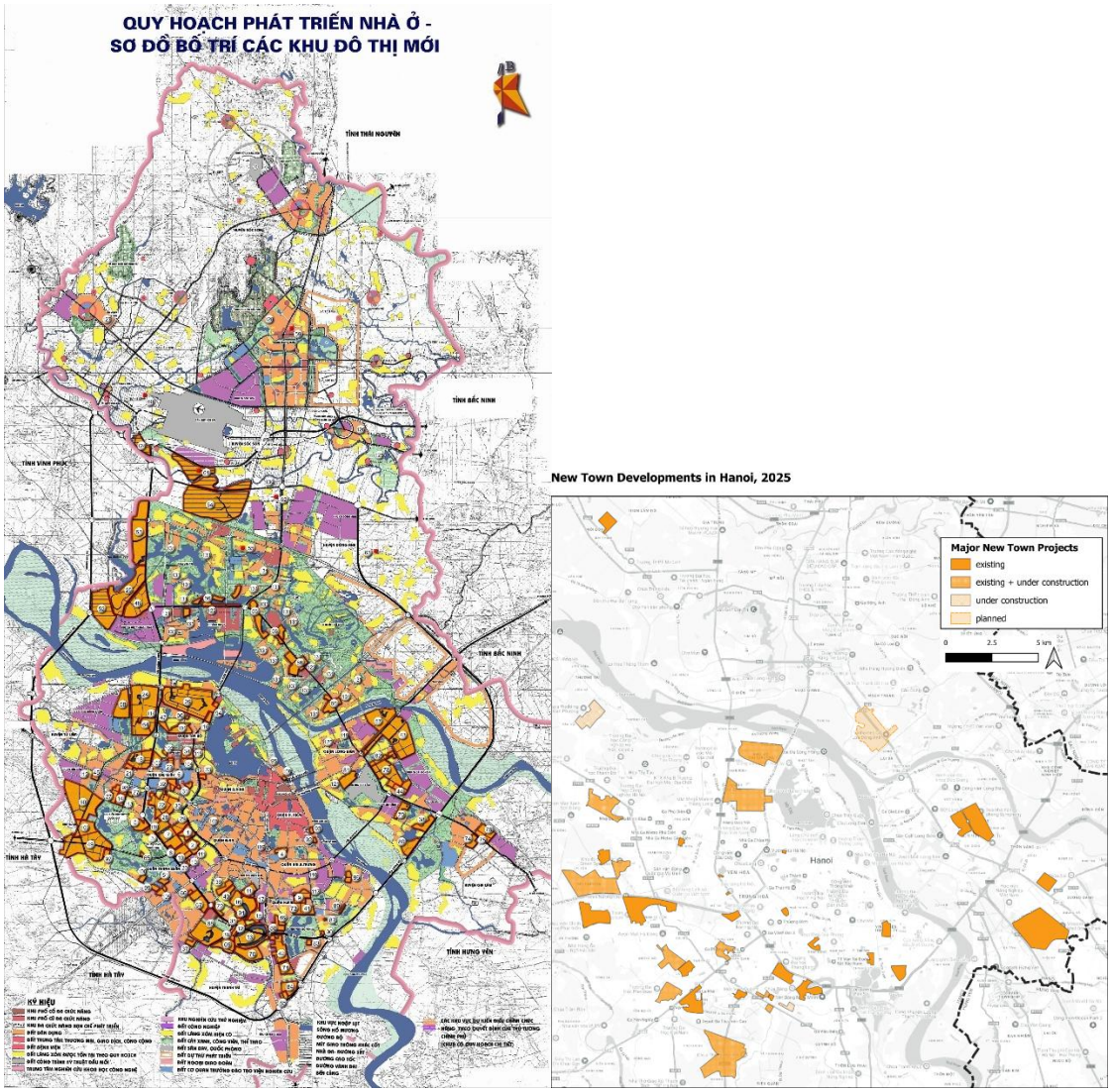
Figure 4.6.12 Location of Industrial Park in Hanoi City

3) **Status of Urban Development Project Implementation**

Figure 4.6.12 compares the urban development projects planned at the time of HAIDEP formulation with the progress of identifiable new, large-scale urban development projects. Many of the implemented urban development projects are in the western and southwestern

areas around the former Hanoi City limits. On the other hand, many of the urban development projects planned on the north or east side of the Red River have not been realized.

Furthermore, the majority of these projects are residential area developments. They lack the necessary business functions to form urban subcenters. As a result, the city continues to have a highly centralized urban structure, worsening the traffic congestion in the downtown area due to the concentration of commuter traffic.



Source: HAUPA (right); prepared by Evaluation Team based on the relevant information (left)

Figure 4.6.13 Urban Developent Project (left: Plan as of 2005, right: status as of 2025)

4.7 Summary of Chapter 4

(1) Planning Approach

HAIDEP's planning approach has been highly valued. Even nearly twenty years later, it is still recognized by those responsible for urban planning administration in Hanoi. Specifically, it features a data-driven planning methodology, a participatory approach that incorporates citizens' opinions, and a comprehensive, cross-sectoral planning framework that considers

urban structure, transportation, and water environment, as well as socio-economic and cultural aspects.

These planning approaches, through continued support provided by subsequent technical cooperation projects such as CUPCUP, have also influenced Vietnam's planning administration, and their linkage to the 2017 Planning Law has been mentioned in the interviews in the Study. On the other hand, although the data-driven planning methodology has been positively evaluated, it has not been institutionalized within the planning system in Vietnam. Consequently, subsequent urban and sectoral plans have not been allocated budgets for data collection. As a result, data updating and data-based planning remain major challenges for Vietnam.

(2) **Planning Concept of TOD**

The most important objective identified in HAIDEP's urban spatial planning is the development of a transit-oriented city. To achieve this goal, HAIDEP proposed an urban railway network along with integrated urban development. Although the construction of the railway network itself has been delayed and the envisioned urban structure has yet to materialize, the concept of TOD remains influential and is still recognized as a key issue for the future.

(3) **Realization of Urban Structure**

A comparison between the urban structure proposed by HAIDEP and the current urban structure reveals a noticeable gap. Urbanization across the Red River, particularly towards the northern area, has not progressed as anticipated, while urban expansion to the west and south has accelerated instead. This is likely due to the advancement of urban development projects in the western and southern areas that became part of Hanoi, as well as delays in the construction of the urban railway network intended to support the proposed urban structure.

Moreover, delays in the development of the railway network have hindered the formation of urban centers, resulting in a more uniform urban structure. Traffic congestion during the morning and evening peak hours has become a chronic issue. A reorganization of the urban structure, in conjunction with the development of the urban railway system, is now required.

5. Status of Urban Transport as a Subsector Program

In HAIDEP, several actions and subsector programs were proposed to translate the overall urban vision and development goals into concrete strategies. This chapter focuses on the urban transport sector as one of these subsectors and evaluates its content.

Section 5.1 outlines the objectives and fundamental policies of the urban transport subsector program, which was formulated following HAIDEP. Section 5.2 examines the formulation status of related plans that were subsequently developed or updated based on these objectives and strategies. Section 5.3 reviews the implementation status of individual projects proposed in HAIDEP and Section 5.4 reviews the outcome of individual projects. Section 5.5 presents the results of a beneficiary survey to understand the perceptions and acceptance of citizens and users.

Along with these analyses, statistical data and findings from field surveys are used to provide a comprehensive evaluation of the urban transport subsector program under HAIDEP. The overall achievements are summarized in Section 5.6.

5.1 HAIDEP Urban Transport Subsector Program

5.1.1 Objectives of the Urban Transport Subsector Program

In the HAIDEP Final Report (2007), a total of nine subsector programs (A to I) were formulated to realize the future vision and development goals, along with a crosscutting subsector program focusing on strategy, action, and monitoring indicators. Among these, the Urban Transport Subsector Program (Program D) occupies a critically important position as one of the fundamental structural components of the city. It sets forth the following three objectives:

- Promote the development of public-transportation-based urban areas and society;
- Ensure equitable and safe mobility and accessibility for all; and
- Ensure efficient/effective transportation between Hanoi and the rest of the region.

These objectives are based on the fundamental recognition that urban transport is not merely a means of mobility, but a backbone infrastructure that supports urban development. It has wide-ranging impacts on economic growth, land use, residential environment, environmental and social considerations, provision of public services, and land and property values. In particular, considering the characteristics of urban expansion in Hanoi, the report emphasizes that transport development is not an issue limited to the city itself but must be addressed in an integrated manner at both the metropolitan and urban core levels.

5.1.2 Urban Transportation Development Strategies, Action Plans, and Monitoring Indicators Proposed under HAIDEP

The table below summarizes the strategies, actions, and monitoring indicators of the subsector program. A systematic set of concrete measures will optimize mobility by

integrating urban structure, land use, and transport services, while enhancing convenience and equity for residents.

Table 5.1.1 Transport Development Strategies, Action Plans, and Monitoring Indicators Proposed under HAIDEP

Strategy	Action	Monitoring Indicator
D1 Establish coordinated urban transportation policy	D11 Establish an effective modal policy to ensure sustainable urban transportation, including management of private transportation D12 Establish a clear strategy for the effective interface of the urban and regional transportation network and services D13 Establish a rational and transparent framework for prioritizing transportation policy and projects D14 Establish a workable mechanism for effective coordination among relevant sectors and organizations D15 Establish a sustainable funding mechanism to promote private sector participation	・A coordinated/integrated policy statement issued by the government ・Standard project management information system shared by relevant ministries/departments ・Roadmap for each action and its progress
D2 Enhance public awareness and understanding of urban transportation issues	D21 Expand transportation education, campaigns, and public information to appeal to the mind and hearts of the people D22 Implement various experimental projects for policy test with the involvement of communities and transportation users D23 Strengthen research and studies on urban transportation issues	・Improved attitude of road users ・Response of the people ・Progress of projects/actions.
D3 Promote realization of mass transit-oriented urban development	D31 Develop mass transit and public transportation systems in full integration with urban growth strategy, land use, and urban development D32 Integrate the transportation master plan with the overall urban /regional master plan as one coordinated statutory plan D33 Establish effective institutional framework and practical development methods for transit-oriented development (TOD)	・Necessary institutional arrangements done ・Concrete arrangement for integration of transportation plan with urban/regional plan ・Shared understanding of the strategy among stakeholders
D4 Expand attractive public transportation system	D41 Develop UMRT network as the city's public transportation backbone. D42 Expand and strengthen the bus system and services in a coordinated manner with UMRT to provide public transportation services in the entire city D43 Develop supplementary public transportation services, including taxi, xe om, cyclo, water transportation, school buses, company buses, etc.	・No. of public transportation users ・Coverage of bus services ・People's satisfaction
D5 Strengthen effective management of traffic and demand	D51Strengthen traffic control and management to regulate traffic flow for enhanced safety, comfort, and efficiency D52 Enhance enforcement capacity in parallel with social awareness (D2) D53 Establish a workable parking policy D54 Introduce phased TDM measures D55 Expand introduction of information technology (IT) for effective transportation management	・Changes in road users' attitude ・No. of traffic accidents ・Road users' satisfaction ・Revenue generated ・Degree of traffic congestion
D6 Focus on the need for comprehensive development of transportation space and environment	D61 Establish a shared concept of comprehensive development of transportation space and environment D62 Strengthen comprehensive management and improvement of transportation corridors D63 Establish comprehensive management of traffic and transportation-related issues in the CBD D64 Provide an adequate transportation environment for pedestrians and bicycle users	・Length and area of sidewalks with improved pavements, pedestrian shade, and street lighting ・Responses of road users and communities

	D65 Provide adequate transportation services and environment at district and community levels, both in urban and rural areas	
D7 Strengthen capacity for effective transportation sector administration and management	D71 Strengthen planning and project preparation capacities, including database, planning tools, and human resources D72 Develop alternative methods for the smooth acquisition of lands for infrastructure development D73 Expand participation of private sector and communities	・Availability of database, planning tools ・No. of qualified transportation planners and engineers ・Land and compensation costs ・ ・Extent of private sector involvement

Source: HAIDEP Final Report

5.1.3 Evaluation Method for HAIDEP Achievement

To evaluate the achievement status of HAIDEP, the monitoring indicators proposed in HAIDEP were first reviewed in terms of the presence of numerical targets and the availability of data, as summarized in the table below. Based on this review, each indicator is assessed in Sections 5.2 through 5.5, and an overall evaluation is presented in Section 5.6. The numerical targets proposed in HAIDEP are compiled in Section 5.1.4. For indicators without defined numerical targets, a qualitative evaluation was conducted based on interviews with local government officials and a review of existing plans. On the other hand, indicators for which information could not be confirmed under this study or for which objective evaluation was considered difficult were excluded from the assessment.

Table 5.1.2 Review of Monitoring Indicators Proposed in HAIDEP and Evaluation Methods

Strategy	Monitoring Indicator	(1)	Evaluation Method	(2)
D1 Establish coordinated urban transportation policy	A coordinated and integrated policy statement issued by the government	×	Reviewed through post-HAIDEP related plans (see Section 5.2)	×
	Standard project management information system shared by relevant ministries/departments	×	Not assessed (the destination government's system could not be verified in detail	-
	Roadmap for each action and its progress	×	Described in Section 5.3 (implementation status of HAIDEP proposed projects)	○
D2: Enhance public awareness and understanding of urban transportation issues	Improved attitude of road users	×	Refer to Section 5.5 (Beneficiary survey)	○
	Response of the people	×	Refer to Section 5.5 (Beneficiary survey)	○
	Progress of projects/actions.	×	Described in Section 5.3 (Implementation status of HAIDEP proposed projects)	○
D3 Promote realization of mass transit-oriented urban development	Necessary institutional arrangements are done	×	Not assessed (due to the difficulty of exhaustive comparative verification.)	-
	Concrete arrangement for integration of transportation plan with urban/regional plan	×	Reviewed through post-HAIDEP related plans (see Section 5.2)	×
	Shared understanding of the strategy among stakeholders	×	Refer to Sections 5.2 and 5.6	×
D4 Expand an attractive public transportation system	Number of public transportation users	●	**Numerical targets set**. Passenger numbers for buses and UMRT are summarized in Section 5.2. Modal share targets in Section 5.1.4, actual figures summarized in Section 5.6	○
	Coverage of bus services	×	Bus kilometers described in Section 5.3.5	○
	People's satisfaction	×	Refer to Section 5.5 (Beneficiary survey)	○

D5 Strengthen effective management of traffic and demand	Changes in road users' attitudes	×	Refer to Section 5.5 (Beneficiary survey)	○
	Number of traffic accidents	○	Not assessed (data unavailable)	○
	Road users' satisfaction	×	Refer to Section 5.5 (Beneficiary survey)	○
	Revenue generated	×	Not assessed (data unavailable)	-
	Degree of traffic congestion	●	**Numerical targets set**, but due to a lack of data, 2024 congestion points are shown (see Section 5.3.1)	×
D6 Focus on the need for comprehensive development of transportation space and environment	Length and area of sidewalks with improved pavements, pedestrian shade, and street lighting	×	Not assessed (data unavailable)	-
	Responses of road users and communities	×	Refer to Section 5.5 (Beneficiary survey)	○
D7 Strengthen capacity for effective transportation sector administration and management strategy	Availability of database, planning tools	×	Not assessed (information difficult to confirm)	-
	Number of qualified transportation planners, engineers	×	Not assessed (data unavailable)	-
	Land and compensation costs ·	×	Not assessed (data unavailable)	-
	Extent of private sector's involvement	×	Comprehensive private sector involvement was not assessed due to a lack of data, but VinBus was interviewed as a newly participating operator	×

Note: (1) ○Can be monitored with a quantitative indicator, ● A quantitative indicator was set in HAIDEP. × Cannot be monitored quantitatively (2) ○ Evaluated quantitatively. ×Cannot be evaluated quantitively.
Source: Evaluation Team

5.1.4 Quantitative Targets

Among the monitoring indicators mentioned above, both "Number (Share) of Public Transport Users" and "Decree of Traffic Congestion (Road Network Performance)" had specific numerical targets set for the target year of 2020. The table below summarizes these targets. However, as there is no comparable data recorded for the decree of traffic congestion (road network performance) indicator, the evaluation primarily focuses on the "Number (Share) of Public Transport Users." In addition, related indicators such as total bus vehicle kilometers, which are useful in understanding changes in urban transportation since the formulation of HAIDEP, were also collected to the extent possible and used in the evaluation.

Table 5.1.3 Estimated Modal Share in 2020

Mode		2005		2020			
				Without UMRT		With UMRT	
		'000/day ※1	%	'000/day ※1	%	'000/day ※1	%
Private Vehicle	Bicycle	1,579	25.3	374	3.8	372	3.8
	Motorcycle	3,396	63.2	5,777	58.7	5,206	52.9
	Car/Taxi	227	3.6	1,921	19.5	1,555	15.8
	Other	69	1.1	350	3.5	350	3.5
	Sub Total	5,811	93.3	8,422	86.5	6,896	70.0
Public Transport	UMRT※2)	-	-	-	-	2,012	20.5
	Bus	420	6.7	1,426	14.5	940	9.5
	Sub Total	420	6.7	1,426	14.5	2,364	30.0
Total		6,321	100.0	9,848	100.0	9,848	100.0

※1 Trips inside Hanoi City ※2 Sum of Urban Rail (UMRT) and BRT Source: HAIDEP

Table 5.1.4 Decree of Traffic Congestion (Road Network Performance in 2020)

	2005	2020	
		HAIDEP Network	
		With UMRT	With UMRT&TDM
Average Travel Speed (km/h)	26.0	22.0	35.2
Average Volume/ Capacity Ratio（Volume/Capacity Ratio）	0.40	0.69	0.52

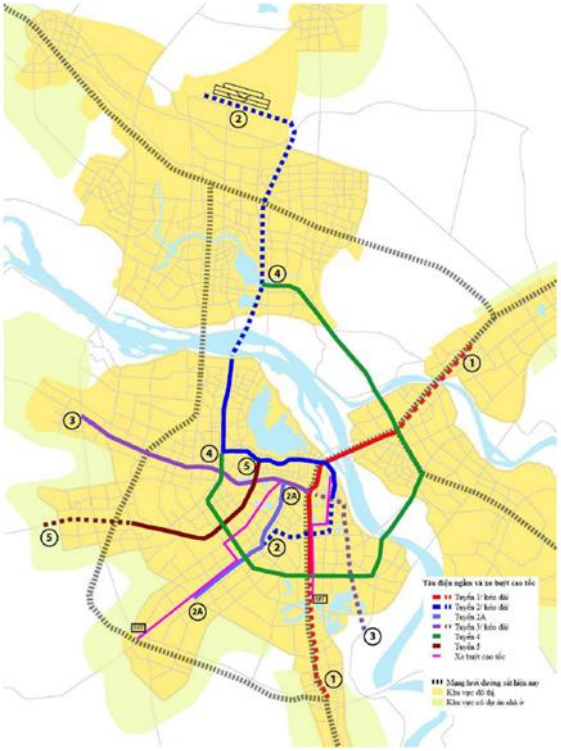
Source: HAIDEP

5.2 Status of Formulation of Related Plans after HAIDEP

Urban transportation–related plans formulated after HAIDEP include the "Hanoi Transport Master Plan to 2020" (Decision No. 90/2008/QD-TTg), the "Transport Master Plan to 2030 and Vision to 2050" (Decision No. 519/QD-TTg), and the "Hanoi Capital Master Plan 2021-2030 (Vision to 2050)" (Decision No. 1569/QD-TTg) along with the "Revised Hanoi Capital City General Plan by 2045 with Vision to 2065" (Decision No. 1668/QD-TTg). This section outlines the formulation process and key features of each plan.

5.2.1 Hanoi Transport Master Plan to 2020 (Decision No. 90/2008/QĐ-TTg)

Formulated in 2007 with support from JICA, the "Hanoi Urban Transportation Development Plan (HAIDEP)" was Hanoi's first comprehensive and long-term urban transportation strategy based on data, including a large-scale household interview survey. However, with the significant expansion of the city's administrative boundaries, the need for a new urban transportation plan covering the expanded area arose. In response, the "Hanoi Transport Master Plan to 2020" (Decision No. 90/2008/QD-TTg) was developed in 2008, building upon the basic policy framework established under HAIDEP.



Source：Hanoi Transport Master Plan to 2020 (2008)

Figure 5.2.1 Proposed Public Transport Network

To address the enlarged urban area, the plan proposed the construction of Ring Roads No. 3 and No. 4, the strengthening of radial roads including National Highways No. 1, 3, 5, 6, and 18, and the development of the North–South Axis Road. The plan also promoted the construction of grade-separated intersections and elevated roads to alleviate urban congestion and improve safety. In terms of public transport, in addition to the five urban rail (UMRT) lines shown in the figure, the

plan proposed LRT and BRT as the backbone of the network, along with the phased expansion of the bus system.

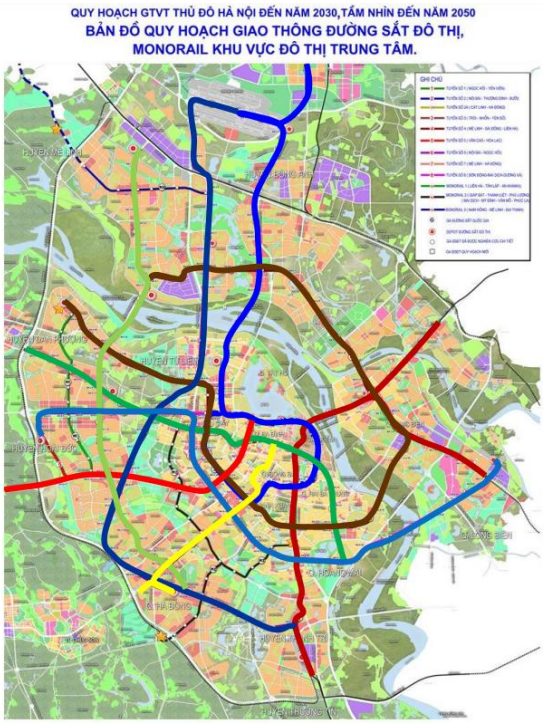
Pre-feasibility studies for UMRT Line 2 and Ring Road 4 were conducted under HAIDEP. This plan builds on those studies: UMRT 2 proceeded toward a Japanese loan agreement, while Ring Road 4, though relocated to a more suburban area, retained HAIDEP's original goal of easing congestion in central Hanoi.

5.2.2 Transport Master Plan for 2030 and Vision to 2050 (Decision No. 519/QĐ-TTg)

In response to the rapid speed of urban development in Vietnam, the Urban Planning Law enacted in 2009 recommends a regular review cycle of approximately five years for small and medium-sized cities or limited-scope issues, and around ten years for large cities such as Hanoi and Ho Chi Minh City. In line with this institutional framework, the "Transport Master Plan for 2030 and Vision to 2050" (Decision No. 519/QD-TTg) was formulated in 2016 to accommodate continued urban expansion and population growth.

The plan focuses on the construction and expansion of Ring Roads No. 2 to 5, a regional expressway network from four to six lanes to strengthen connections with surrounding areas, a network of urban trunk roads, and an urban expressway network including elevated roads.

Concerning public transport, the plan proposes the development of ten urban rail (UMRT) lines (approximately 413 kilometers in total), three monorail lines, and eight BRT routes. The BRT routes are envisioned to be converted into urban rail (UMRT) lines in the future. In addition, the plan promotes Transit-Oriented Development (TOD) centered on interchanges between rail, BRT, and bus services. The public transport modal share is targeted to reach 50 to 55 percent by 2030 and 65 to 70 percent by 2050.

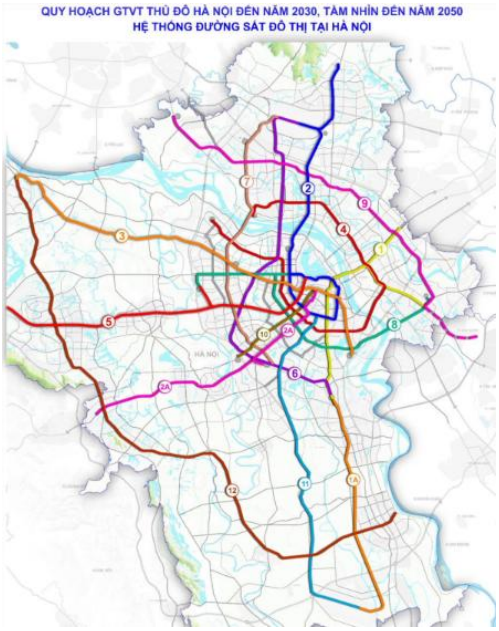


Source：Decision No.519/QĐ-TTg

Figure 5.2.2 Proposed UMRT Network

5.2.3 Hanoi Capital Planning for 2021–2030 (Vision to 2050) (Decision No. 1569/QĐ-TTg) and Revised General Plan of Hanoi Capital by 2045 with vision to 2065 (Decision No. 1668/QD-TTg)

In November 2024, the "Hanoi Capital Plan for 2021–2030 (Vision to 2050)" was approved by the Decision No. 1569/QD-TTg as a comprehensive and cross-sectoral master plan, integrating urban development, society, economy, environment, and transport. Subsequently, in December of the same year, the "Revised General Plan of Hanoi Capital City by 2045 with vision to 2065" was also approved (Decision No. 1668/QD-TTg), which highlighted urban transportation. The two plans are consistent, with the latter providing a detailed and transport-focused framework aligned with the broader capital planning.



Source：Hanoi Revised General Plan (Decision No.1668/QD-TTg)

Figure 5.2.3 Proposed UMRT

Compared with the "Transport Master Plan to 2030 and Vision to 2050" (Decision No. 519/QD-TTg) formulated in 2016, the new plan revises part of the previously proposed urban rail (UMRT) routes and includes five additional lines, further strengthening the emphasis on public transport development.

According to interviews with the Ministry of Construction (MOC) and domestic construction consultants, planning in Vietnam is based on careful review of existing plans and is revised in accordance with changes in socioeconomic conditions. The series of plans originating from HAIDEP has been updated with consistency and continuity. Through regular revisions over time, the urban transportation planning initiated by HAIDEP has been progressively developed, maintaining a consistent policy direction that prioritizes public transport centered on UMRT. In recent years, planning frameworks have also been initiated to incorporate elements such as smart cities and environmentally sustainable mobility, including the application of ICT and the introduction of clean energy vehicles.

5.3 Implementation Status of Projects Proposed under HAIDEP

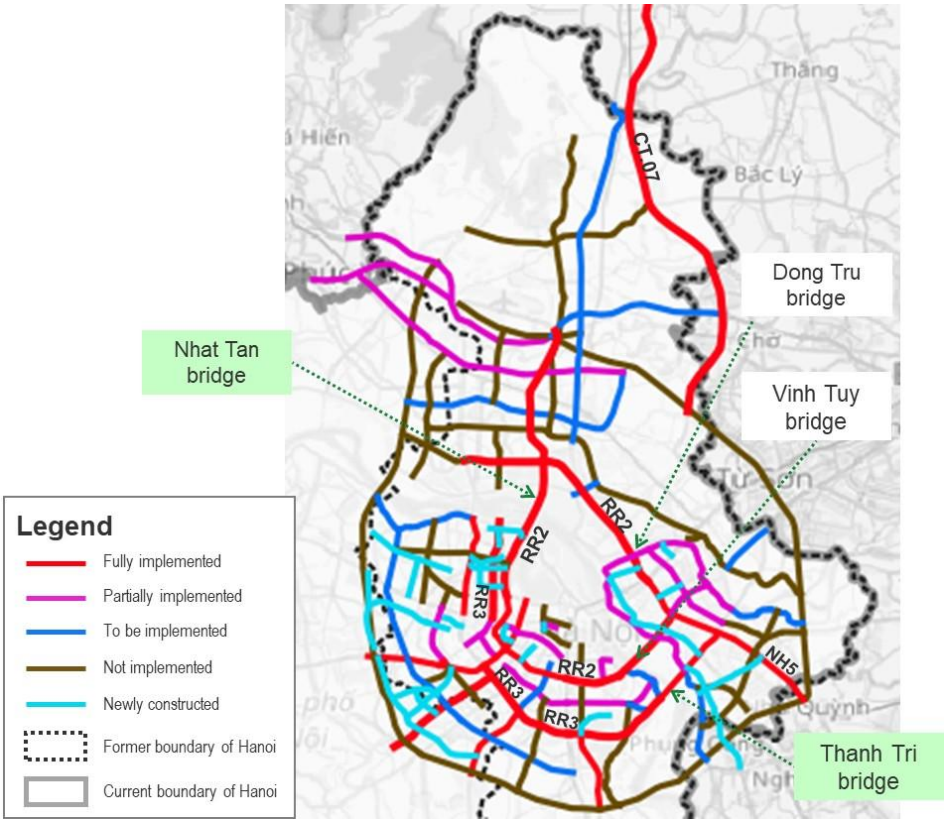
The implementation status of projects proposed under HAIDEP, including urban roads, regional roads, UMRT, and regional rail, has been reviewed and organized. As previously mentioned, Hanoi's urban transportation master plans have been revised following the formulation of HAIDEP, notably in 2008 and 2016, in response to urban expansion and population growth. These revisions have involved reassessing both the necessity of specific infrastructure projects and the alignment of proposed routes.

Therefore, it is not appropriate to assess the implementation of HAIDEP solely based on built infrastructure. It is important to consider the evolution of subsequent planning frameworks. In this section, each project proposed in HAIDEP is classified into one of six categories: Implemented, Partially Implemented, Planned, Deleted, Under Construction, and Newly Planned, to provide a systematic overview of its implementation status.

5.3.1 Urban Road Projects

The figure below presents a comparison between the urban road network proposed in HAIDEP and the status in Hanoi City. Key roads located in the central area of the former Hanoi city, such as Ring Road 2 and Ring Road 3, as well as major bridges including Nhat Tan Bridge and Thanh Tri Bridge, have all been completed. Additionally, key radial routes such as National Highway 5 and Expressway CT07 have also been constructed. The construction of the main arterial roads in Hanoi has been predominantly carried out with the support of the Vietnamese government and JICA, and as indicated by the beneficiary survey conducted and this study, the level of recognition by the public is very high. Although support from other donors is limited, the southern section of the Nhat Tan Bridge (Nhat Tan to Cau Giay, 6.5 km) has been developed with the support of the World Bank.

On the other hand, roads located beyond Ring Road 3 in suburban areas have undergone alignment adjustments in response to the expansion of the city boundary. Current planning efforts now focus more on outer suburban areas.



Source: Evaluation Team

Figure 5.3.1 Implementation Status of Urban Road Project

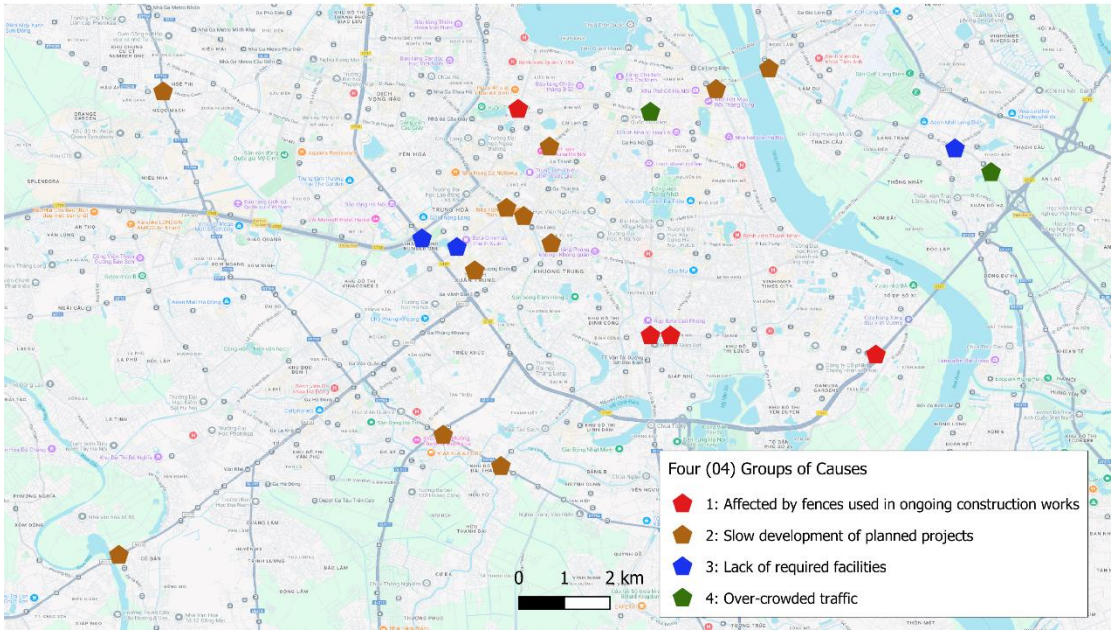
The implementation status of each project is summarized in the table below. Among the roads proposed in HAIDEP, a total of 125.2 km have been fully implemented as planned, while 99.5 km have been partially implemented, including changes in the number of lanes or completion of certain sections. An additional 169.8 km is planned for future implementation, and 244.1 km have been revised or removed from the plan. Meanwhile, the total length of newly proposed roads since HAIDEP is limited to 76.9 km. As shown in the figure above, many of these new roads follow alignments that are very close to those originally proposed in HAIDEP.

Table 5.3.1 Implementation Status of Urban Road Projects Proposed in HAIDEP

Implementation Status	Road Length (km)
Fully implemented	125.2
Partially implemented	99.5
To be implemented	169.8
Not implemented (Not planned)	244.1
Newly constructed	76.9

Note: CT07 is classified as a regional road and therefore, excluded from the above calculation.
Source: Evaluation Team

The figure below shows congestion locations identified by the Department of Construction. As mentioned earlier, although road development has been progressing steadily, many congestion points remain within Hanoi City. According to the department, there are 20 particularly severe congestion points, of which 4 are considered temporary due to ongoing road construction works. The remaining 16 locations are recognized as having persistent congestion issues. Among these 16, 11 are locations where improvement works have been delayed, three are affected by deficiencies in road facilities, and two suffer from excessive traffic volume.



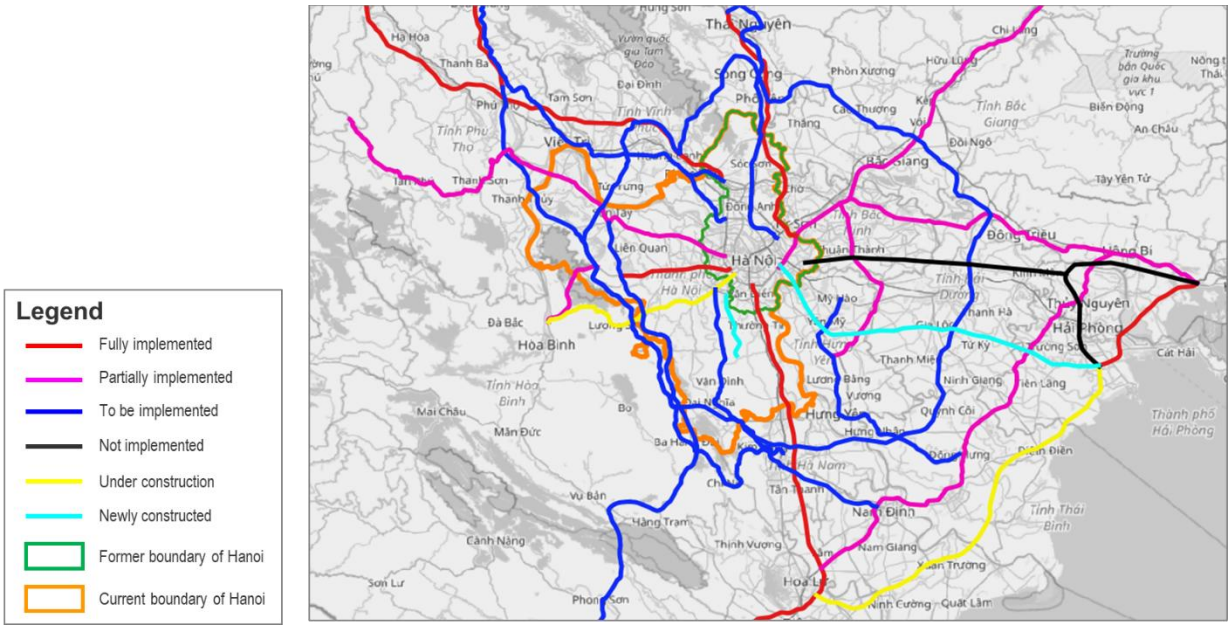
Source: DOC

Figure 5.3.2 Congestion Locations in 2024

5.3.2 Regional Road Projects

The figure below presents a comparison between the regional road projects proposed in HAIDEP and their status. In HAIDEP, regional roads centered on Hanoi were conceptualized as a system of transport corridors, with the fundamental policy to provide a balanced and efficient response to passenger and freight transport demand, while also considering appropriate institutional responsibilities.

Based on this policy, many of the key corridors proposed in the plan have been completed. The only delays in development are in certain ring direction roads. In the case of the east-west corridor between Hanoi and Hai Phong, the alignment was revised to a more southern route than originally proposed in HAIDEP, to better accommodate existing transport demand.



Source: Evaluation Team

Figure 5.3.3 Implementation Status of Regional Road Project

The implementation status of regional road projects around Hanoi City is summarized in the table below. Among the roads proposed in HAIDEP, a total of 583.4km have been fully implemented as planned, while 581.3km have been partially implemented, including modifications such as changes in the number of lanes or partial section development. An additional 1,079.5km is planned for future implementation, and 165.8km are currently under construction. A total of 129.9km has been revised from the original plan. Compared to urban roads, regional roads have seen more progress in development.

Since the completion of HAIDEP, only one newly proposed road has been added, namely a 111.0 km route planned as an alternative to National Highway 19, extending eastward from Hanoi.

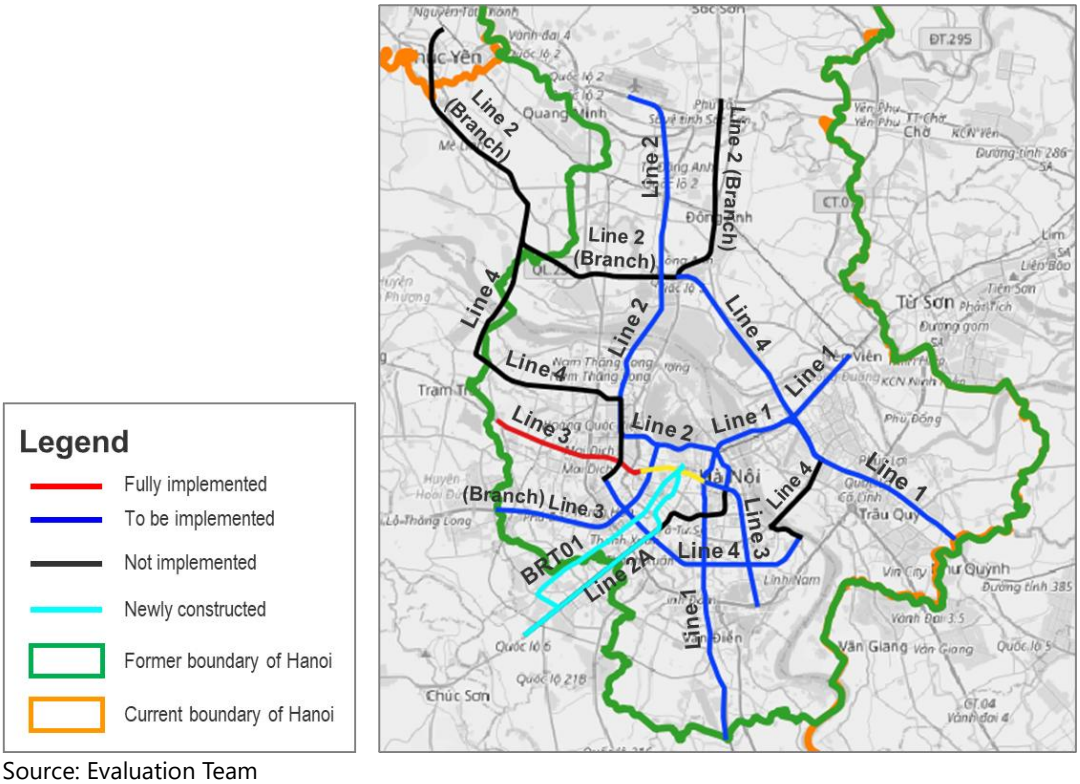
Table 5.3.2 Implementation Status of Regional Road Projects Proposed in HAIDEP

Implementation Status	Road Length (km)
Fully implemented	583.4
Partially implemented	581.3
To be implemented	1,079.5
Under construction	165.8
Not implemented (Not planned)	129.9
Newly constructed	111.0

Note: The total length includes only the routes shown in the above figure.
Source: Evaluation Team

5.3.3 UMRT Projects

In HAIDEP, the development of an UMRT network in Hanoi was proposed, covering a total of 101.2km across Lines 1 to 4. Of these, progress since the formulation of HAIDEP to 2025 shows that Line 1 was the first to be considered, but its development was suspended due to technical and political reasons. As a result, Line 3, with a length of 8.5km, was prioritized and implemented with support from France. Subsequently, Line 2A proposed by the Hanoi Transport Master Plan to 2020 (Decision No. 90/2008/QĐ-TTg), measuring 13.1km, was developed with support from China, and the Line 2 construction project commenced with support from Japan. The figure and table below show the current progress by line, including the total length and a comparison with the HAIDEP proposal.



Source: Evaluation Team

Figure 5.3.4 Implementation Status ofUMRT Projects

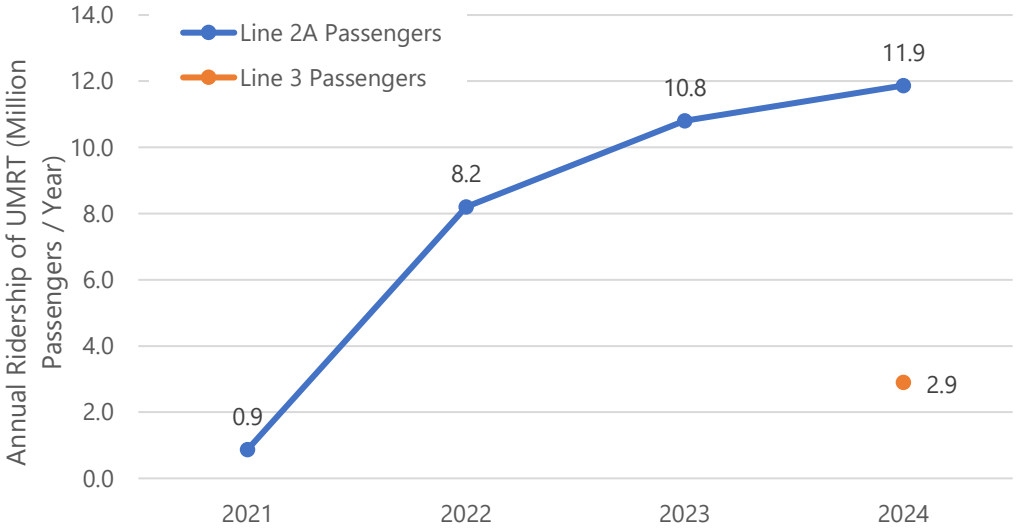
Table 5.3.3 Implementation Status of Urban Rail (UMRT) Projects Proposed in HAIDEP and Other Relevant Projects

Line No.		Length(km)	
		HAIDEP (2020)	2024
Line 1		38.7	-
Line 2	2A		13.1
	Line 2	41.5	-
Line 3		21.0	8.5
Line 4		-	-
Total		101.2	21.6

*Line 2A was not proposed by HAIDEP but is included in the table since it was planned as a branch line with a modified section of Line 2.
Source: Evaluation Team

Based on interviews with MRBs in May 2025 and supporting documents, the completion of Line 2 (proposed in HAIDEP and construction project commenced with support from Japan), Line 3 (underway with support from France), and Line 5 (as outlined in Decision No. 90/2008/QĐ-TTg, see Figure 5.2.1) have been designated as short-term priorities for 2026–2030. In addition, Lines 1 and 4, the extension of Line 2A (proposed in HAIDEP), and studies for new lines are planned for implementation after 2030. Since Hanoi's urban context has changed significantly since HAIDEP was formulated, not all current priorities align with its original proposals. Nonetheless, the four routes proposed in HAIDEP remain central to ongoing progress.

In terms of annual ridership, Line 2A has seen a steady increase in passengers since its opening in 2021, reaching approximately 11.9 million passengers in 2024. In contrast, for Line 3, only data from its opening year in 2024 is available, showing an annual ridership of approximately 2.9 million passengers.

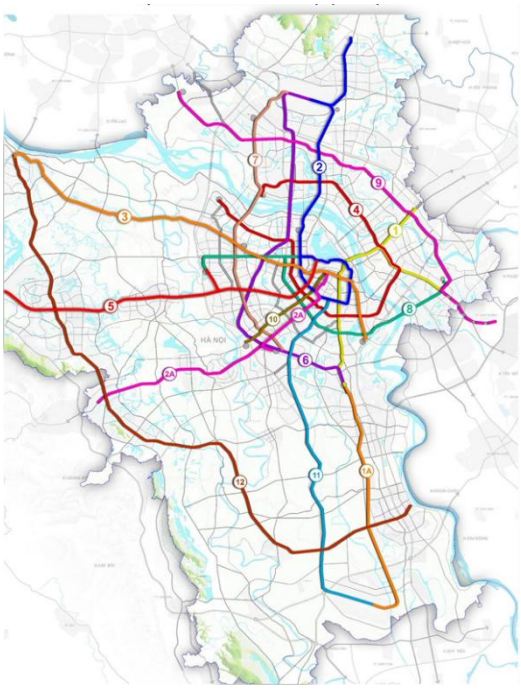


Source: Evaluation Team

Figure 5.3.5 Annual Ridership of UMRT (Million Passengers / Year)

On the other hand, as mentioned in Section 5.2 Status of Formulation of Related Plans after HAIDEP, the UMRT network has been progressively expanded in response to rapid urbanization and increasingly severe traffic congestion in Hanoi. As shown in the figure on the right, the current UMRT network plan is designed to cover the entire city through a combination of radial and circumferential routes.

In particular, the plan sets a target to complete the full development of Line 2 and Line 3, which were among the key routes proposed in HAIDEP, as well as the newly added Line 5 by 2030. These efforts aim to significantly strengthen the role of public transport in the city's overall modal share and establish the foundation for shifting away from automobile dependency.



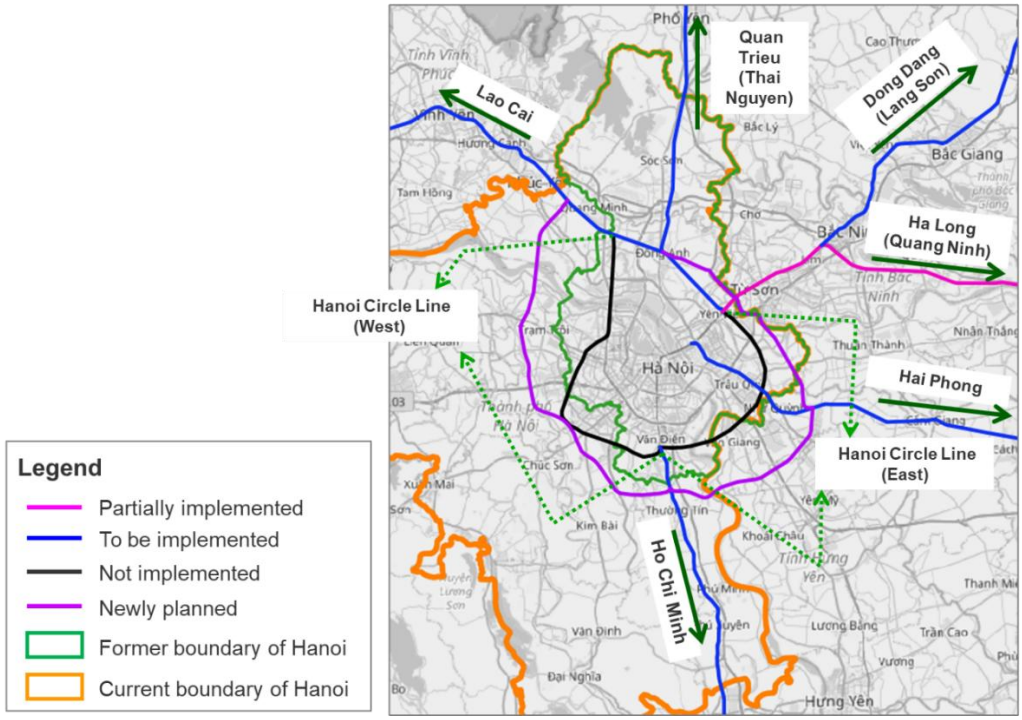
Source: Evaluation Team

Figure 5.3.6 Proposed UMRT Network

5.3.4 Regional Rail Projects

Compared to road projects, rail projects require significantly higher investment costs, which has resulted in relatively slower progress. Nonetheless, planning and construction have been steadily advancing. To ensure smooth rail traffic flow, direct connections between major rail lines are essential.

HAIDEP particularly emphasized the importance of improving the flow of traffic between Hai Phong and Hanoi, as well as addressing missing links in the rail network within the city. In practice, partial implementation has only progressed on the corridor leading toward Hai Phong, underscoring the continued strategic importance of this section. Once the construction and double tracking of the ring rail are completed, it will become possible to efficiently divert, especially freight transport, around the urban core without passing through it.



Source: Evaluation Team

Figure 5.3.7 Implementation Status of Regional Rail Projects

5.3.5 Bus Projects

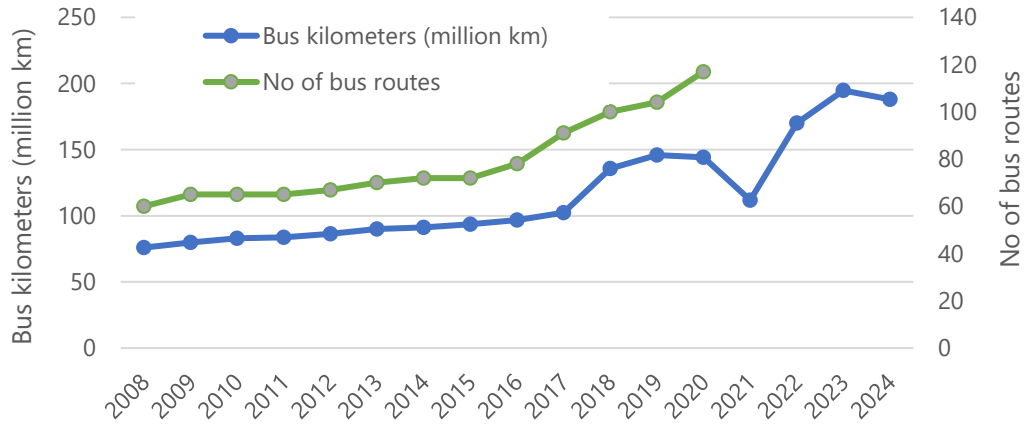
In HAIDEP, the basic policy for bus development proposed a two-tiered network structure, consisting of a primary bus network and a secondary bus network, with each tier designed to reflect its operational characteristics. The primary bus network was intended to provide high-frequency, high-capacity service, with the assumption that some corridors would be converted to UMRT in the future. Once UMRT lines are operational, the primary bus routes are expected to serve as feeders, linking surrounding areas to UMRT stations. Various operational models were proposed, depending on the characteristics of each corridor, ranging from closed systems such as BRT to semi-open and open systems.

The secondary bus network has feeder routes to UMRT as well as local service lines. It aims to provide wide area coverage through a dense network. These routes typically operate on mixed-traffic roads and therefore face constraints in terms of speed and frequency. However, by using standard or small-sized buses, this system was expected to provide flexible and responsive service.

The figure below illustrates trends in Hanoi from 2008 to 2020 in terms of annual bus ridership, number of routes, and bus kilometers (total distance traveled by buses). To ensure access to public transportation for all citizens, Hanoi has expanded its bus network with financial support through operational subsidies. As a result, the number of bus routes has steadily increased, accompanied by growth in both fleet operations and total distance travelled.

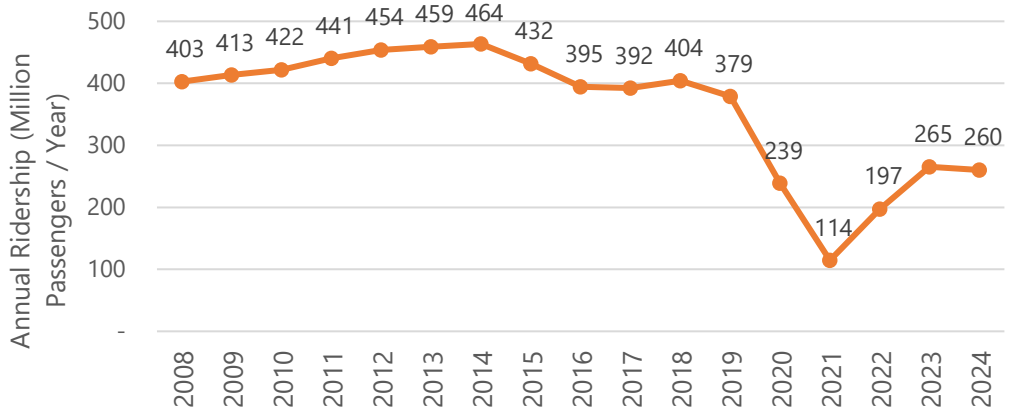
However, annual bus ridership has shown a gradual decline since peaking in 2014. The

situation worsened significantly in 2020 due to the COVID-19 pandemic. Although ridership has been gradually recovering since then, it remains below the 2014 level.



Source: Evaluation Team

Figure 5.3.8 Trend in Number of Bus Routes and Bus Kilometers (2008 to 2020)



Note: Figures do not include passengers using the free pass program for the elderly, which started in 2019.
Source: Evaluation Team

Figure 5.3.9 Trend in Bus Ridership (2008 to 2020)

5.4 Individual Project Results

This section summarizes the results of JICA projects related to urban transportation that were implemented after the formulation of HAIDEP, based on the results of JICA's ex-post evaluations. For projects that have not undergone ex-post evaluation, this is noted in the achievement status.

5.4.1 Road Projects

For the six road-related projects implemented by JICA since the formulation of HAIDEP, the following information is compiled: project name, type of cooperation, project overview, year of completion, implementation status, and achievement status (based on ex-post evaluation).

Table 5.4.1 JICA Projects Implemented after the Formulation of HAIDEP (Road)

No.	Project name	Type of Cooperation	Project Overview	Completion Year	Implementation Status	Achievement Status (As Evaluated at Completion or Post-Completion)
1	Red River Bridge Construction Project	Japanese ODA Loan	The Red River Bridge Project (Phases I to IV) constructed key sections of Ring Road No. 3, including the Red River Bridge, New Duong Bridge, and Phap Van Elevated Road, to address urgent transport needs in Hanoi.	2018 (completion year including additional scope such as Gia Lam, etc.)	Completed	Based on the comparison between actual and target traffic volumes in 2017, Phap Van Flyover achieved a level close to its target, while the Thanh Tri Bridge reached approximately 74 percent of its target. In contrast, the New Duong Bridge recorded a traffic volume about 2.7 times higher than its target. The main reason for the Thanh Tri Bridge falling short of its target is that, by the time of the ex-post evaluation, other bridges crossing the Red River, such as Vinh Tuy Bridge and Nhat Tan Bridge, both constructed with Japanese ODA loans, had been newly opened to traffic, resulting in the redistribution of traffic across these alternative routes.
2	Hanoi Ring Road No. 3 Development Project	Japanese ODA Loan	The Ring Road No. 3 project built and upgraded approximately 9 km between the National Highway No. 32 junction and the north side of Linh Dam Lake, improving traffic flow in western Hanoi.	2016 (completion year including additional works such as underpasses and elevated roads)	Completed	The comparison of actual and target traffic volumes in 2015 shows that the section between Trung Hoa Interchange and Thanh Xuan Interchange, which was expected to have the highest traffic volume within the project area, achieved 79.72 percent of the target value of 95,000 PCU per day. Regarding travel time reduction, the measurement section was the same as the one defined during the appraisal, and the actual result was approximately 1.5 times better than the target. These findings indicate that the project generally produced the intended effects as planned.
3	Hanoi City Ring Road No. 3 Development Project (Mai Dich - South Thang Long Section)	Japanese ODA Loan	The North–South Connection Segment Project improved continuity on Ring Road No. 3 by linking disconnected sections, easing congestion across the city.	2018	Completed	Although a formal project evaluation has not been conducted, this project set average daily traffic volume and travel time as key performance indicators. For 2020, the target traffic volume was 29,077 PCU per day on the expressway and 45,992 PCU per day on general roads, aiming to reduce congestion by shifting traffic from general roads to the expressway. In terms of travel time, the baseline value for general roads in 2012 was 15 minutes, while the 2020 target was 8 minutes, indicating that the project was expected to achieve a significant reduction in travel time. Furthermore, the Economic Internal Rate of Return (EIRR) was calculated at 22.1 percent, far exceeding the standard threshold for economic viability. This suggests the project is expected to deliver strong impacts in both traffic diversion and travel time reduction.

No.	Project name	Type of Cooperation	Project Overview	Completion Year	Implementation Status	Achievement Status (As Evaluated at Completion or Post-Completion)
4	Nhat Tan Bridge Construction Project (Vietnam-Japan Friendship Bridge)	Japanese ODA Loan	The Red River Crossing Bridge Project built a 3,084-meter bridge to improve access between central Hanoi and Noi Bai International Airport	2014	Completed	The average daily traffic volume in 2017 appears to have met the target value set for 2016. Moreover, based on the 2020 traffic survey results, traffic volume has continued to increase, indicating that the project has effectively responded to travel demand between central Hanoi and its northern areas. In addition, the reductions in travel time and vehicle operating costs significantly exceeded target values. This outcome is attributed to both a higher-than-expected share of vehicles in total traffic and an overall traffic volume that surpassed the original demand forecasts.
5	Noi Bai International Airport to Nhat Tan Bridge Connecting Road Construction Project (1)	Japanese ODA Loan	The Connecting Road Construction Project built 12.1km of road between Noi Bai Airport and Nhat Tan Bridge to reduce travel time and support airport access.	2015	Completed	The target values for operational and impact indicators two years after project completion (2017) were calculated based on traffic surveys and analysis. A follow-up survey was conducted in November 2020, and the results suggest that the 2017 targets were achieved by 2020. Specifically, while the average daily traffic volume on Nhat Tan Bridge was 139,398 PCU per day, the newly constructed road between Nam Hong IC and Noi Bai International Airport recorded 74,507 PCU per day. This implies that approximately half of the traffic crossing Nhat Tan Bridge is now using the connecting road. Therefore, the project has partially achieved its objective of enhancing transport capacity between central Hanoi and Noi Bai International Airport. Furthermore, reductions in travel time and vehicle operating costs significantly exceeded the original targets due to both a higher share of automobiles and overall traffic volume surpassing demand forecasts.
6	The New National Highway No.3 and Regional Road Network Construction Project (1)	Japanese ODA Loan	The National Highway No. 3 Improvement Project widened and upgraded 61.3km of road between Hanoi and Thai Nguyen to handle growing traffic and improve safety.	2014	Completed	The project involved the construction of a bypass road and surrounding roads along National Highway 3, connecting Hanoi and Thai Nguyen, to address increasing traffic volumes, improving user convenience, and ensuring road safety. In addition, the project contributed to enhancing logistics efficiency and improving the livelihoods of residents, including low-income groups. As of 2016, the quantitative outcomes show that the average annual daily traffic volume was 5000 vehicles on the existing highway (achievement rate 78 percent) and 20,100 vehicles on the new highway (achievement rate 75 percent). Travel time was reduced by 22 minutes and 38 seconds on the existing route (achievement rate 100 percent), and vehicle operating cost savings reached 247.37 billion dong

No.	Project name	Type of Cooperation	Project Overview	Completion Year	Implementation Status	Achievement Status (As Evaluated at Completion or Post-Completion)
						(achievement rate 101 percent), indicating that the project largely met its targets.

Source: Evaluation Team

5.4.2 Public Transport Projects

For the five projects implemented by JICA after the formulation of HAIDEP, the project name, form of cooperation, project overview, completion year, implementation status, and achievement status (based on ex post evaluations) are summarized.

Table 5.4.2 JICA Projects Implemented after the Formulation of HAIDEP (Public Transport)

No.	Project name	Type of Cooperation	Project Overview	Completion Year	Implementation Status	Achievement Status (As Evaluated at Completion or Post-Completion)
1	Project for studying the implementation of integrated UMRT and urban development for Hanoi in Vietnam	Technical Cooperation	While the construction of UMRT Line 1, Line 2A, and Line 3, as proposed in HAIDEP, has progressed, there was a lack of knowledge and experience regarding the establishment of an organization responsible for the operation and maintenance of the UMRT. Therefore, support was provided for institutional development and enhancement of the regulatory and operational capacity of the Hanoi Metropolitan Rail Management Board (MRB).	2016	Completed	・Output 1 (Strengthening the capacity of the urban rail regulatory body): Largely achieved through the establishment of the Operation and Maintenance Division within MRB and the preparation of a proposal. ・Output 2 (Development of fare and subsidy determination system): Largely achieved through the preparation of a fare policy proposal and establishment of a subsidy determination method. ・Output 3 (Development of operation planning and safety management system): Largely achieved through the development of relevant guidelines. ・Output 4 (Clarification of handover conditions for Line 2A): Achieved. ・Output 5 (Registration of the O&M company): Achieved with the official registration of HMC in June 2015. ・Output 6 (Formulation of O&M company regulations): Largely achieved.
2	Hanoi City Urban Railway Construction Project (Line 1) Phase I - Ngoc Hoi Complex	Japanese ODA Loan	Construction project of UMRT Line 1 (Hanoi Station to Gia Lam), proposed in HAIDEP, which involves developing an urban rail line along the north-south axis of the city center.	2012 to Present (Suspended)	Suspended	No ex-post evaluation has been conducted due project suspension. A loan agreement (L/A) was signed in 2012 under the Japanese ODA loan scheme. The original plan was to develop the line in phases from the city center to Van Canh (Gia Lam), but the project has been suspended due to delays in urban planning coordination, funding issues, and land acquisition procedures.
3	Hanoi City Urban Railway Construction Project (Nam Thang Long - Tran Hung Dao Section (Line 2))	Japanese ODA Loan	Construction project of part of UMRT Line 2 (Nam Thang Long to Tran Hung Dao), which connects Noi Bai Airport to the city center, as proposed in HAIDEP.	2009 to Present (Ongoing)	Ongoing	No ex-post evaluation has been conducted as the project is still under implementation. A loan agreement (L/A) was signed in 2009 under the Japanese ODA loan scheme, with the initial plan aiming for construction completion in 2016 and the opening in 2017. However, the planned station in the Old Quarter area (around Hoan Kiem Lake) conflicted with heritage conservation regulations, requiring a review of the station location and route alignment. As a result, the project was suspended. Following design modifications and coordination of administrative

No.	Project name	Type of Cooperation	Project Overview	Completion Year	Implementation Status	Achievement Status (As Evaluated at Completion or Post-Completion)
						procedures, the construction project commenced in October 2025. Currently, redesign and land acquisition are underway.
4	Project for Improving Public Transportation in Hanoi	Technical Cooperation	As part of promoting a modal shift to public transport proposed in HAIDEP, this project aimed to enhance the implementation capacity of relevant Hanoi authorities for promoting public transport use, and to increase the number of public transport users while improving the convenience and comfort of bus services.	2015	Completed	The project aimed to enhance the capacity of relevant Hanoi authorities to implement public transport policies. While safety driving and customer service training for bus drivers and a pilot introduction of IC card systems were implemented, the timetable-based operation was limited to providing departure time information only, and the bus priority lane initiative was not carried out. Thus, only partial achievement was recognized. ・ Travel time and speed: No improvement was confirmed. The average traffic speed in the city has shown a declining trend, indicating the target was not achieved. ・ Public transport ridership and modal share: Although total public transport ridership declined by 6 percent, the shift to BRT increased, indicating partial achievement. ・ User satisfaction: Although no comparative data exists, a 2016 survey showed that about 21 percent rated service as “good” or “somewhat good,” about 50 percent as “average,” and about 30 percent as “somewhat poor” or “poor,” suggesting partial achievement.
5	Project for Supporting Development of Interoperable Smart Card System for Public Transportation in Hanoi	Technical Assistance under Japanese ODA Loan	Technical support for the design and institutional development of an interoperable IC card system for urban rail, BRT, and bus services.	2021	Completed	No ex-post evaluation has been conducted. However, design guidelines and specifications for the interoperable IC card system, as well as fare policy directions, were formulated through information gathering, drafting, inter-agency consultations, and the organization of seminars. In addition, the scope of responsibilities for the Fare Management Center (FMC) and the roles and responsibilities of each department were defined, and the Terms of Reference for the organization were prepared following consultations with relevant agencies.

Source: Evaluation Team

5.5 Beneficiary Survey

5.5.1 Selection of Survey Respondents and Their Basic Characteristics

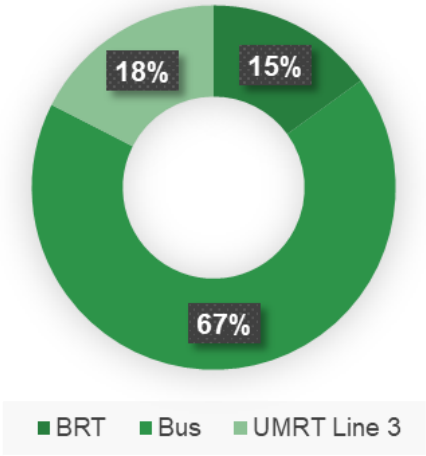
(1) Selection of Survey Respondents

The beneficiary survey on urban transportation targeted a total of 71 individuals, consisting of 40 public transport users and 31 road users, and was conducted through interview-based methods. The benefits generated by HAIDEP in the urban transportation sector tend to spread widely across the entire city of Hanoi rather than being limited to specific user groups. On the other hand, since it is difficult to obtain accurate assessments from individuals who do not use a particular project daily, this survey adopted a method that gathered diverse opinions on urban transportation in general while intentionally distributing respondents across users of the major projects listed below.

Table 5.5.1 Survey Respondents in the Beneficiary Survey

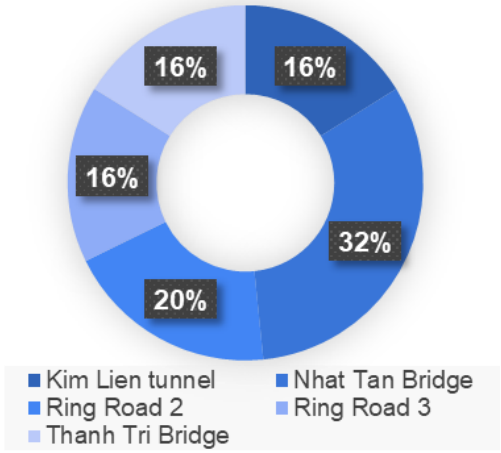
Respondent Category		Sample Size	
Public Transport Users	BRT	6	40
	UMRT Line3	7	
	Bus	27	
Road Users (mainly taxi drivers)	Kim Lien Tunnel	5	31
	Nhat Tan Bridge	10	
	Hanoi Ring Road No 2	6	
	Hanoi Ring Road No 3	5	
	Red River Bridge	5	

Source: Evaluation Team



Source: Evaluation Team

Figure 5.5.1 Survey Locations (Public Transport Users),n=40



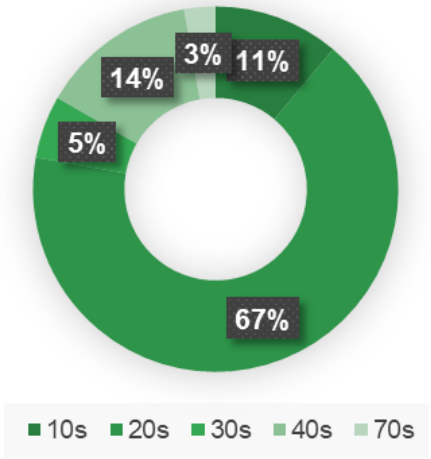
Source: Evaluation Team

Figure 5.5.2 Survey Locations (Road Users),n=31

(2) Basic Characteristics of Respondents

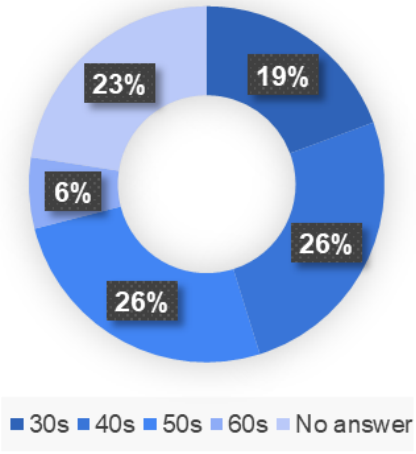
To avoid biased opinions, the survey considered gender balance and a wide range of age groups. The summary of basic attributes of the interview respondents from both public transport and road user groups is shown in the figure below. While a relatively large number

of respondents were in their twenties, interviews were conducted across a broad age range, including those in their thirties and forties.



Source: Evaluation Team

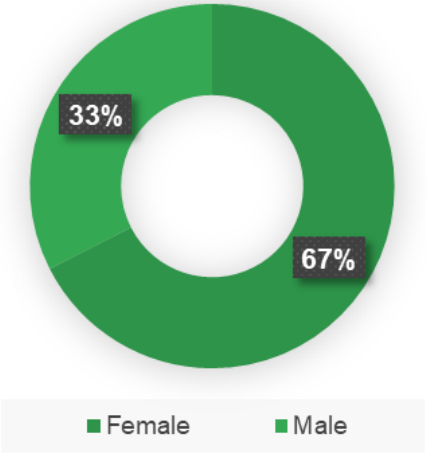
Figure 5.5.3 Age Distribution (Public Transport Users),n=36



Source: Evaluation Team

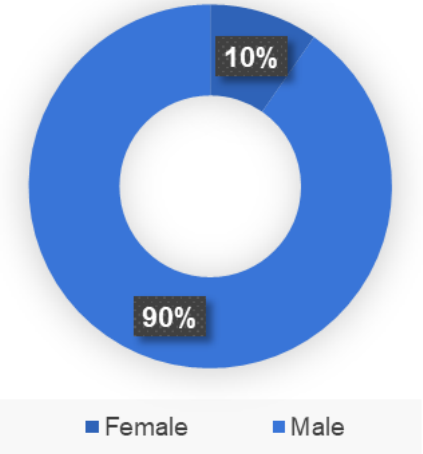
Figure 5.5.4 Age Distribution (Road Users),n=31

As shown in the figure below, both male and female respondents were interviewed. However, since road users were primarily taxi drivers, the proportion of female respondents in this group is relatively low.



Source: Evaluation Team

Figure 5.5.5 Gender Distribution (Public Transport Users),n=40



Source: Evaluation Team

Figure 5.5.6 Gender Distribution (Road Users),n=31

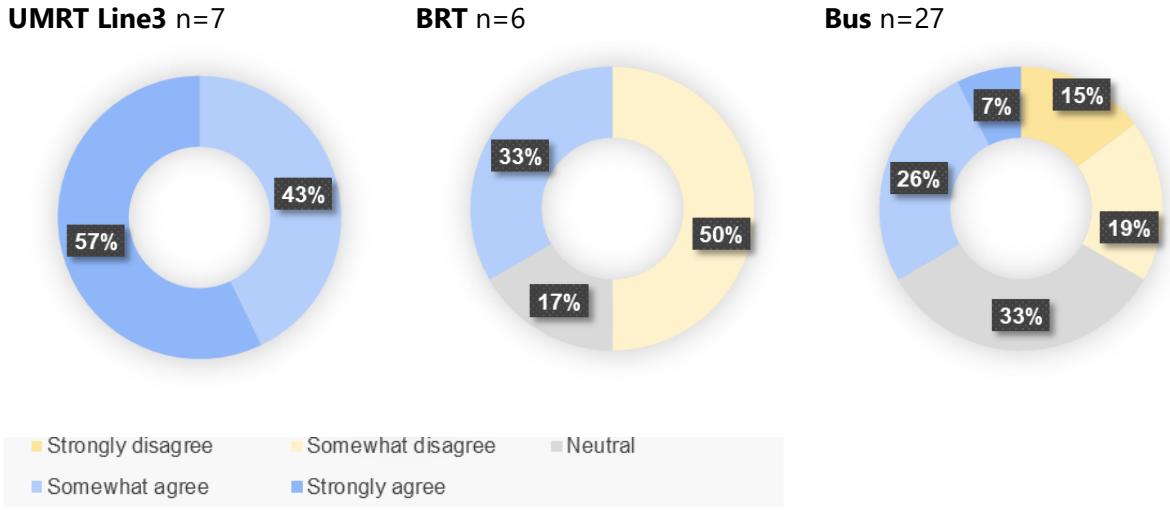
5.5.2 Public Transport

(1) Travel Time Reduction Resulting from Project Implementation

The results regarding travel time reduction for each public transport project are shown in the figure below. Although the sample size is insufficient for detailed analysis by transport mode, many respondents recognized that UMRT has contributed significantly to reducing travel

time. On the other hand, several negative opinions were expressed regarding the time-saving effects of BRT and buses.

In particular, the relatively low evaluation of BRT, which is constructed with dedicated lanes and is expected to be less affected by road congestion, can be attributed to insufficient connectivity with other modes. As a result, the time required for transfers is perceived to limit the overall effectiveness of reducing total travel time.

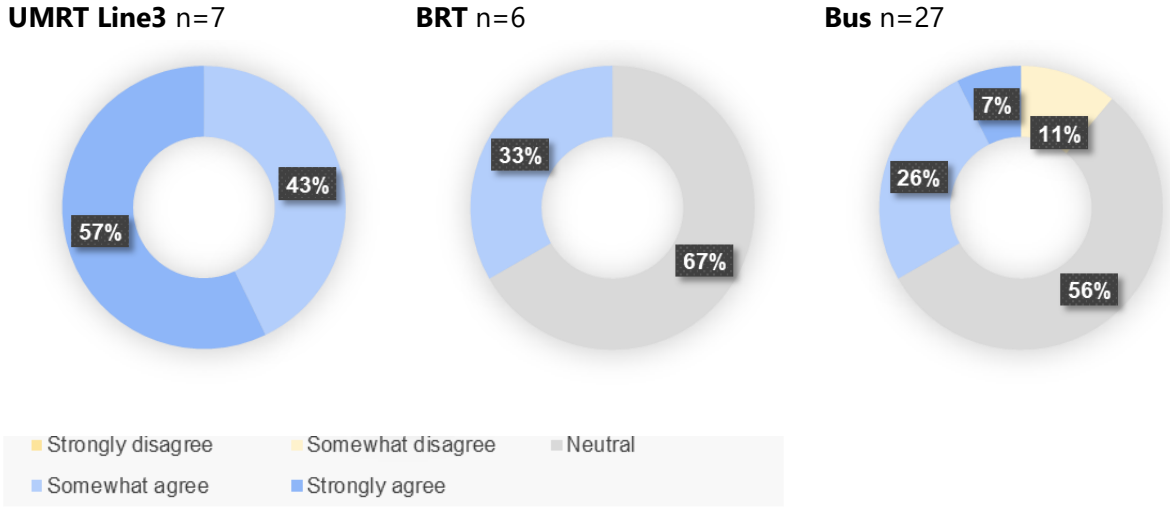


Source: Evaluation Team

Figure 5.5.7 Benefits of Travel Time Reduction by Each Project

(2) Travel Time Reliability Resulting from Project Implementation

The results regarding improvements in travel time reliability from each public transport project are shown in the figure below. For UMRT, many respondents recognized improvements in travel time reliability. In contrast, for BRT and buses, although some respondents acknowledged improved reliability, a significant number of them did not perceive any development or even felt that reliability had worsened.

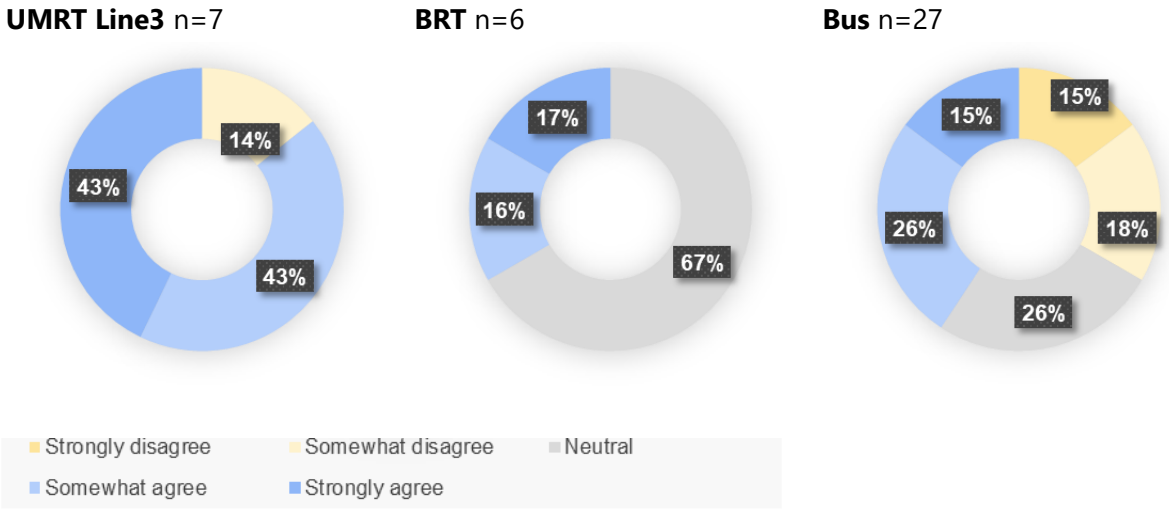


Source: Evaluation Team

Figure 5.5.8 Benefits of Each Project on Travel Time Reliability

(3) Travel Comfort Resulting from Project Implementation

The results regarding the improvement of travel comfort from each public transport project are shown in the figure below. Many respondents perceived that travel comfort had improved with the implementation of UMRT. In contrast, while some respondents reported improved comfort for BRT and buses, a significant number indicated that they did not feel any improvement.

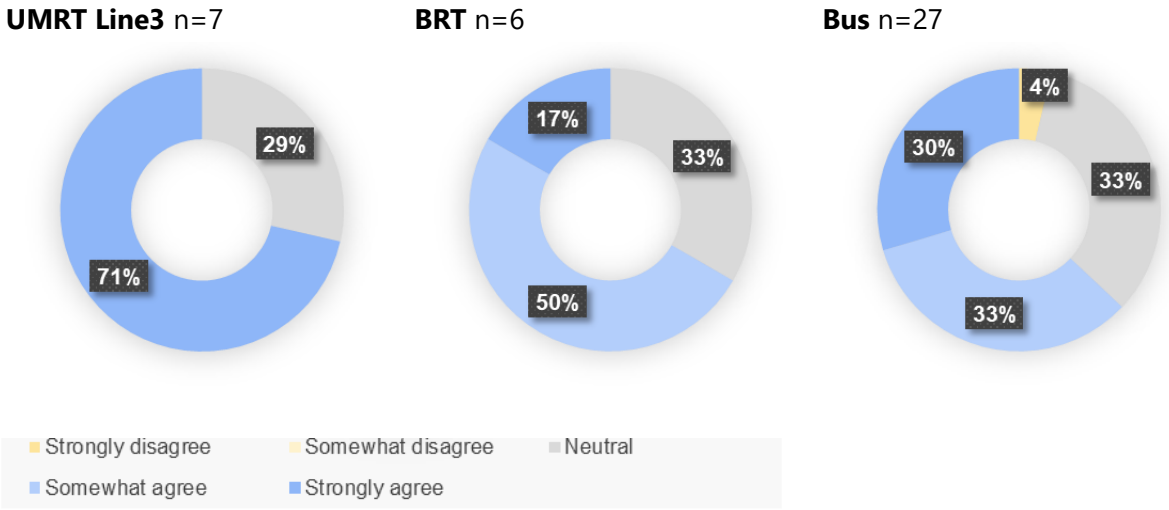


Source: Evaluation Team

Figure 5.5.9 Benefits of Each Project on Travel Comfort

(4) Travel Safety Resulting from Project Implementation

The results on travel safety improvements from each public transport project are shown in the figure below. While some respondents felt that buses had not contributed to enhanced safety, the majority evaluated them as contributing positively to safer travel. Particularly, UMRT received numerous “strongly agree” responses, indicating a high level of satisfaction with its contribution to safety improvements.

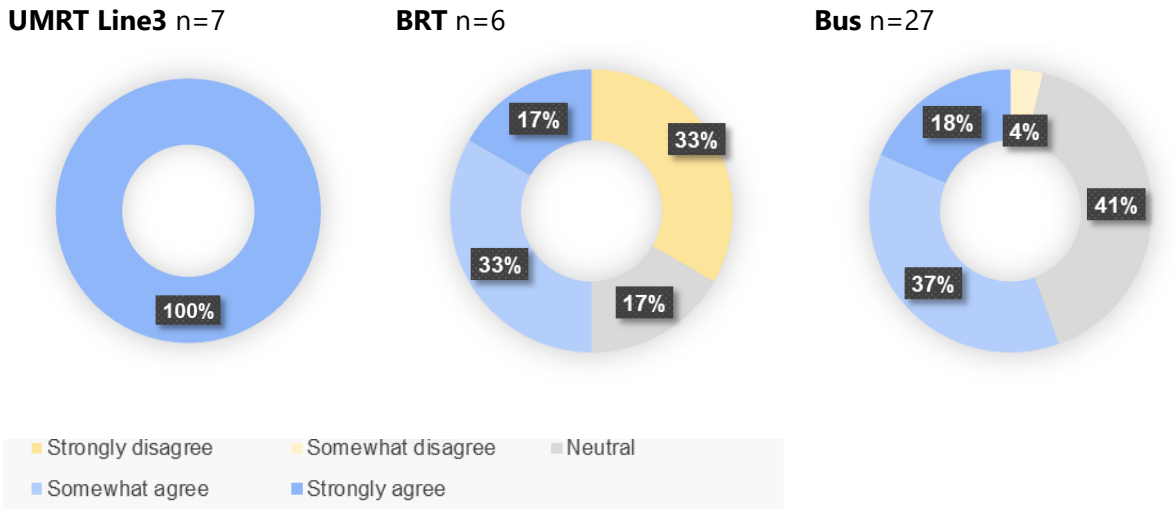


Source: Evaluation Team

Figure 5.5.10 Benefits of Each Project on Travel Safety

(5) Travel Cost Reduction Resulting from Project Implementation

The results on travel cost reduction from each public transport project are presented in the figure below. For UMRT, many respondents recognized that the project reduced their travel costs. In contrast, while some users reported cost reductions from BRT and bus services, a notable portion stated that they did not experience any benefits. The evaluation of travel cost reductions varies depending on the travel routes and mode of transport used as a basis for comparison; however, the survey results confirm that a significant number of users perceived cost-saving effects.

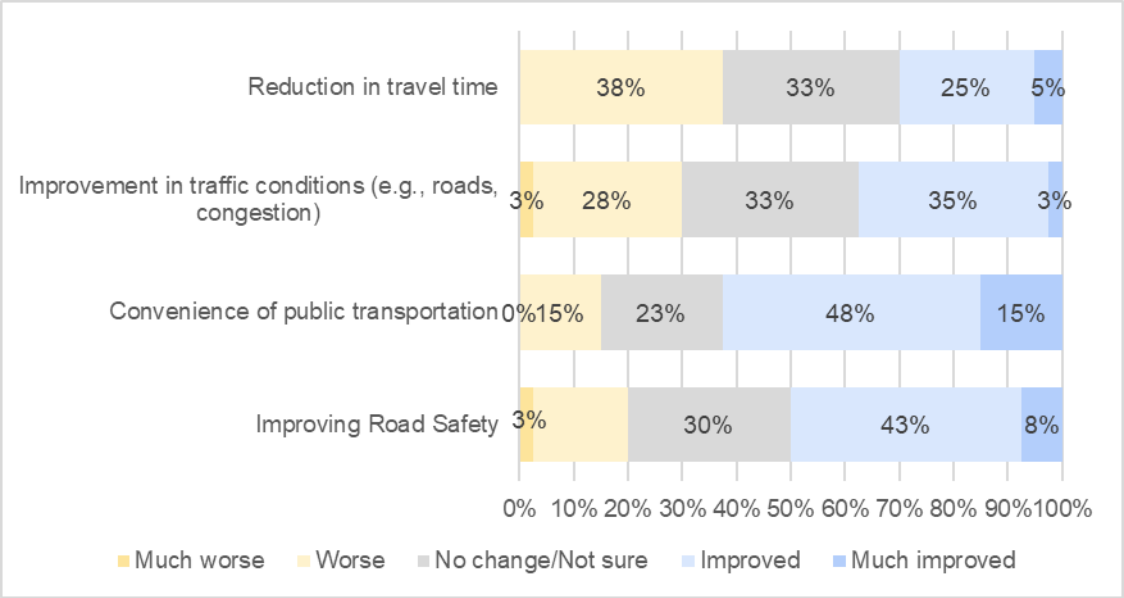


Source: Evaluation Team

Figure 5.5.11 Benefits of Each Project in Reducing Travel Costs

(6) Changes in Public Transport in Hanoi over the Past Twenty Years

Interviews were conducted to assess changes in Hanoi's traffic situation over the past 20 years, focusing on travel time, road congestion, public transport convenience, and traffic safety. The results are summarized in the table below. As discussed in section 5.3 on the implementation status of HAIDEP proposed projects, the overall improvement of public transport and road infrastructure appears to have contributed to better traffic conditions. In particular, many public transport users reported perceived improvements. Notably, the enhancement of public transport convenience received high ratings, suggesting that improvements in public services are recognized as tangible benefits, especially in light of the increasing road congestion in the city.



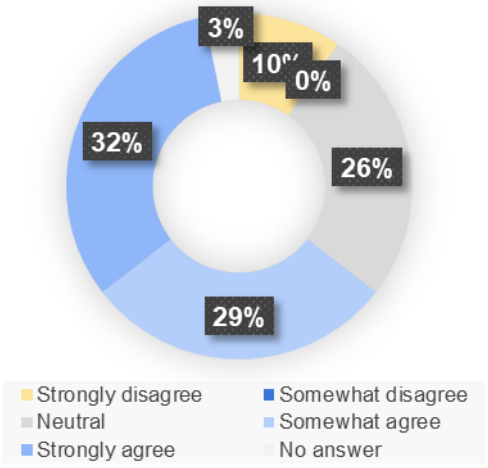
Source: Evaluation Team

Figure 5.5.12 Changes in Traffic Situation in Hanoi over the Past Twenty Years (n=40, respectively)

5.5.3 Road Transport

(1) Travel Time Reduction of Project Implementation

In Hanoi City, the road sector has long played the primary role in accommodating growing transport demand due to delays in the development of the urban railway network. Although severe traffic congestion remains an unresolved issue, the summary of user responses on the right regarding travel time reduction from road projects shows that 51 percent of respondents felt a positive effect on travel time, 26 percent answered, "neither agree nor disagree," and only 10 percent disagreed. This indicates that many users have a generally favorable view of road projects. In particular, the road projects targeted in the survey have contributed not only to increasing the city's overall transport capacity but also to alleviating congestion and expanding route options through the development of trunk and ring roads.

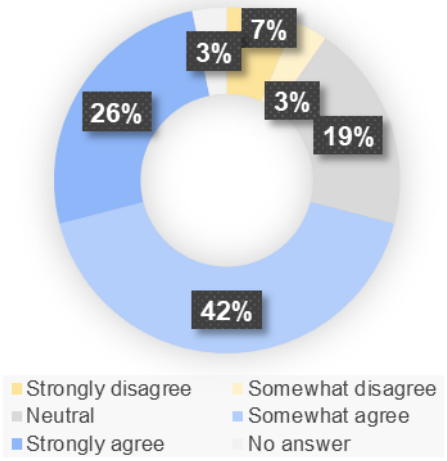


Source: Evaluation Team

Figure 5.5.13 Benefits of Road Projects on Travel Time Reduction, n=31

(2) Travel Time Reliability Effect of Project Implementation

According to the interview results on the improvement of travel time reliability due to road projects, 68 percent of respondents answered that "travel time reliability has improved," while 19 percent answered "neutral," and 10 percent answered "disagree." This implies that many users hold a positive view of road projects in terms of improving travel time reliability.



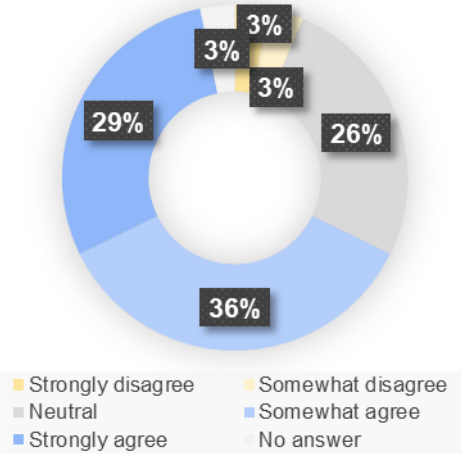
Source: Evaluation Team

Figure 5.5.14 Benefits of Road Projects on Travel Time Reliability,n=31

Improved travel time reliability contributes to a reduction in the buffer time required for travel, thereby effectively shortening total travel time. Therefore, the previous evaluation of "travel time reduction" also likely includes the effect of improved reliability to some extent. In particular, the development of trunk roads and ring roads may have contributed to this evaluation by reducing the frequency of unexpected congestion and the variability in travel time.

(3) Travel Comfort Improvement through Project Implementation

According to the interview results on travel comfort improvement due to road projects, 65 percent of respondents answered that "travel comfort has improved," while 26 percent answered "neutral," and 6 percent answered "disagree." This implies that many users hold a positive view of road projects in terms of improving travel comfort.



Source: Evaluation Team

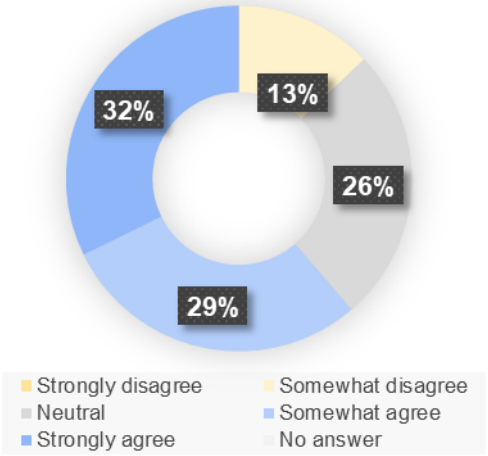
Figure 5.5.15 Benefits of Road Projects on Travel Comfort,n=31

Before the implementation of the surveyed road projects, many users reported that they had to take long detours, use narrow local roads to avoid congestion, or travel on poorly maintained roads. The resolution of these issues contributed to the high level of positive evaluation observed in the survey.

(4) Travel Cost Reduction through Project Implementation

According to the interview results on travel cost reduction due to road projects, 61 percent of respondents agreed that travel cost decreased, while 26 percent were neutral, and 13 percent disagreed, suggesting that many users hold a positive evaluation of road projects in terms of reducing travel costs.

This trend is consistent with the evaluation of comfort improvement. Before the implementation of the surveyed road projects, users were often forced to take long detours, travel on narrow local roads to avoid congestion, or pass through poorly maintained roads. The improvement of these conditions resulted in shorter travel distances and reduced travel time, which contributed to better fuel efficiency and lower fuel consumption. These changes are considered the main factors behind the recognized cost-saving effects.



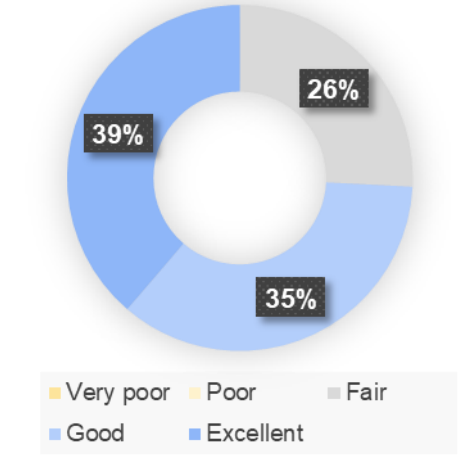
Source: Evaluation Team

Figure 5.5.16 Benefits of Road Projects on Travel Cost Reduction,n=31

(5) Improvement in Safety through Project Implementation

According to the interview results on improved safety due to road projects, 74 percent of respondents agreed that safety has improved, and 26 percent were neutral. Compared to other survey items, this shows the highest level of perceived improvement, with no respondents feeling that safety had worsened.

This result reflects a significant improvement in safety from the drivers' perspective due to more stable driving environments after the implementation of road projects, including improved road surfaces, clearer lane markings, and upgraded intersections. Additionally, reduced congestion and fewer forced detours contributed to a decrease in accident risks, further supporting the positive perception of safety improvements.



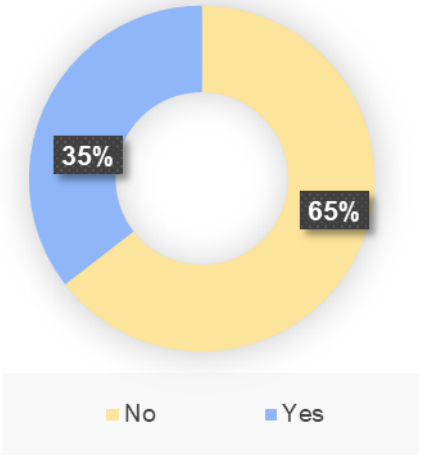
Source: Evaluation Team

Figure 5.5.17 Benefits of Road Projects on Travel Time Reduction

(6) Awareness of Japanese Projects

Since this interview survey targeted drivers who use road projects supported by Japan, respondents were also asked whether they were aware that these projects were funded by Japanese assistance. The results showed that 35 percent of respondents recognized the projects as being supported by Japan, indicating a certain level of public awareness.

This level of recognition is notable given that road infrastructure is a type of public good used in daily life, and in many cases, the source of foreign assistance is not clearly known. The relatively high awareness of Japan's involvement in these projects suggests a positive visibility of Japanese aid.



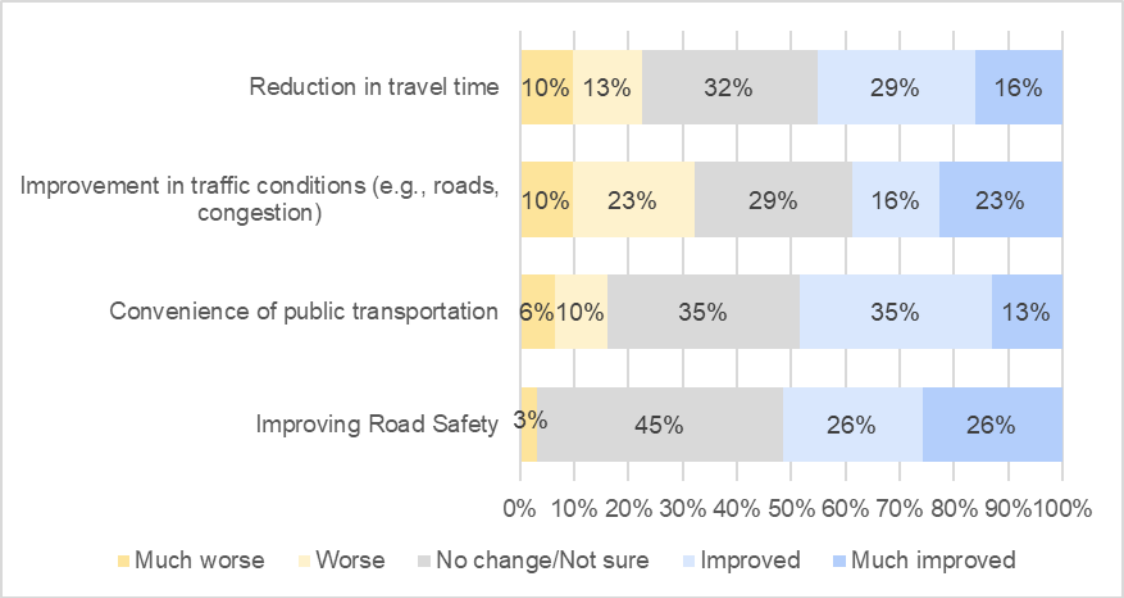
Source: Evaluation Team

Figure 5.5.18 Awareness of Japanese Projects,n=31

(7) Changes in Road Transport in Hanoi over the Past Twenty Years

Over the past twenty years, a hearing survey was conducted in Hanoi City to assess changes in the traffic situation from the perspectives of travel time, road congestion, public transport convenience, and traffic safety. The aggregated results are presented in the table below. As described in Section 5.3 on the implementation status of HAIDEP-proposed projects, various public transport and road-related projects have been carried out, and the survey confirms certain positive outcomes.

For all questions, around half of respondents answered that the situation has "improved," followed by "neutral" at 29 to 45 percent, while those who answered "worsened" accounted for only around 10 to 20 percent. However, in questions related to travel time and road congestion, the share of negative responses was slightly higher than for other categories, indicating that traffic congestion remains a persistent issue in the city.



Source: Evaluation Team

Figure 5.5.19 Benefit of Each Project on Reduction of Travel Cost(n=31, respectively)

5.6 Summary of Chapter 5

Based on the above findings, this section presents an overall evaluation of the urban transportation subprogram proposed in HAIDEP.

(1) Planning Approach

Urban transportation planning in Hanoi is reviewed every five to ten years. Due to this cyclical nature, it is not appropriate to compare or verify the contents proposed in HAIDEP with the current situation. However, interviews with government officials and local consultants confirmed that subsequent plans were formulated with reference to the HAIDEP proposals, indicating a certain level of technology transfer in planning methodology. In addition, the major concepts set out in the HAIDEP transport sub-sector program, such as 'ensuring equal and safe mobility and accessibility for all citizens', were carried forward from HAIDEP. At the same time, the statistical data and monitoring indicators, which serve as the foundation for effective planning, have not been sufficiently developed or accumulated. As a result, urgent issues remain, including the institutionalization of regular data collection, such as traffic surveys, and the implementation of fundamental studies needed for planning. Creating an institutional and technical environment that enables planning based on scientific evidence is an immediate priority.

(2) Achievement Status of the Subsector Program Objectives

As discussed earlier, Hanoi's urban transportation plans have several revisions, making it inappropriate to directly compare them with the original HAIDEP framework. Notably, HAIDEP's Basic Strategy 4 emphasized the development of modern, competitive urban centers capable of attracting diverse investment, generating employment, and enhancing access to essential services. The limited progress in urban development relative to these

objectives contributed to the partial implementation of associated transport sub-sector programs, which also aimed to mitigate traffic concentration in the city center.

Nevertheless, a substantial number of public transport and road infrastructure projects proposed under HAIDEP have been implemented. Beneficiary survey results indicate that a majority of respondents perceive these interventions as having contributed to improved traffic conditions, and they are widely recognized as being supported by Japan.

From a quantitative standpoint, modal share remains a key indicator of progress. According to the "Development Plan for Urban Public Transport Modes in the Period 2021–2030" (No. 201/KH-UBND) issued by the Hanoi People's Committee, the bus modal share in 2019 was recorded at 8.7 percent, while the overall public transport share—including taxis and similar modes—reached 17.03 percent. These figures fall short of HAIDEP's 2020 target of 14.5 percent for only bus usage, which was under the assumption that the UMRT system would not yet be operational. While there has been a slight improvement from the 2005 baseline of 6.7%, the progress is still modest. This indicates that the intended modal shift has not yet been fully achieved.

On the other hand, there has been clear progress toward the sub-sector program's goal of promoting safe and equitable mobility for all. Bus routes and service coverage have steadily expanded, which leads to measurable improvements in local accessibility and transport equity. Although the modal share targets have not yet been reached, these developments show meaningful alignment with HAIDEP's original vision for inclusive service delivery.

(3) Promotion of Rail Development Integrated with Urban Development

Over the past two decades, one of the most prominent aspects of urban transportation development in Hanoi has been the steady expansion of road infrastructure, in contrast to considerable delays in the UMRT Lines. These delays were partly caused by unavoidable challenges, including the need to redesign routes that overlapped with heritage conservation areas. However, as traffic congestion intensifies and the demand for modal shifts grows, accelerating the development of UMRT has emerged as a pressing policy priority. This calls for a more integrated approach that aligns rail expansion with broader urban development strategies.

In particular, Hanoi has demonstrated a strong demand for rail station development that is closely integrated with urban planning, including the design of station plazas and surrounding areas. There is growing momentum for UMRT expansion, with a clear emphasis on TOD. While steady progress continues on Line 2, it is essential to accelerate the implementation of other priority lines, such as Line 5, to meet long-term mobility and urban growth objectives.

In suburban areas where a defined urban structure has yet to emerge, gradual expansion is anticipated. To guide this growth effectively, it is essential to integrate urban structure planning with rail and road network development from an early stage. Coordinated planning

between transportation systems and land use will support the creation of a sustainable and highly accessible urban environment.

(4) Improving Traffic Flow at Urban Bottlenecks

As previously noted, while steady progress has been made in expanding the road network, many intersections within the city continue to suffer from congestion and remain key bottlenecks in urban transportation, as outlined in Section 5.3.1 on urban road projects. However, the identification of these bottlenecks has not yet been grounded in quantitative measures such as traffic volume surveys or demand forecasts. Current responses tend to be subjective and localized. To address this issue more effectively, a comprehensive analysis of the entire urban transportation system is needed—one that prioritizes interventions based on data and supports the development of a targeted and strategic action plan.

Looking ahead, enhancing traffic management through digital transformation (DX) and reinforcing traffic safety measures will be critical to improving urban mobility. It involves the collection and analysis of real-time traffic data, the optimization of traffic signal control systems, and the implementation of measures to discourage traffic violations. Together, these efforts can help alleviate congestion at key locations and contribute to a safer and more efficient road environment.

During the transitional phase before the full-scale development of the urban rail system, improving connectivity among existing public transport services remains a pressing challenge. Stronger integration is essential between the UMRT and bus networks, Bus Rapid Transit (BRT) systems and buses or motorcycles, and conventional buses and motorcycles. To support this integration, coordinated scheduling, enhanced passenger information systems, and upgraded transfer facilities at major interchange points will be essential. These measures are expected to encourage greater use of public transport, reduce traffic congestion, and improve the overall efficiency of the urban transportation network.

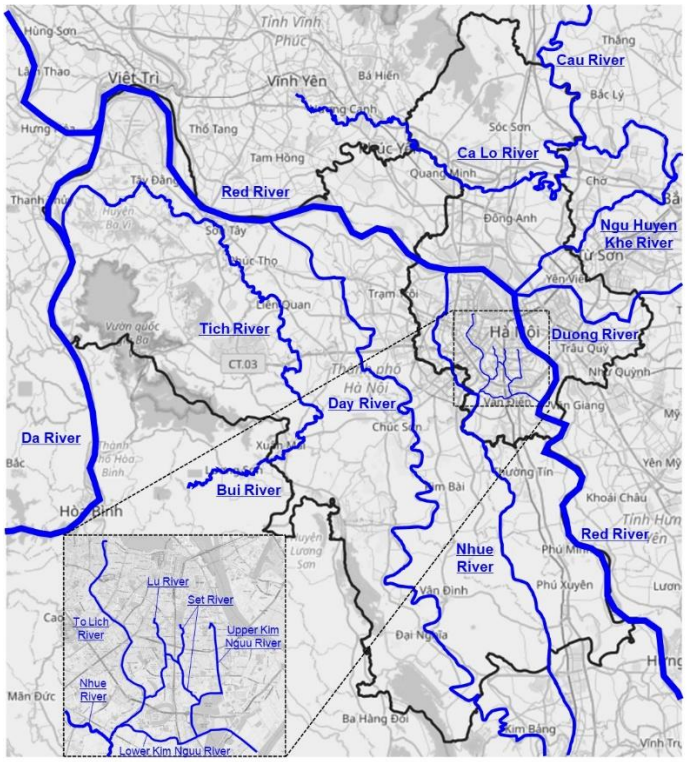
(5) Improvement of Bus Service

As previously discussed, although the expansion of bus routes has contributed to certain service improvements, it has not led to a substantial increase in ridership, and overall user satisfaction remains relatively low. Moreover, the ongoing financial burden of government subsidies for bus operations focuses on the urgent need to balance service quality enhancements with fiscal sustainability to achieve long-term growth in public transport usage.

In Hanoi, motorcycles dominate the primary mode of transport. However, buses offer comparative advantages in terms of safety and passenger comfort. This indicates considerable potential to encourage bus use through comprehensive service improvements, including network optimization, increased service frequency, enhanced connectivity, and better vehicle standards. Looking ahead, strategic upgrades will be essential, guided by the city's spatial development patterns and evolving transport demand characteristics.

6. Status of Water Environment as Subsector Program

Hanoi, whose name “Ha-Noi” means “Inside the River,” is a city defined by its waterways. Numerous rivers, including the Red River, To Lich River, Set River, and Lu River, traverse its urban landscape (Figure 6.1.1). While these rivers provide significant benefits to the city’s residents, they also pose a risk of flooding. Therefore, improving the water environment is essential for safeguarding public health, supporting urban activities, and enhancing Hanoi's overall city image.



Source: Evaluation Team

Figure 6.1.1 Major Rivers Flowing Through Hanoi

HAIDEP proposes actions and subsector programs aimed at realizing strategies to achieve the city's overall vision and development goals. This section evaluates the water environment within the subsector program.

First, the subprograms and objectives outlined in HAIDEP are described. Next, water environment plans formulated after HAIDEP are summarized. Finally, the implementation status of HAIDEP-proposed projects and the outcomes of individual initiatives are assessed.

6.1 HAIDEP Sub-sector Programs and Objectives

6.1.1 Objectives of the Water Environment Sub-sector Program

HAIDEP proposes the following three key objectives for the water environment under Sub-sector Program E.

1) Ensure the people's safety and healthiness by improving water environment;

2) Promote sustainable use of water resources; and

3) Enhance the city's image by improving water environment and sanitation conditions.

6.1.2 Water Environment Development Strategy, Actions, and Monitoring Indicators Proposed by HAIDEP

Improving the water environment aims to protect citizens from disasters and provide a foundation for safe and healthy living, while also enhancing Hanoi's image, symbolized by "water, greenery, and culture." To achieve this, it is essential to establish a sustainable water resource management system and implement the basic policies outlined in the table below.

Table 6.1.1 Water Environment Development Strategy, Actions, and Monitoring Indicators Proposed at HAIDEP

Strategies	Actions	Monitoring Indicators
E1 Enhance public awareness and understanding of water, sanitation and related environmental issues	E11 Establish "Water Forum" with participation of extensive stakeholders to discuss and disseminate water, water environment and related issues E12 Conduct regular media campaign on water and sanitation	· Establishment of Water Forum · Number of campaigns conducted
E2 Ensure stable supply of safe water for all	E21 Address water pollution issues immediately E22 Expand water supply coverage E23 Shift gradually from groundwater to surface water as raw water source E24 Improve operational efficiency of water supply	· Water quality · Water supply coverage · Water loss · % of surface water
E3 Promote improvement of sanitary conditions in urban areas	E31 Improve drainage conditions E32 Develop sewerage systems E33 Improve solid waste management E34 Establish workable mechanism for consolidation of graveyards	· Coverage · Degree of inundations · Progress of actions
E4 Promote improvement of water quality of lakes, ponds, and rivers	E41 Monitor water quality of lakes, ponds, and rivers in Hanoi E42 Develop water quality improvement measures E43 Establish common guidelines on waterfront use and management in coordination with urban land use and communities	· Water quality · Progress of actions
E5 Protect urban areas from flood and promote disaster preparedness	E51 Ensure urban areas shall be protected from floods E52 Establish effective early warning system E53 Redevelop outside-of-dyke area	· Degree of floods · No of households in outside of dyke area

Source：HAIDEP

In addition, the following actions should be prioritized, listed in order of priority.

PE1 Development of surface water resources and related water distribution systems

PE2 Development of drainage systems with multipurpose flood protection reservoir

PE3 Development of sewerage system for the urban core

PE4 Development of water flow diversion system for environmental maintenance of rivers and lakes

6.1.3 Examination of Methods for Evaluating Achievement Status of HAIDEP

The table below shows the availability of numerical targets and data for the monitoring indicators proposed in HAIDEP. Based on these results, each indicator is evaluated in Sections 6.2 to 6.6, with a summary provided in Section 6.7. The numerical targets proposed by HAIDEP are compiled in Section 6.5. Indicators without set numerical targets were assessed qualitatively using interviews with local governments and existing plans. Conversely, indicators for which information could not be verified or for which objective evaluation was difficult were excluded in the assessment.

Table 6.1.2 Review of Monitoring Indicators and Evaluation Methods Proposed by HAIDEP

Strategies	Monitoring Indicator	(1)	Evaluation Method	(2)
E1 Enhance public awareness and understanding of water, sanitation and related environmental issues	Establishment of Water Forum	×	Excluded from evaluation due to the unavailability of data	-
	Number of campaigns conducted	×		-
E2 Ensure stable supply of safe water for all	Water quality	○	Excluded from evaluation due to the unavailability of data	-
	Water supply coverage	●	Described in Section 6.5	○
	Water loss	●	Described in Section 6.3.1	○
	% of surface water	●	Described in Section 6.6.2	○
E3 Promote improvement of sanitary conditions in urban areas	Coverage	●	Described in Section 6.5	○
	Degree of inundations	○	Described in Section 6.6.1(the result of the resident's interview)	○
	Progress of actions	○	Described in Section 6.4.1（Before and after maintenance of facilities）	○
E4 Promote improvement of water quality of lakes, ponds, and rivers	Water quality	○	Described in Sections 6.3.4、6.6.1、and 6.6.3	×
	Progress of actions	×	Excluded from evaluation due to the unavailability of data	-
E5 Protect urban areas from flood and promote disaster preparedness	Degree of floods	×	Described in Sections 6.4.1 and 6.6.1	○
	No of households in outside of dyke area	○	Excluded from evaluation due to the unavailability of data	-

Note: (1) ○Can be monitored with a quantitative indicator, ● A quantitative indicator was set in HAIDEP. × Cannot be monitored quantitatively (2) ○ Evaluated quantitatively. ×Cannot be evaluated quantitively.
Source：Evaluation Team

6.2 Status of the Relative Plan after HAIDEP

Following the issuance of HAIDEP in March 2007, master plans for water supply, sewerage, and drainage were developed. An outline of each master plan is summarized below.

6.2.1 Water Supply

The Master Plan for the Water Supply System was formulated in 2013, with a revised version issued in 2021.

The 2013 Master Plan outlines the development of Hanoi's water supply system through 2030, with a vision extending to 2050, and was approved by the Prime Minister's Office on March 21, 2013. Its objectives are as follows:

- To concretize the orientation of water supply development for Hanoi in the general construction plan for the period up to 2030, with a vision to 2050, as approved by the Prime Minister.
- To identify demand for clean water, plan the development of the water supply system, and determine investment requirements for each period, while ensuring the rational exploitation of water sources (groundwater and surface water).
- To continuously improve the quality of water supply service, ensure water supply safety, and modernize the management, production, and business of clean water in a step-by-step manner.
- By 2020, achieve 100% access to clean water in the inner urban center (with new development zones from rural districts reaching 95-100%); 90-95% in satellite urban areas, and 85-90% in ecological urban areas. By 2030, the target is 100% for urban centers, 100% for satellite urban areas, and 95-100% for ecological urban areas.
- To reduce water loss and revenue loss from clean water, targeting 22-27% by 2020, and below 20% by 2030.

The water demand projections and the development plan for water treatment plants are presented below.

Table 6.2.1 Water Demand and Water Treatment Plant Development Plan

Unit: 1,000 m^3/day

Item	Year 2020	Year 2030	Year 2050
Average Water Demand	1,287	1,939	2,576
Water Treatment Plant Capacity	1,763.5	2,738	3,328
- 3 nos. (Surface Water Source)	1,140	2,125	2,750
- 21 nos. (Underground Water Source)	623.5	613	578

Source：The 2013 Water Supply Master Plan of Hanoi Capital through 2030, with a Vision till 2050

The water source is gradually being shifted from underground to surface water. Due to deterioration of groundwater quality at the Ha Dinh, Tuong Mai, and Phap Van water treatment plants in Southern Hanoi, groundwater intake was discontinued in 2020, with water subsequently sourced from the Da River and Duong River starting in 2030. Water transmission pipes are planned to extend to 843.4 km by 2020, with an additional 124.9 km planned between 2021 and 2030.

The 2013 Master Plan includes plans for the locations, scale, and implementation schedule for the expansion and construction of water treatment plants, changes in and development

of water sources, and the expansion of water transmission pipe networks. It also identifies priority projects with targets for 2015 and 2020. Table 6.2.2 below summarizes the details of these priority projects and their progress, as of 2020.

All completed and ongoing projects were implemented using the Hanoi City budget.

Table 6.2.2 Status of Priority Project Development for Water Supply System

Item	Priority Project		Status
	Name	Target	In 2020
Plant	Yen Vien Township Water Supply Project with Capacity of 10,000 m^3/day	2015	In process
	Increasing Capacity of Son Tay Water Plant from 10,000 m^3/day up to 20,000 m^3/day.	2015	Completed
	Construction of Duong River Surface Water Plant with Capacity of 150,000 m^3/day.	2015	Completed
	To increase capacity of Da River Surface Water Plant from 300,000 m^3/day up to 600,000 m^3/day.	2020	Not yet
	To build Red River Surface Water Plant with capacity of 300,000 m^3/day.	2020	In process
	To increase capacity of Duong River Surface Water Plant from 150,000 m^3/day up to 300,000 m^3/day (240,000 m^3/day for demand of Hanoi Capital, the rest is estimated to supply for areas adjacent to Hanoi in Hung Yen and Bac Ninh provinces).	2020	Completed
	For groundwater plants: To basically maintain the existing plants, reduce the exploitation capacity of Phap Van, Tuong Mai and Ha Dinh water plants, and gradually turn them into flow-regulating stations. Ha Dinh Water Plant will stop exploitation in 2020, and its site is projected for construction of Hanoi water supply system repair and maintenance workshop.	2020	Reduce the exploitation capacity (Phap Van, Tuong Mai, Ha Dinh WTPs)
Booster Pump	Ha Dong District: To build a pump station with capacity of 20,000 m^3/day, volume of storage tank will be 4,000 m^3. Water from Da River Surface Water Plant will be supplied for Ha Dong District and the rural districts including Ung Hoa and My Duc.	2015	Completed
	Son Tay Town: To build a booster pump station with capacity of 30,000 m^3/ day, and volume of storage tank will be 6,000 m^3, taking water from Da River Surface Water Plant to supply for Son Tay Town.	2015	Not yet
	Ba Vi Rural District: To build a booster pump station with capacity of 10,000 m^3/day, and volume of storage tank will be 1,500 m^3, taking water from Da River Surface Water Plant to supply for Ba Vi Rural District.	2015	Built 3,500 m^3/day
	To build the main booster pump stations at Kim Bai, Soc Son, Xuan Mai, Phu Xuyen and Chuc Son	2020	Not yet
Transmission Pipeline	To develop a grade-I network with pipe diameter of DN300 - DN1500, in the period by 2015 total length will be about 300 km.	2015	In process
	To complete the distribution and service networks in the city with a total length of about 4,000 km, prioritize to develop networks in districts which are lacking in water, and basically complete the pipe	2015	In process (National Highways 32, 6, 1, Lang-Hoa Lac)

Item	Priority Project		Status
	Name	Target	In 2020
	networks in Gia Lam and Tu Liem rural districts, along highways 32, 6 and 1, and Lang - Hoa Lac, and develop water supply network in the rural areas adjacent to urban area.		
	To complete the urban water supply network from the center to Belt 3.	2020	Partial completed (Ba Dinh, Hai Ba Trung, Hoan Kiem, Dong Da)
	To develop water supply network in the areas from Belt 3 to Belt 4 of the urban centers, Long Bien - Gia Lam, Dong Anh, Me Linh, Soc Son, Hoa Lac, Son Tay, Xuan Mai, and Phu Xuyen urban areas.	2020	Partial completed (Long Bien, Gia Lam)
	To further develop transmission routes from Da River, Red River and Duong River surface water plants to urban centers and satellite urban areas.	2020	Completed (6.4 km from Tay Mo flow control station to Tran Duy Hung), (Duong River water plant's transmission line)
	To build the main booster pump stations at Kim Bai, Soc Son, Xuan Mai, Phu Xuyen and Chuc Son.	2020	No information
To prevent revenue loss and clean water loss	To zone and separate water supply pipeline systems; To establish system of management and supervision over water supply pipeline and water meter systems in the river basins.	2015	Many areas completed
	To train and improve management and operation capacity for water supply units.	2015	Completed
	To renovate or replace about 70 km of old pipes in Ba Dinh, Dong Da, Thanh Xuan, Hai Ba Trung, Ha Dong and Son Tay; replace about 400,000 water meters.	2015	95% completed
	To formulate projects to fight clean water loss and revenue loss.	2015	Partial completed

Source: Evaluation Team

Based on the above, the achievements of the priority water supply projects as of 2020 are summarized as follows. Of the 21 projects, 18 were completed or partially completed, or underway.

Table 6.2.3 Achievement of Water Supply Developmemt in 2020

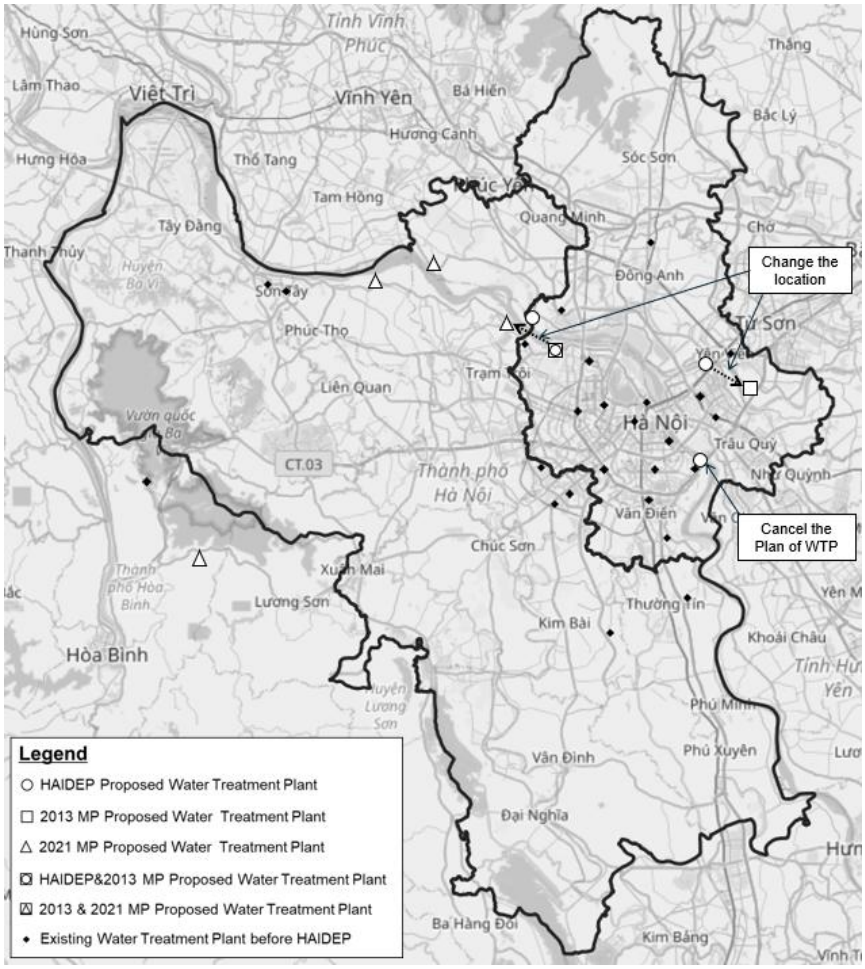
Item	Completed	Partial Completed/ In Process	Not Yet
Plant	3	3	1
Booster Pump	1	1	2
Transmission Pipeline	0	6	0
Prevent Revenue Loss and Clean Water Loss	1	3	0

Source: The 2013 Water Supply Master Plan of Hanoi Capital through 2030, with a Vision till 2050

A revised master plan was formulated in 2021. Like the 2013 Master Plan, it covers the water supply system for Hanoi through 2030 with a vision for 2050. However, it was revised to apply

uniform standards to both urban and rural areas in Hanoi, consider the impacts of climate change, and promote the transition of water sources from groundwater to surface water, as recommended by HAIDEP. As a result, compared with the master plan in 2013, the projected water demand for 2030 and 2050 was revised upward to 1.16 times and 1.07 times, respectively. The capacity of surface water treatment plants was revised to 1.23 times and 1.33 times for 2030 and 2050, respectively. In contrast, the capacity of groundwater-based water treatment plants was revised downward by 82% and 71% in 2030 and 2050, respectively.

The following presents a comparison of the water treatment plant development plans under HAIDEP and the 2013 and 2021 master plans. Although the locations and scopes of two water treatment plants planned under HAIDEP have been changed, they are still included in the master plans.



Source: Evaluation Team

Figure 6.2.1 Water Treatment Plant of HAIDEP and Master Plan in 2013 and 2021

6.2.2 Wastewater and Drainage

The Master Plan for Sewerage and Drainage was formulated in May 2013. Like the Water

Supply Master Plan, it covers the period up to 2030, with a vision till 2050. This master plan follows HAIDEP's proposal, which was developed based on updated population projections and land use for the expanded Hanoi capital area, compared with the 1995 and 1998 master plans. Its objectives are as follows:

- To consolidate the orientations for the development of Hanoi's drainage system in the general construction plan for the capital through 2030, with a vision toward 2050, already approved by the Prime Minister.
- To define water drainage zones and basins; to forecast rainwater drainage requirements and total urban wastewater volumes; and to determine drainage and wastewater treatment schemes for each urban basin.
- To progressively address urban flooding based on rainwater volumes projected for a ten-year return period for key works, while enabling regulation of floods with shorter-return periods.
- The proportion of the population provided with wastewater collection and treatment services within the planning area will reach 90% by 2030 and 100% by 2050.
- To identify investment needs in water drainage systems in each period, serving as a basis for the formulation and implementation of drainage projects in Hanoi and meeting state management requirements for drainage.
- For drainage, the construction, expansion, and rehabilitation of facilities such as rivers, channels, lakes, sluice gates, and pumping stations are planned, with the following indicators:
- 310 mm over 2 days for core urban areas south of the Red River, and more than 200 mm/day for each urban basin, based on a ten-year return period rainfall event.

The above indicator of 310 mm in two days follows the recommendation by HAIDEP.

The development plan for the main drainage facilities is shown below.

Table 6.2.4 Drainage Facility Development Plan

District	Reservoir Capacity (ha)	Pump Capacity (m^3/s)	Outlet
To Lich River*	944	90.0	Red River
Dong My	97	41.3	Red River
Nhue Left	564	115.0	Red and Nhue Rivers
Nhue Right	531	464.0	Red, Nhue, and Day Rivers
Phu Xuyen	194	101.2	Red and Nhue Rivers
Son Tay	300	-	Tich River
Xuan Mai	270	70.6	Bui River
Hoa Lac	1,221	-	Tich River
Quoc Oai	14	30.7	Tich and Day Rivers
Chuc Son	75	-	Tich and Day Rivers
Phuc Tho	-	-	Tich River
Long Bien	156	65.0	Red and Duong Rivers
Gia Lam	240	47.5	Red and Duong Rivers
Dong Anh	350	202.0	Red, Ca Lo, and Ngu Huyen Khe Rivers
Me Linh	123	87.7	Red, Ca Lo, and Ngu Huyen Khe Rivers
Soc Son	326	-	Cau and Ca Lo Rivers

Source: The 2013 Hanoi Capital's Water Drainage Master Plan through 2030 with a Vision toward 2050

* Hanoi Drainage Project for Environmental Improvement (Japanese ODA Loan)

With respect to the sewerage system, the planned sewage volume and the construction plan for sewage treatment plants are presented below.

Table 6.2.5 Sewerage Plan

Area	Wastewater Drainage Norms (L/person/day)	
	By 2030	By 2050
Urban centers	254~321	312~379
Satellite town, Quoc Oai urban center	239~274	312~350

Source: Evaluation Team

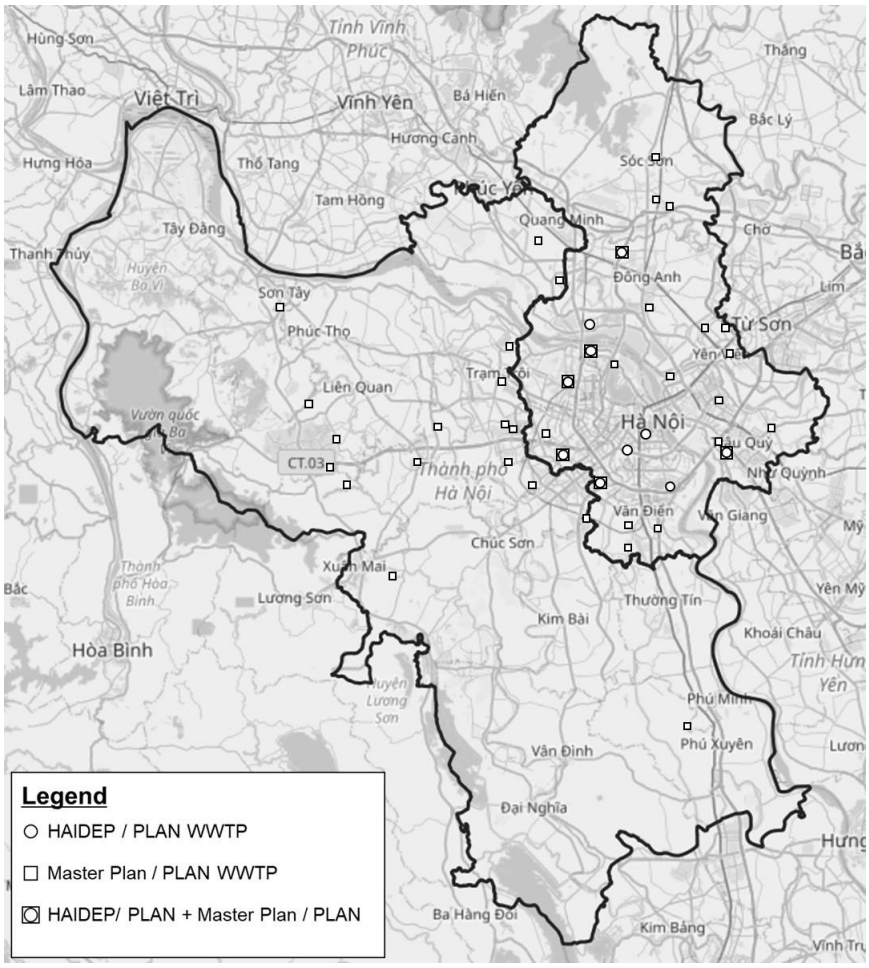
Table 6.2.6 Wastewater Treatment Plant Development Plan

Area	WWTP Capacity (m^3/day)			
	Number	by 2030	by 2050	System*
To the south of Red River (in the To Lich River basin and part of Nhue River Left-bank basin)	5	588,300	588,300	C
To the south of Red River (in the Nhue River Right-bank area to the Day River and part of Nhue Left-bank basin)	11	406,000	675,000	S
To the north of Red River	13	445,000	620,000	S
Son Tay	1	50,000	75,000	S
Hoa Lac	2	149,000	238,000	S
Xuan Mai	1	58,000	100,000	S
Phu Xuyen	1	33,000	52,000	S
Soc Son	3	66,000	116,000	S
Quoc Oai	2	13,000	18,000	S

Source: The 2013 Hanoi Capital's Water Drainage Master Plan through 2030 with a Vision toward 2050

*: S; Separated, C; Combined

This section presents a comparative analysis of the construction plans for wastewater treatment plants outlined in the HAIDEP and the master plan. A review of both planning documents shows that six of the wastewater treatment plants proposed in the master plan are located at the same sites as those identified in the HAIDEP framework. This overlap indicates a degree of alignment between the two planning initiatives in terms of site selection for key infrastructure projects.



Source: Evaluation Team

Figure 6.2.2 Wastewater Treatment Plant of HAIDEP and Master Plan in 2013

Conversely, the master plan for sewerage and drainage includes projects prioritized for development by 2020. The names of those projects and their status as of 2020 are summarized below.

Table 6.2.7 Status of Priority Project Development for Drainage and Sewerage System

Item	Project	Status In 2020
Drainage Improvement	Water Drainage Project to Improve Hanoi Environment – Project II, Water Drainage for To Lich River Basin (ongoing project and additional project)	Completed
	Investment Project to Construct the Nhue River Basin Rainwater Drainage System	Not Yet
	Project to Construct and Renovate 3 Water Drainage Pump Stations of Co Nhue, Dong Bong 1, and Dong Bong 2, in the Western Area of Hanoi	Completed
	Investment Project to Construct Water Drainage Systems for Ha Dong Urban District	Not Yet
	Projects to Construct Key Grade-I Works (main canals, regulating lakes and rainwater pump stations) in Long Bien Urban District	Not Yet
	Projects on Water Drainage against Local Flooding in Urban Centers, Satellite, and Eco-urban Centers	Not Yet
Sewerage System	Project to Build Yen So Wastewater Treatment Plant	Completed
	Project to Construct Systems for Collection of S1 Basin Wastewater for Yen So Wastewater Treatment Plant	Not Yet
	Project to Build Bay Mau Wastewater Treatment Plant	Completed
	Project to Build Ho Tay Wastewater Treatment Plant	Partially Completed
	Project to Construct Wastewater Collection Systems and a Wastewater Treatment Plant of Yen Xa	Completed
	Project to Construct Wastewater Collection Systems and a Wastewater Treatment Plant of Phu Do	Not Yet
	Project to Construct Wastewater Collection Systems and a Wastewater Treatment Plant of Tay Song Nhue (Western Nhue river)	Not Yet
	Project to Construct Wastewater Collection and Treatment Systems for Ha Dong and Son Tay Areas	Not Yet
	Project to Construct Wastewater Collection Systems and a Wastewater Treatment Plant of An Lac	Not Yet
	Project to Construct a Plant for Treatment of Waste Mud Discharged from Wastewater Treatment Plants at Yen So Dump Site	Not Yet
	Projects to Improve Inner-city Lakes against Pollution	Partially Completed

Source: Evaluation Team

The achievements of the Master Plan as of 2020 are as follows: Of the six drainage improvement projects, two have been completed and four projects have not yet commenced. Of the eleven sewerage system projects, three have been completed, two partially completed, and six have not yet started. Overall, these achievements are generally lower than those of the Master Plan for Water Supply Development.

6.3 Achievement of Project Implementation Proposed by HAIDEP

6.3.1 Water Supply System

By 2020, the daily water supply capacity of water treatment plants in the former city area is projected to be 1,871 m^3/day. This projection is based on the capacity of existing water treatment plants, Hanoi's development plan, and HAIDEP's plan, which considers the timing of development and projected water demand. The table below summarizes the development status as of 2020.

Table 6.3.1 Implementation of Water Treatment Plant

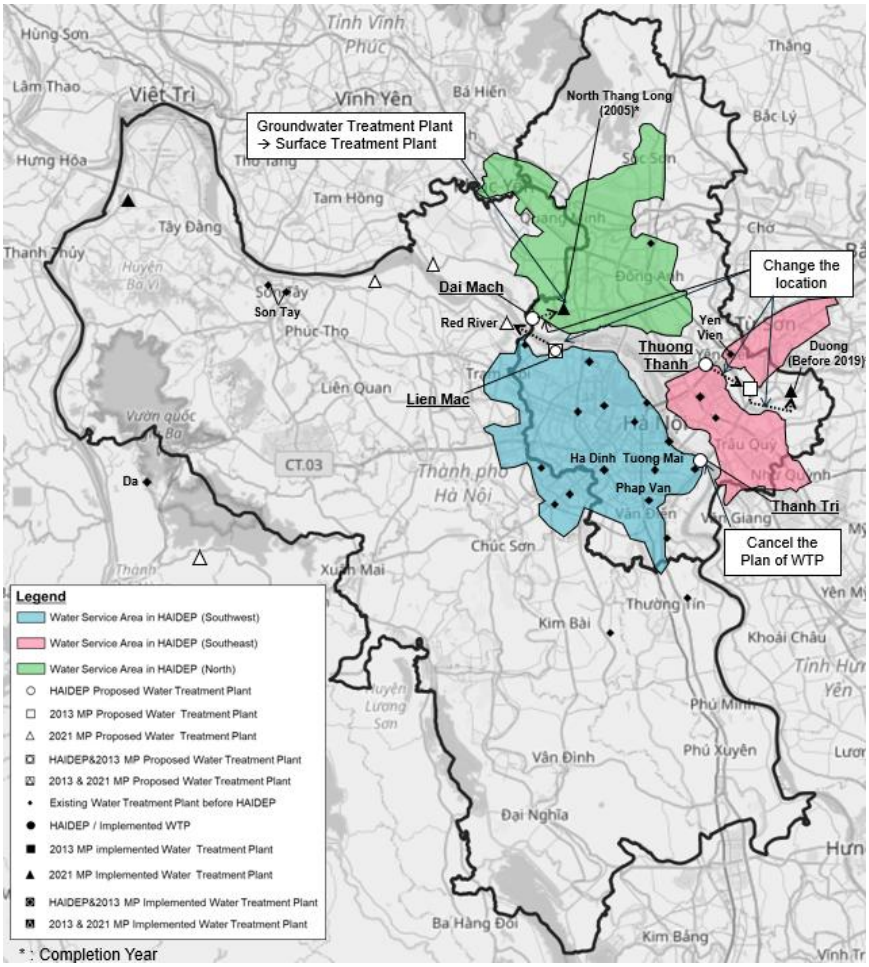
Unit: 1,000 m^3/day

Location	Status	Year				
		2007	2010	2015	2020	2024
Southwest	Plan		901.0	1,101.0	1,151.0	-
	Actual	474.0	810.0	816.5	835.5	835.5
Southeast	Plan	-	226.0	-	326.0	-
	Actual	36.0	66.0	86.2	389.0	389.0
North	Plan	-	294.0	-	394.0	-
	Actual	62.0	62.0	63.0	164.9	164.9

Source: Evaluation Team

As of 2020, the development of water treatment plants relative to the plan was 73% in the southwest area, 119% in the southeast area, and 42% in the north area, with an overall development rate of 74%. Under HAIDEP, the plan for surface water treatment included the construction of two water treatment plants in the southwest area (Thanh Tri and Lien Mac), one in the southeast area (Thuong Thanh), and one in the north area (Dai Mach). The plants in the southwest area were not constructed. In the southeast, the construction site was changed due to land acquisition issues, and plants with a larger capacity than initially planned were built. No new plants were constructed in the north area; however, the treatment capacity of the existing North Thang Long Water Treatment Plant, originally funded by the Japanese ODA Loan, was increased.

The status of HAIDEP and the Master Plan, along with the water treatment plants that were developed, is shown below.



Source: Evaluation Team

Figure 6.3.1 Status of Water Treatment Plant in 2020

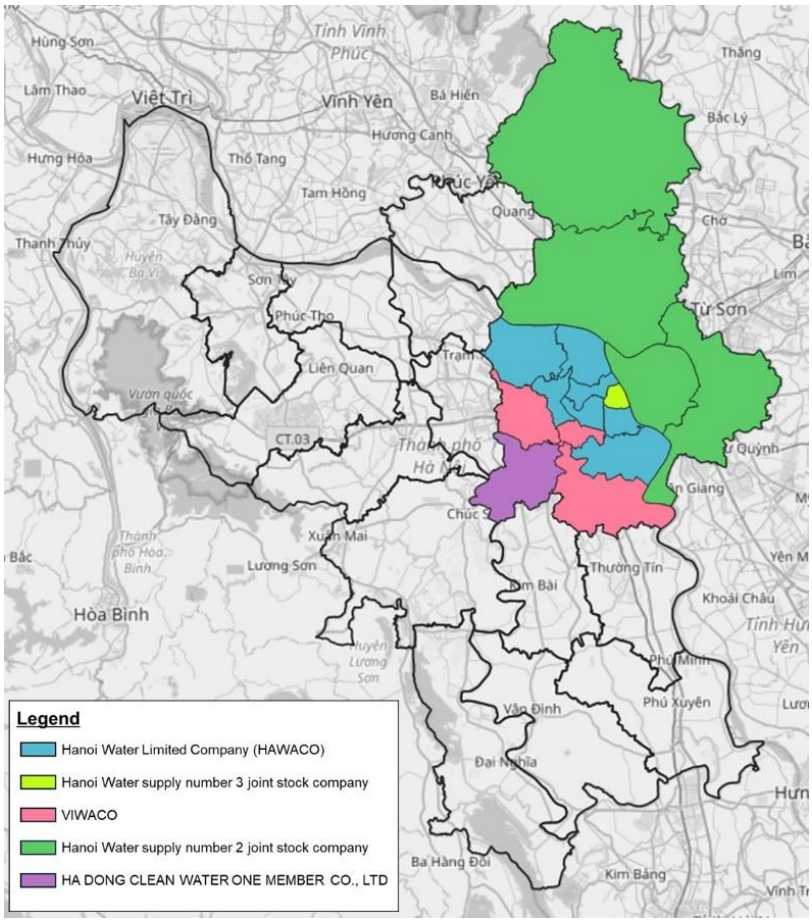
(1) Non-revenue Water

The data from water supply companies managing Hanoi's water supply are compared with the HAIDEP plan below, which set a non-revenue water (NRW) target of 25% for 2020. The relatively low NRW rate of Hanoi Water Supply Number 2 Joint Stock Company is attributed to the fact that the water supply systems in its service areas - Long Bien, Gia Lam, Dong Anh, and Soc Son - are relatively new, allowing NRW issues to be identified and addressed early. Furthermore, since the operational area of these water suppliers are generally limited to urban zones, it is assumed that the NRW target has been largely achieved.

Table 6.3.2 Plan and Actual for Non-revenue Water

Name of Water Supply Business Company	2015	2016	2017	2018	2019	2020
HAIDEP Target	28%	-	-	-	-	25%
Hanoi Water Limited Company (HAWACO)	-	20.47%	20.47%	15.72%	14.92%	15.48%
Hanoi Water Supply Number 3 Joint Stock Company	-	25.67%	22.70%	-	17.68%	15.30%
VIWACO	-	23%	20.50%	-	16.47%	-
Hanoi Water Supply Number 2 Joint Stock Company	-	11.32%	10.15%	8.62%	9.23%	8.11%
Ha Dong Clean Water One Member Co., Ltd.	-	11.76%	11.94%	14.90%	15.58%	16.74%

Source HAIDEP Evaluation Team



Source: Evaluation Team

Figure 6.3.2 Operation Area of Water Business Company

(2) Water Transmission Pipeline

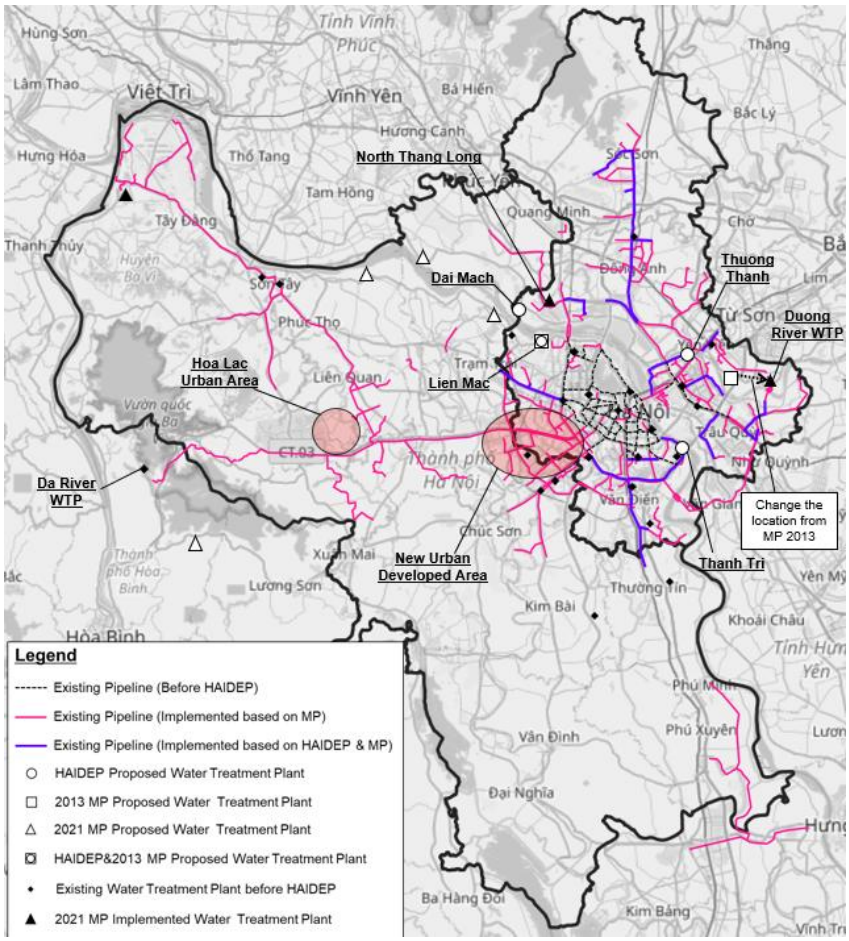
The total planned length of water transmission pipelines was 416,597 m, with 72,557 m in the southwest area, 121,777 m in the southeast area, and 222,263 m in the north area. These pipelines were planned to connect to the water treatment plants in Thanh Tri (WS-1) and Lien Mac (WS-2) in the southwest, Thuong Thanh (WS-3, WS-4) in the southeast, and Dai Mach (WS-5, WS-6) in the north.

Regarding the status of the water pipelines, Figure 6.3.3 shows the location of the pipelines planned in the 2013 Master Plan and laid by 2020 (pink lines), along with the portions

proposed by HAIDEP that were implemented as planned (blue lines).

Regarding the progress of water transmission pipeline construction planned by HAIDEP in 2020: In the southwest area, WS-1 and WS-2 water treatment plants were not constructed; however, 32,812 m of water transmission pipelines (45% of the plan) were installed, connecting to existing pipelines to supply water from the current treatment plants. In the southeast area, 27,795 m (23% of the plan) were installed, linking with pipelines from the master plan to supply water from the Song Duong Water Treatment Plant, constructed in place of Thuong Thanh. In the north area, 31,814 m (14% of the plan) of pipelines were installed, connecting with the expanded North Thang Long Water Treatment Plant and the master plan pipelines. The total length of pipelines installed was 92,421 m, equivalent to 22% of the HAIDEP plan.

As shown in Figure 6.3.3 many of the water transmission pipelines planned in the 2013 Master Plan have been installed in Western Hanoi. This is related to the fact that urban development investments have progressed significantly in the western areas (e.g., Trung Hoa Nhan Chinh Urban Area, Manor Central Park, Vinhomes Green Bay, Vinhomes Thang Long, and Mailand Ha Noi City), in conjunction with the construction of the Ring Road as a major arterial road following the expansion of Hanoi in 2008. Water pipelines were installed preferentially to meet the water demand of these newly developed western areas, resulting in deviations from the HAIDEP plan. For example, a transmission pipeline was installed from the Da Water Treatment Plant—using the Da River near the western border of Hanoi as its source—toward the city center to supply water to the newly developed western areas and the Hoa Lac urban area, which is being developed as a city of science, technology, and innovation highlighted in red in Figure 6.3.3.

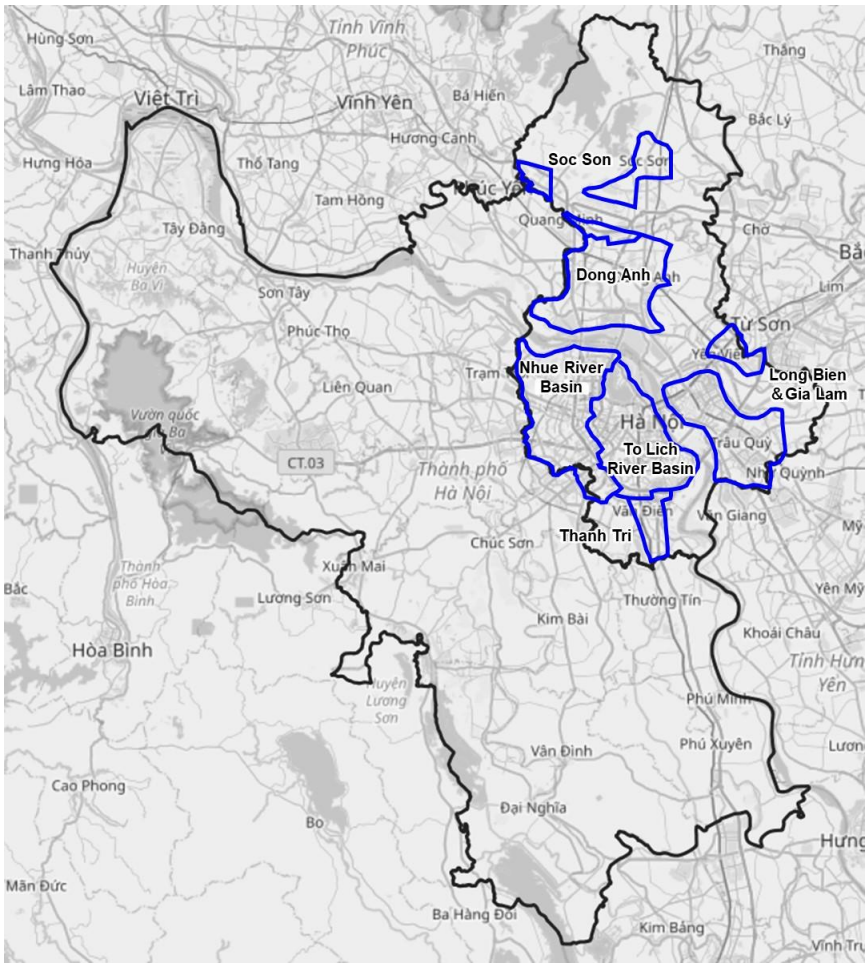


Source: Evaluation Team

Figure 6.3.3 HAIDEP, Master Plan, and Existing Water Supply Infrastructure

6.3.2 Drainage System

HAIDEP states that by 2020, 45,291 ha of drainage extension areas capable of coping with 310 mm of rainfall over two days will be developed. Based on this design policy, HAIDEP planned nine projects to improve rivers, construct reservoirs, install pumping facilities in six basins (To Lich River, Nhue River, Dong Anh, Soc Son, Long Bien and Ga Lam, Thanh Tri) (Figure 6.3.4).



Source: Evaluation Team

Figure 6.3.4 Catchment Area for Drainage Improvement in HAIDEP

The following presents the planned areas in HAIDEP and the status of reservoirs and pumping facilities as of 2020.

Table 6.3.3 Status of Development of Retention Reservoir and Pumps

Basin	a. HAIDEP		b. Actual			b / a (%)	
	Reservoir (ha)	Pump (m^3/s)	Reservoir (ha)	Pump (m^3/s)	Implemented Project	Reservoir	Pump
To Lich River	244	90	244	90	1)	100	100
Nhue River Left	266	36	76.9	40	3)	29	111
Nhue River Right	212	24	0	0		0	0
Long Bein/Gia Lam	186	98	90.4	0	3)	49	0
Dong Anh	118	44	6	20	2)	5	45
Soc Son	-	-	-	-		-	-
Thanh Tri	-	-	-	-		-	-
Total	1,026	292	417.3	150		41	51

Source: Evaluation Team

1): Drainage Project for Environment Improvement in Hanoi

2): Thang Long North – Van Tri Urban Infrastructure Development Project

3): Local Project (State Budget)

The completion rates of retention reservoirs and pumping facilities are 41% and 51%, respectively. Retention reservoirs have not been developed outside the To Lich River area, which was constructed using Japanese loans, and pumping facilities have not been developed outside the To Lich River area and the right bank area of the Nhue River.

Appendix A presents the rainfall record during the Yagi Typhoon in September 2024 and the operation record of the Yen So Pumping Station, installed in the To Lich River Basin under the Hanoi Drainage Environment Improvement Project. The recorded rainfall exceeded the design criterion of 310 mm over two days; however, it was confirmed that, by operating the pumps at full capacity (90 m^3/sec) for five consecutive days, no flooding damage occurred in the To Lich River Basin, based on beneficiary interviews conducted during this evaluation study (see Appendix C).

6.3.3 Sewerage System

At the time of the preparation of HAIDEP in 2007, the sewage treatment plants in operation in Hanoi were Truc Bach (treatment capacity: 2,300 m^3/day) on West Lake and Kim Lien (treatment capacity: 3,700 m^3/day) on the Lu River, both were developed under the Hanoi Water Environment Improvement Project, and North Thang Long (treatment capacity: 532,800 m^3/day). As part of the Sewerage System Development Plan toward 2020, HAIDEP proposed the construction of wastewater treatment plants and sewerage systems to serve 2,848,000 people in 12 districts. The following summarizes the development status of wastewater treatment plants.

Table 6.3.4 Status of Wastewater Treatment Plant

Basin	HAIDEP			Actual			
	System*	Population in Service (person)	Plant (m^3/day)	System*	Population in Service (person)**	Plant (m^3/day)	Implemented Project
West Lake	S	42,000	12,300	C	18,300	5,500	4)
				C	7,600	2,300	1)
Bay Mau Lake	C	41,000	13,300	C	41,000	13,300	1)
Upper Kim Nguu River	C	267,000	75,000	-	-	-	-
Lu River	C	142,000	45,000	C	12,300	3,700	1)
Upper To Lich River	C	299,000	90,000	-	-	-	-
Lower Kim Nguu River	C	287,000	90,000	C	666,600	200,000	4)
Lower To Lich River	S	441,000	140,000	-	900,000	270,000	3)
Nhue River Left	S	455,000	140,000	-	-	-	-
Nhue River Right	S	190,000	60,000	-	-	-	-
Long Bien and Gia Lam	S	343,000	110,000	-	-	-	-
North Thang Long	S	160,000	58,000	C	126,600	38,000	2)
Central Dong Anh	S	198,000	60,000	-	-	-	
Total	-	2,848,000	893,600	-	1,772,400	532,800	

Source: Evaluation Team

*: S; Separated, C; Combined

**: It is estimated based on the treatment capacity of the wastewater treatment plant. The population of the sewerage area is assumed as 300L/day/person. For the combined sewer system, it is multiplied by 90%.

1): Drainage Project for Environmental Improvement in Hanoi

2): Thang Long North – Van Tri Urban Infrastructure Development Project

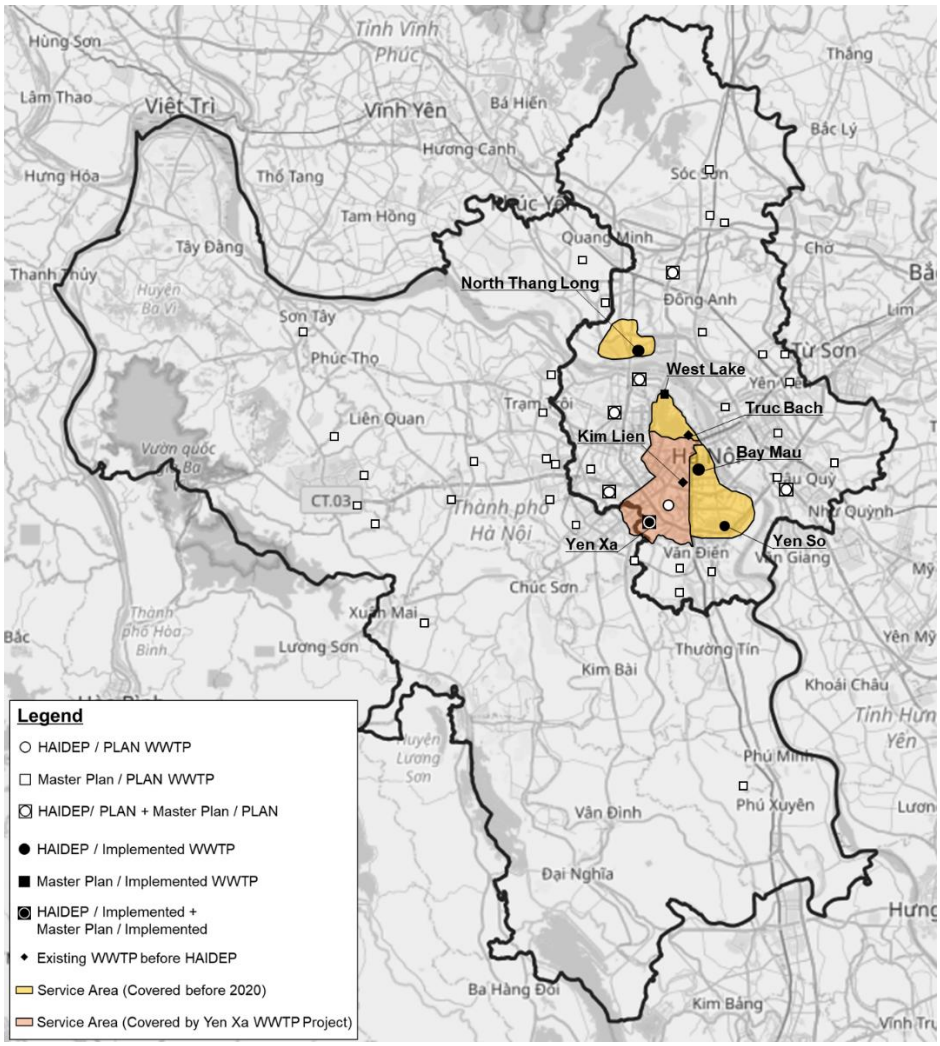
3): Hanoi City Yen Xa Sewerage System Project

4): Local Project (State Budget)

Figure 6.3.5 shows the developed areas of the wastewater treatment plants and sewerage system. As of 202, the actual construction of wastewater treatment plants accounted for 29% of the planned capacity. However, in 2025, the Yen Xa Wastewater Treatment Plant was completed in the Lu River basin and Lower To Lich River districts, with a treatment capacity of 270,000 m^3/day. This increased the actual implementation rate of wastewater treatment plants to approximately 60%. Regarding the sewerage system, the proposed separate system was changed to a combined system in the West Lake, Lower To Lich, and North Thanh Long districts. HAIDEP recommended the introduction of separate sewer system in newly developed areas to treat stormwater and wastewater separately, despite higher cost. However, it is considered that the shift to a combined system was made due to financial constraints and feasibility considerations.

Since sewerage pipes have not been installed in some areas, improvements in the water environment and sanitation remain insufficient. For example, in the Lower Kim Nguu River area, interceptor pipes have not been installed due to financial constraints; consequently, sewage flows directly into the Lower Kim Nguu River, and the sanitary environment around

the river has not improved. In addition, the construction of sewer pipes planned for laying in the Lu River Basin as part of the Yen Xa Sewerage Development Project was cancelled due to financial problems with the local contractor. These construction projects are scheduled to be implemented as a State Budget project.



Source: Evaluation Team

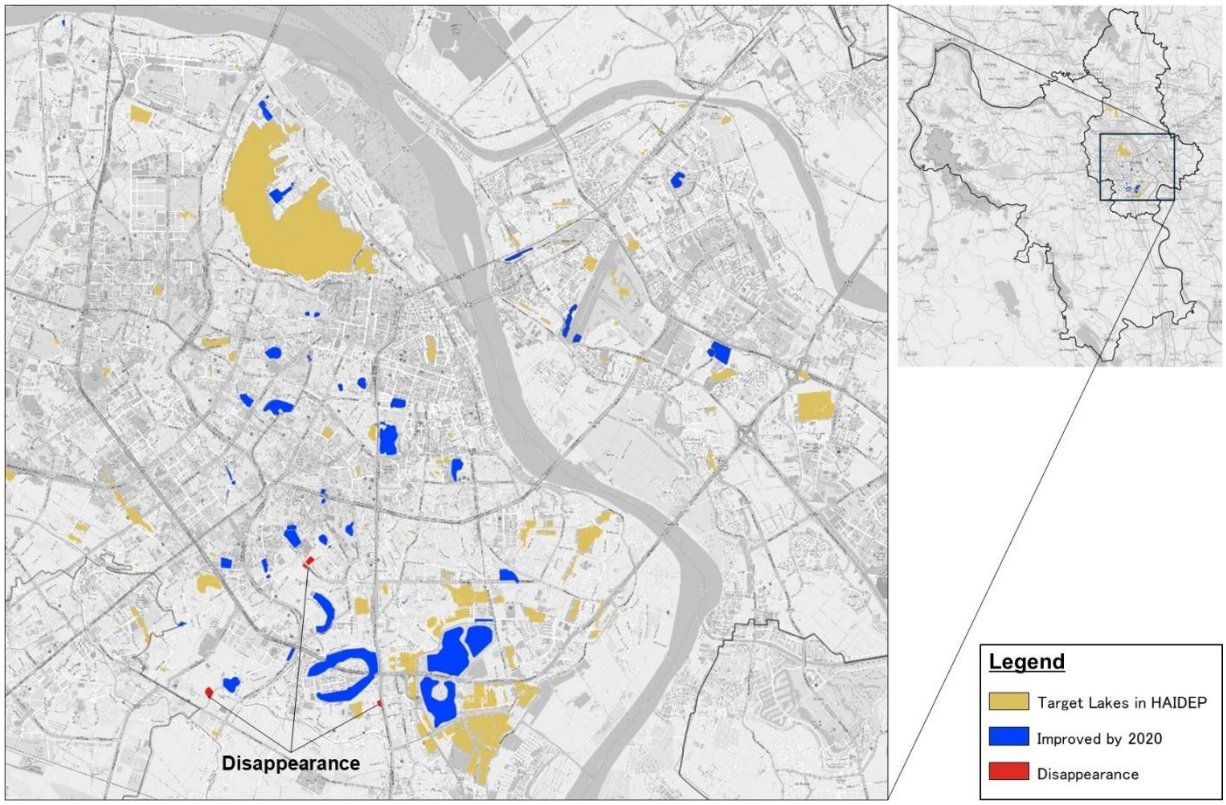
Figure 6.3.5 Developed Area of Wastewater Treatment Plant and Sewerage System

6.3.4 Lake Improvement

It is estimated that there are approximately 900 lakes and marshes larger than 1 ha in the former Hanoi City area, forming a rich water environment. HAIDEP proposed lake improvement measures, which were not explicitly addressed in previous plans, with the aim of improving water quality and enhancing greening of the surrounding area, thereby improving the local environment. These measures are also expected to enhance water storage capacity and provide flood regulation functions, contributing to reduced flood damage. Accordingly, HAIDEP planned the construction of revetments, promenades and

walkways, interceptor pipes, sludge dredging from the lake beds, and the installation of gates and pumps for 85 lakes in the To Lich and Nhue river basins and the Long Bien, Gia Lam, Dong Anh, and Soc Son districts.

Focusing on the To Lich River and Nhue River areas in Central Hanoi, Figure 6.3.6, Tables 6.3.5 and 6.3.6 show the locations and status of lake improvement projects identified in this survey. Progress in the To Lich River area, where lake improvement projects were clearly implemented through Japanese loan projects, is evident. Consequently, water quality has improved, as shown in Table 6.3.7.



Source: Evaluation Team

Figure 6.3.6 Plan and Actual for Lake Improvement

Table 6.3.5 Plan and Actual for Lake Improvement (To Lich River Basin)

Name	HAIDEP						Actual in 2020						Note
	B	W	I	D	G	R	B	W	I	D	G	R	
Linh Dam	O	O	O	O	O	O	O	O	O	O	O	O	
Bay Gian & Ho Dam	O	O	O	O	O	O	O	O	O	O	N	O	
Hao Nam	O	O	O	O	O	O	O	O	O	O	O	O	
Dong Da 1	O	O	O	O	O	O	O	O	O	O	O	O	
Me	O	O	O	O	O	O	O	O	O	O	O	O	
Bay Mau	O	O	O	O	O	O	O	O	O	O	O	O	
Dam Xuai (Khuong Trung 2)	O	O	O	O	O	O	O	O	O	O	O	O	
Dinh Cong 1	O	O	O	O	O	O	O	O	O	O	O	O	
Dam Set (Tan Mai)	O	O	O	O	O	O	O	O	O	O	O	O	
Phuong Liet 1	O	O	O	O	O	O	O	O	O	O	O	O	
Dam Sen (Khuong Trung 1)	O	O	O	O	O	O	O	O	O	O	O	O	
Dam Hong (Khuong Dinh)	O	O	O	O	O	O	O	O	O	O	N	O	
Van Chuong	O	O	O	O	-	-	O	O	O	-	-	-	
Linh Quang	O	O	O	O	-	-	O	O	x	x	O	O	Only gate installation.
Ao Dinh/Ao Cat/Ao To Chi	O	O	O	O	-	-	x	x	x	x	-	-	
Dam Bong	O	O	O	O	-	-	x	x	x	x	-	-	Disappearance
Giap Nhi	O	O	O	O	-	-	x	x	x	x	-	-	
Nha Dao	O	O	O	O	-	-	x	x	x	x	-	-	Disappearance
Dong Ba (Hoang Van Tri)	O	O	O	O	-	-	x	x	x	x	-	-	
Dam Quan (Minh Khai)	O	O	O	O	-	-	x	x	x	x	-	-	
HM-21 (to be confirmed)	O	O	O	O	-	-	O	O	N	O	O	O	
Nuoi Ca	O	O	O	O	-	-	x	x	x	x	-	-	
Ba Mui	O	O	O	O	-	-	x	x	x	x	-	-	
Dong Mo/Duoi Ca	O	O	O	O	-	-	x	x	x	x	-	-	
Cua Dinh	O	O	O	O	-	-	x	x	x	x	-	-	
Dong Vay	O	O	O	O	-	-	x	x	x	x	-	-	
HM-30 (to be confirmed)	O	O	O	O	-	-	x	x	x	x	-	-	Disappearance
Canh Dong Vang	O	O	O	O	-	-	x	x	x	x	-	-	
Ho Yen So	O	O	O	O	-	-	x	x	x	x	-	-	
Mau Tam	O	O	O	O	-	-	O	O	O	O	-	-	
Dam Tri	O	O	O	O	-	-	P	P	P	-	-	-	
Ao Dai	O	O	O	O	-	-	O	O	O	-	-	-	
Boi Quang Ba	O	O	O	O	-	-	x	x	x	x	-	-	
Dam Chuoi (Khuong Ha)	O	O	O	O	-	-	O	O	O	O	O	O	
Ao Thuong	O	O	O	O	-	-	O	O	O	O	-	O	

Source: Evaluation Team

B: Revetment, W: Walkway, I: interceptor, G: Gate and Pump, R: Reservoir

O: Plan/Implemented, x: No Implemented, P: Partial Implemented, N: No Information

Table 6.3.6 Plan and Actual for Lake Improvement (Nhue River Basin)

Name	HAIDEP						Actual in 2020						Note
	B	W	I	D	G	R	B	W	I	D	G	R	
Reservoir (NE-1)	O	O	O	O	O	-	x	x	x	x	x	x	
Reservoir (NE-2)	O	O	O	O	O	-	x	x	x	x	x	x	
Reservoir (NE-3)	O	O	O	O	O	-	x	x	x	x	x	x	
Reservoir (NE-4)	O	O	O	O	O	-	x	x	x	x	x	x	
Reservoir (NE-5)	O	O	O	O	O	-	x	x	x	x	x	x	
Reservoir (NW-1)	O	O	O	O	O	-	x	x	x	x	x	x	
Reservoir (NW-2)	O	O	O	O	O	-	x	x	x	x	x	x	
Reservoir (NW-3)	O	O	O	O	O	-	x	x	x	x	x	x	
Reservoir (NW-4)	O	O	O	O	O	-	x	x	x	x	x	x	
Ao Chuon	O	O	O	O	-	-	x	x	x	x	-	-	
Dong Bong (Dich Vong 2)	O	O	O	O	-	-	x	x	x	x	-	-	
Ao Dai/Ao Bau Due	O	O	O	O	-	-	O	O	O	O	-	O	
Bo Dam (Ha Dinh 2)	O	O	O	O	O	-	O	O	O	-	-	-	
Dai Quat (Ha Dinh 1)	O	O	O	O	-	-	x	x	x	x	-	-	
Ao Sen (Thuy Phuong)	O	O	O	O	-	-	O	O	-	-	-	-	
TT-2 (to be confirmed)	O	O	O	O	O	-	x	x	x	x	x	-	
Ao So	O	O	O	O	-	-	x	x	x	x	x	-	
Dam Ngoc (Ba Xa)	O	O	O	O	O	-	O	O	N	N	N	O	
TT-5 (to be confirmed)	O	O	O	O	-	-	x	x	x	x	x	-	Disappearance
Ao Lung Trieu Chuc	O	O	O	O	-	-	O	O	N	N	x	O	
Ao Lang	O	O	O	O	-	-	x	x	x	x	-	-	
South Thang Long	-	-	-	-	-	O	x	x	x	x	x	x	
Co Nhue	-	-	-	-	-	O	x	x	x	x	x	x	
My Dinh	-	-	-	-	-	O	x	x	x	x	x	x	
Me Tri	-	-	-	-	-	O	x	x	x	x	x	x	
Ba Xa	-	-	-	-	-	O	x	x	x	x	x	x	

Source: Evaluation Team

B: Revetment, W: Walkway, I: interceptor, G: Gate and Pump, R: Reservoir

O: Plan/Implemented, x: No Implemented, P: Partial Implemented, N: No Information

The above 11 lakes were improved as part of the Hanoi Drainage and Environment Improvement Project. Improvements have been completed or are ongoing for 25 lakes, representing approximately 41% of the planned target. In addition, three lakes have disappeared. The limited progress in lake improvement is attributed to Hanoi City prioritizing road and irrigation development in its budget allocations.

Table 6.3.7 presents the results of water quality tests on major lakes in central Hanoi, conducted as part of the Hanoi Drainage and Environment Improvement Project. The tests measured dissolved oxygen (DO), which indicates the amount of oxygen in the water, and biochemical oxygen demand (BOD) and chemical oxygen demand (COD) values, which are common indicators of organic pollution. Inspection results of Bay Mau Lake, Linh Dam Lake and Dong Da Lake—lakes that improved during the second phase of the JICA Hanoi Water Environment Improvement Project—show that values for these indicators, which did not

meet acceptable standards in 2004, all met acceptable standards by 2020 following the project implementation. Factors contributing to this improvement include the removal of lake bottom sludge and the prevention of sewage inflow through the installation of interceptor pipes.

Comparing water quality test results for the same lakes in 1994 and 2020, the environment for aquatic life has improved. The number of lakes with dissolved oxygen (DO) levels above the allowable value of 2 mg/L, increased from 4 in 1994 to 6 in 2020. Regarding biochemical oxygen demand (BOD) and chemical oxygen demand (COD), which are common indicators of organic pollution, the number of lakes with BOD below the allowable value of 25 mg/L decreased slightly from 5 in 1994 to 4 in 2020, while the number of lakes with COD below the allowable value of 35 mg/L increased from 0 in 1994 to 4 in 2020. These results confirmed that overall water quality is improving.

Table 6.3.7 Water Quality of Lake

Lake	Year	Parameter					Time for Improvement
		pH	DO (mg/L)	TSS (mg/L)	BOD (mg/L)	COD (mg/L)	
Giang Vo	1994[1)]	8.21	6.14	26	-	-	1997~2006
	2010[3)]	8.34-8.35	1.68-1.88	-	85-90	-	
	2015[3)]	7.40-7.70	1.86-2.44	-	24-26	-	
	2020[5)]	7.56	4.17	24.7	15.7	21.5	
Thanh Nhan 1	1994[1)]	7.67	1.09	31	28	77	1997~2006
	2020[5)]	6.94	1.48	40.1	29.7	41.5	
Thanh Nhan 2	1994[1)]	7.64	1.69	49	29	65	1997~2006
Thang Cong	1994[1)]	8.75	10.31	33	12	48	1997~2006
Ba Mau	1994[1)]	7.57	1.13	22	24	73	-
	2010[3)]	8.33-8.62	2.37-3.12	-	60-65	-	
	2015[3)]	8.9-9.0	4.63-4.81	-	25-27	-	
	2020[5)]	7.34	3.45	28	20.7	29.5	
Thien Quang	1994[1)]	7.72	1.48	18	19	62	1997~2006
	2010[3)]	8.20-8.55	3.76-4.13	-	80-110	-	
	2015[3)]	7.30-7.60	3.31-3.83	-	18-23	-	
	2020[5)]	7.74	0.99	45.8	42.6	43	
Bay Mau	1994[1)]	8.97	11.57	16	-	-	2008~2016
	2004[2)]	8.03	7.15	58	94	158	
	2020[4)]	7.23	7.00	41	9.5	20	
Linh Dam	1994[1)]	7.53	0.91	14	18	50	2008~2016
	2004[2)]	8.95	0.15	34	348	504	
	2020[4)]	7.72	5.50	19	12.7	26	
	2020[5)]	7.24	2.58	29.6	17.9	23	
Dinh Cong	1994[1)]	8.12	1.97	13	12	40	2008~2016
	2004[2)]	7.35	1.45	27	120	184	
	2022[6)]	7.00	5.10	31	28	35	
Dong Da	1994[1)]	8.05	4.20	35	17	51	2008~2016
	2004[2)]	9.05	0.15	40	210	324	
	2015[3)]	7.00-7.10	1.29-3.83	-	20	-	
	2020[4)]	7.70	6.70	27	11	32	
	2020[5)]	7.12	5.14	32.2	18.3	24.3	
Ngoc Khanh	1994[1)]	8.64	7.48	32	18	66	2008~2016
	2020[4)]	7.50	5.10	22	12	26	

Applied water quality standards are:

TCVN 5942-1995 Maximum allowable concentration of pollutants in surface water

TCVN 5945-1995 Industrial wastewater maximum allowable concentration of pollutants

pH: 5.5~9.0, DO (Dissolved Oxygen): >2.00 mg/L, BOD (Biological Oxygen Demand): <25 mg/L, COD (Chemical Oxygen Demand): <35 mg/L

Source: Evaluation Team

1): The Study on Urban Drainage and Wastewater Disposal System in Hanoi City

2): Feasibility Study Report and Implementation Program for Drainage Project for Environment Improvement in Hanoi - Second Stage

3): Hanoi Lakes Report 2015/Center for Environment and community Research

4): Current Environment Status of Hanoi City in 2020 Report – Department of Resource and Environment

5): Water Quality Assessment and Eutrophic Classification of Hanoi Lakes Using Different Indices/Vietnam Journal of Agricultural Sciences

6): Assessment of the Status of Environmental Protection Work in Hoang Mai District – Institute of Environmental Engineering and Technology

6.3.5 Flood Protection

As flood protection measures, HAIDEP proposed strengthening dykes, rehabilitating existing structures, and constructing early warning systems for the Red River adjacent to the central Hanoi, the Duong River east of Hanoi, and the Day River south of central Hanoi. Table 6.3.8 below shows the rivers and the lengths of dykes strengthening projects implemented from 2010 to 2020.

Table 6.3.8 Improved Dyke Length of Major Rivers

Unit: m

River	2010-2011	Y2012	Y2013	Y2014	Y2015	Y2016	Y2017	Y2018	Y2019	Y2020	Total
Red	9,445	11,630	1,873	3,370	1,200	1,100	4,723	5,150	4,617	3,820	46,928
Duong	6,058	5,433	136	-	2,115	2,000	-	1,205	830	280	18,057
Day	3,244	11,668	4,474	6,014	1,944	2,158	-	1,678	694	7,145	39,019
Other	17,007	16,388	1,300	1,060	1,000	400	1,000	2,144	4,356	2,490	47,145
Total	35,754	45,119	7,783	10,444	6,259	5,658	5,723	10,177	10,497	13,735	151,149

Source: Evaluation Team

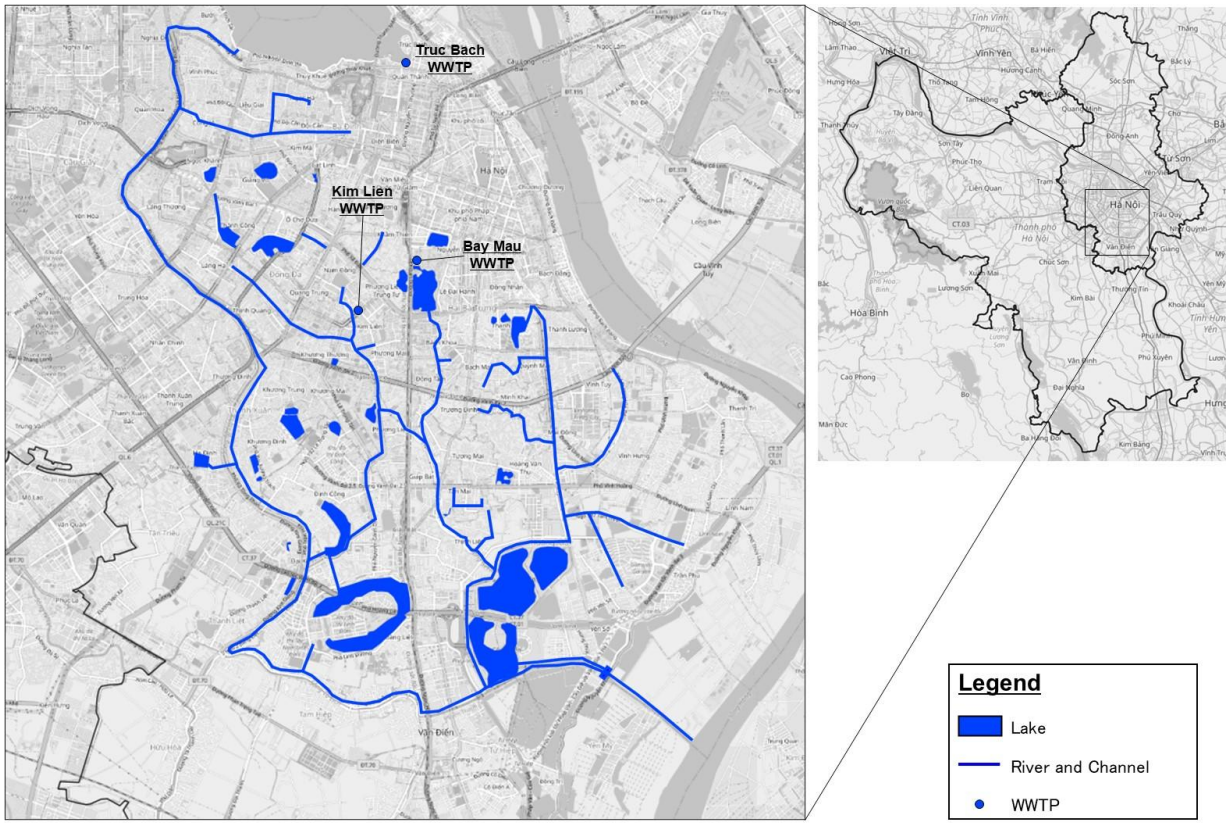
From 2010 to 2020, a total of 151 km of dykes were strengthened. Dyke strengthening along the major rivers—Red, Duong, and Da—accounts for 69% of the total. In line with the expansion of Hanoi, dyke strengthening along other rivers is also being promoted.

No information was available on the development of a warning system.

6.4 Assessment of Project-level Achievements

6.4.1 Hanoi Drainage Project for Environmental Improvement (Japanese ODA Loan)

The project was implemented in two stages: the first from 1997 to 2006, and the second from 2008 to 2016, covering an area of approximately 78 km^2 in central Hanoi. The project aimed to implement flood control measures and improve the sanitary environment. Water environment-related improvements included river rehabilitation, construction of large-scale pumping stations, lake improvement, construction of retention basins, development of wastewater treatment plants, and installation of sewerage pipelines.



Source: Evaluation Team

Figure 6.4.1 Location of Drainage Project for Environment Improvement in Hanoi In Relation to Water Environment Development

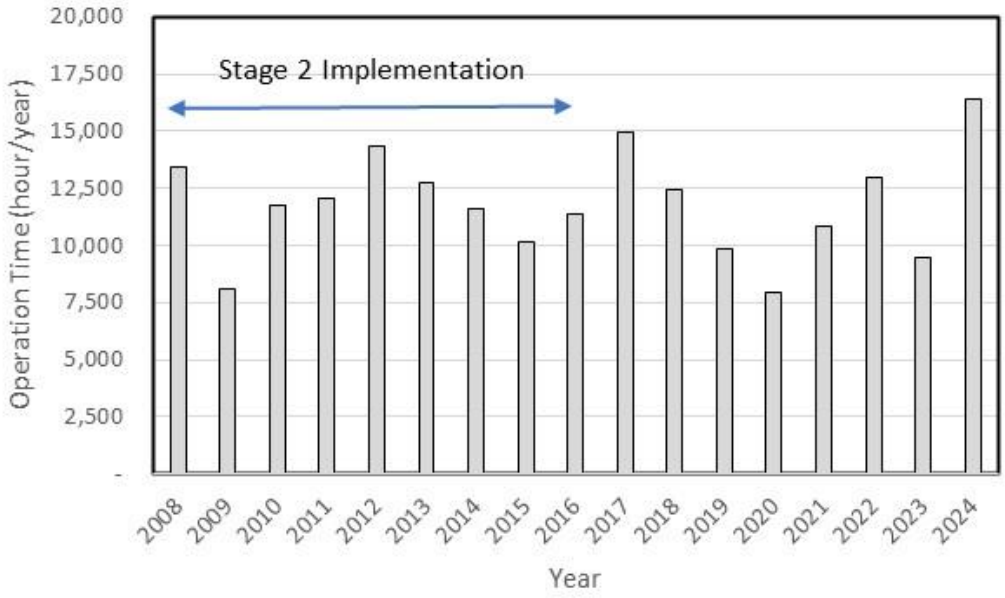
The team visited more than a dozen locations developed through the project to survey the current conditions, and in particular interviewed managers of pumping stations and wastewater treatment plants to assess the operation and maintenance status of the facilities.

(1) Yen So Pump Station

As part of a facility that can handle 310 mm of rainfall over two days, pumps with a total capacity of 90 m^3/sec were installed in two stages. In Stage 1, five pumps with a capacity

of 3 m^3/sec and six pumps with a capacity of 5 m^3/sec were installed. In Stage 2, nine pumps with a capacity of 5 m^3/sec pumps were installed.

Regarding the pump operation as shown in the records in Figure 6.4.2 below, it was disclosed that they have been operating without any problems every year.



Source：: Evaluation Team

Figure 6.4.2 Operation Record of Yen So Pump

According to Appendix A, the rainfall during Typhoon Yagi in September 2024 exceeded the design rainfall. However, because the pumps were operating at full capacity, no significant flood damage was reported in central Hanoi, confirming that the facilities developed under the Hanoi Drainage for Environment Improvement Project were functioning effectively. It was also disclosed that there were no maintenance issues with the pumps, as the supplier has branches and agents in Vietnam. It was further observed that the land subsidence around the pump station, an issue since its construction, continues, although the rate of subsidence has decreased. The following shows the condition of the pump station as inspected on April 24, 2025.

Pump

Inlet Canal

Pump House and Surcharge Tank

-

Source: Evaluation Team

Figure 6.4.3 View of Yen So Pump Station

(2) Bay Mau Wastewater Treatment Plant

A wastewater treatment plant was constructed underground on a site of approximately 5,060 m^2. The second stage of the project commenced in June 2012 and was completed in November 2015. The plant employs the standard activated sludge treatment method, with a design capacity of 13,300 m^3/day and a target population of 41,200.

According to interviews, the average treatment capacity over the past three years has been 11,500 m^3/day. Treated water is discharged into three lakes adjacent to the treatment plant: Bay Mau Lake, Ba Mau Lake and Thien Quang Lake. However, discharge into Thien Quang Lake has been suspended since 2024 due to repairs to the drainage pipes. The supplier of the broken treatment equipment, such as diffuser and air blower (WAMKOREA, Korea), could not be contacted, so these components were replaced with products from another company (Annette, USA). Regarding the SCADA system used to monitor and control treatment operations, attempts to replace two broken units led to consideration of alternative suppliers due to high cost of the product. Although the sewage treatment system remains operational, this study identified maintenance challenges, particularly difficulties in procuring replacement parts for the original

equipment installed during construction.

The following presents the condition of the wastewater treatment plant as observed during the inspection on April 24, 2025.


Interview


Control House


Plant View


Plant View


Grid Tank


Sedimentation Tank

Source: Evaluation Team

Figure 6.4.4 View of Bay Mau Wastewater Treatment Plant

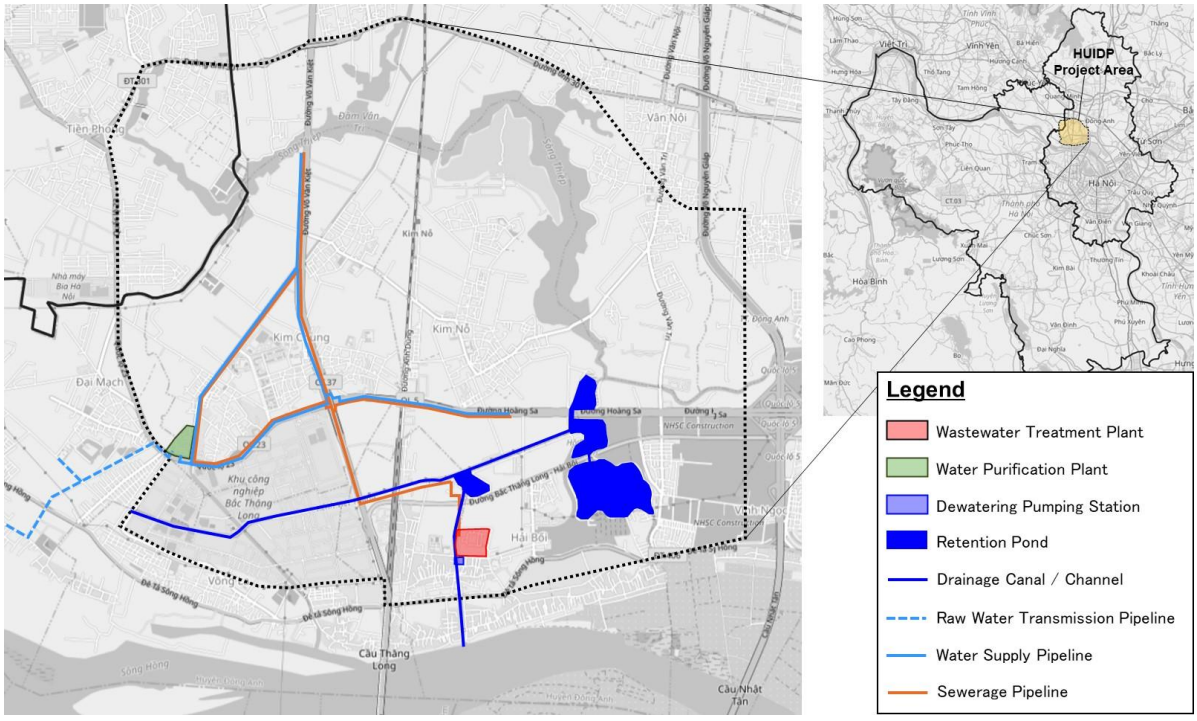
(3) Status Before and After the Construction of Facilities

Appendix B compares the status of three channel improvement sites and eight lake improvement sites developed under the project with their pre-project conditions. The results of the site survey are summarized below.

- In the channels, the condition of the revetments constructed with wet masonry is good. In areas where culverts were installed, the water environment has improved due to the reduced odors and the prevention of direct garbage dumping. Additionally, the space created by the culverts is being effectively utilized as roads and parking areas. To maintain Hanoi's drainage function, it is necessary to regularly clean the inside of the culverts; however, no evidence of such maintenance was confirmed.
- For lake improvement, revetments were constructed, interceptor pipes were installed, and sludge was dredged from the lakebed. As a result, the areas surrounding the lakes have been landscaped and transformed into parks, providing recreational spaces for residents. However, in some lakes where fish were released, nearby residents reported complaints about odors from dead fish.

6.4.2 Thang Long North – Van Tri Urban Infrastructure Development Project under Hanoi Urban Infrastructure Development Project (Japanese ODA Loan)

The project was implemented from October 2000 to May 2009 in the North Thang Long District of Hanoi, aiming to support regional development, including industrial park and housing construction, increasing industrial production, expansion of residential areas, export growth, foreign currency acquisition, and the alleviation overcrowding in central Hanoi. Water environment-related improvements under the project included enhancements to water supply, drainage, and wastewater treatment systems.



Source: Evaluation Team

Figure 6.4.5 Location of Thang Long North – Van Tri Urban Infrastructure Development Project in Relation to Water Environment Development

The water treatment plant, constructed in 2005, has a capacity of 51,360 m^3/day, corresponding to the water demand in North Thang Long District. In 2005, the district's water demand was 22,400 m^3/day; however, in 2007, water transmission pipelines were installed to supply water demand to central of Hanoi in response to increasing demand. Furthermore, from 2012 to 2016, 15,000 to 20,000 m^3/day of water was transmitted to the Long Bien and Gia Lam districts. By 2025, a total of 3,300 m of transmission pipelines had been installed, including 4,500 m of pipelines to central Hanoi and 2,300 m to the Long Bien and Gia Lam districts.

The current capacity of the water treatment plant is 150,000 m^3/day. An expansion planned for 2027 is expected to achieve the master plan target capacity of 300,000 m^3/day by 2030. Spare parts for maintenance of the water treatment plant are procured without any issues.

In 2016, the water source comprised 25,000 m^3/day of groundwater intake and 25,000 m^3/day of surface water intake from the river. Since 2018, all water has been sourced from the Red River, with a total intake of 150,000 m^3/day.

The water supply coverage rate in North Thang Long was 95% in 2025, and the NRW rate was 3%.

Based on the above, the water treatment plant developed under the Project is functioning smoothly. It was also confirmed that the plant's capacity is being independently expanded and utilized to meet water demand in other areas of Hanoi. The following shows the water treatment plant as inspected on April 25, 2025.


Interview


Monitoring System


Pump


Filtration Pond


Water Tank

-

Source: Evaluation Team

Figure 6.4.6 View of North Thang Long Water Treatment Plant

6.4.3 Yen So Wastewater Treatment Plant (Build-Transfer Model with Private Developer)

HAIDEP planned the construction of a wastewater treatment plant downstream of the Upper Kim Nguu River. GAMUDA, a Malaysian foreign-affiliated private company, independently prepared a feasibility study (F/S) for the wastewater treatment plant and associated housing development and submitted it to Hanoi. Hanoi approved the F/S in 2010 based on Decision No.3000/QD-UBND (July 28, 2008), and GAMUDA constructed the wastewater treatment plant using the engineering, procurement, construction (EPC)

method. The wastewater treatment plant was transferred from GAMUDA to the Department of Construction (DOC) in October 2013 and is currently operated and maintained by a local private company, O&MC and SFC (JV), commissioned by the DoC. The plant has a treatment capacity of 200,000 m^3/day, consisting of 125,000 m^3/day from the Kim Nguu River basin, 65,000 m^3/day from the Set River basin, and 10,000 m^3/day from the Gamuda Urban Area. Wastewater is abstracted from the Set River through a culvert downstream of a weir. As interceptor sewers have not been installed along the Upper Kim Nguu River or the Set River, the plant treats river water that receives untreated sewage directly. The treatment process is the sequential batch reactor (SBR) activated sludge method, and spare parts for maintenance can be procured without difficulty.

The private company also developed a downstream park and, with approval from the city of Hanoi, carried out a housing development on a 500 ha plot of land adjacent to the park (Gamuda Urban Area). This is a notable example of integrated development combining a wastewater treatment plant, a park, and residential development.

The following shows the wastewater treatment plant as inspected on April 24, 2025.


Interview


Inlet at the Kim Nguu River


Sedimentation Tank

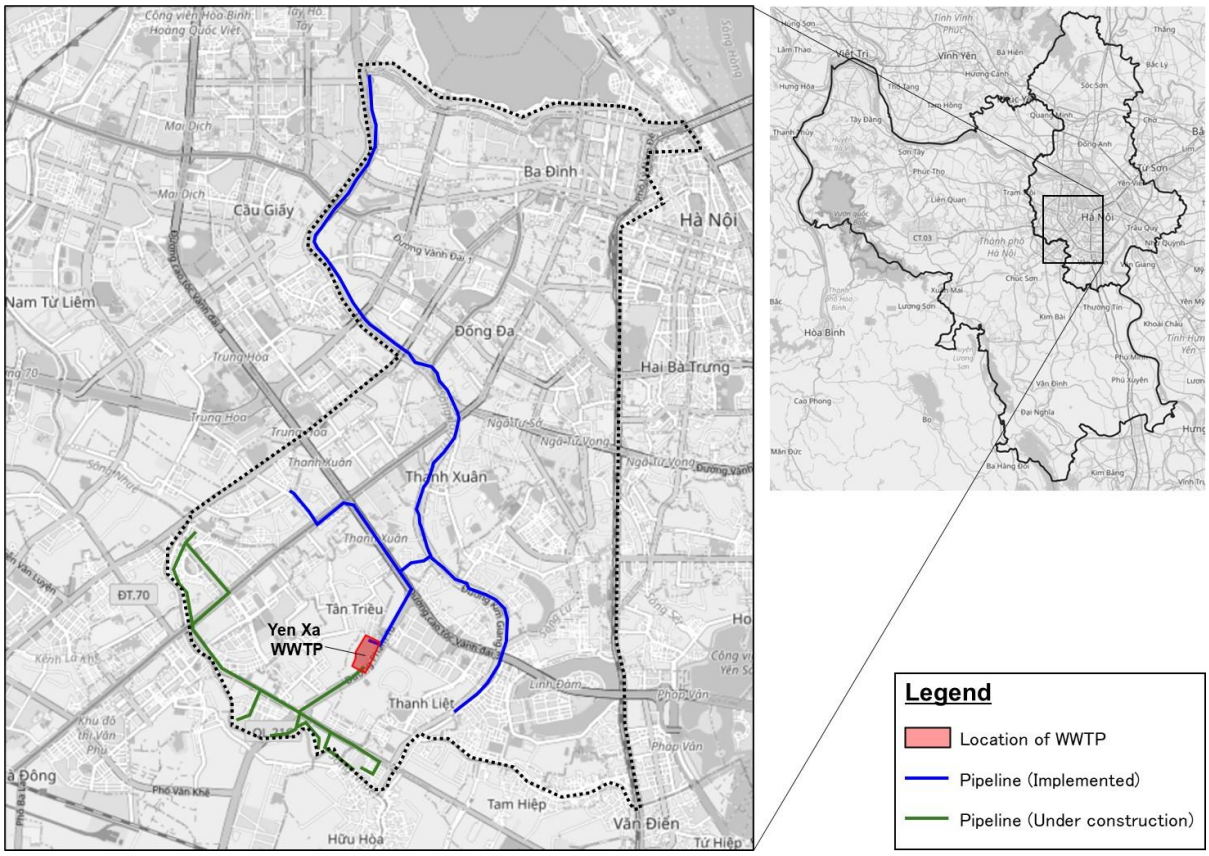

Treated Water

Source: Evaluation Team

Figure 6.4.7 View of Yen So Wastewater Treatment Plant

6.4.4 Yen Xa Wastewater Treatment Plant in Hanoi (Japanese Yen Loan)

This project develops a sewerage system for approximately 900,000 beneficiaries in an area of about 4,874 ha in the To Lich River basin, Lu River basin and Ha Dong basin in central Hanoi. The project commenced in March 2013. As of the end of April 2025, an interceptor sewer has been installed in the To Lich River, and a wastewater treatment plant with a capacity of 270,000 m^3/day has been constructed in Yen Xa. The project improves the water environment by intercepting sewerage that would otherwise flow directly into major rivers.



Source: Evaluation Team

Figure 6.4.8 Location of Yen Xa Wastewater Treatment Plant in Hanoi

6.4.5 The Project for Enhancing Management Capacity of Sewerage Works (JICA Technical Assistance)

This project was implemented from January 2016 to December 2019 to enhance institutional capacity for sewerage planning and implementation in order to train sewerage engineers to support Vietnam's expanding sewerage development. The principal beneficiaries of this support included the Ministry of Construction (MOC), the Administration of Technical Infrastructure (ATI), the College of Urban Works Construction (CUWC), and the Training Center for Water and Environment (CNEE) under CUWC. Activities were conducted to achieve the following results.

Table 6.4.1 Project Results

Output
1. Comprehensive human resource development needs for the sewerage sector were identified.
2. The organizational structure and establishment plan for implementing training in the sewerage sector were drafted and submitted to the competent authorities.
3. Basic training courses were implemented based on the comprehensive curriculum.
4. A sewerage and drainage master plan for a specific city was developed, and the experience gained during its development was incorporated into and shared through the basic training courses.

Source: The Project for Enhancing Management Capacity of Sewerage Works

As part of the activities, the following recommendations were proposed.

Table 6.4.2 Recommendations for Respective Support Targets

Targets	Recommendations
CUWC	- Training in the "Sewerage Planning and Design" module should continue beyond the completion of the project. - The training program should be financially self-sustaining. To achieve this, training fees should be collected from participants, and a stable number of trainees should be maintained.
ATI	- Encourage the MOC to provide and increase subsidies for the implementation of sewerage projects. - Promote the preparation of sewerage master plans for each municipality that incorporate house connections and support the development of appropriate sewerage plans. - Instruct local authorities to strengthen house connections and address issues in Vietnam's existing sewerage system. - Establish a qualification system for sewerage planning and design engineers, managers, and plumbers responsible for house connection work. - Continue and maintain training in the Sewerage Planning and Design module, providing institutional support for proper sewerage planning and system development. - Cooperate with CUWC to continue and maintain the training on the Sewerage Planning and Design module conducted by CUWC.
Local Government	- Develop sewerage master plans that consider branch line culverts and house connections. - Draw lessons from Buon Me Thuot City, Da Lat City, and Binh Duong Province, where the quality of water in city rivers and influent to wastewater treatment plants has improved through the construction of house connections and branch line culverts. Conduct awareness-raising and publicity activities to enhance residents' understanding of sewerage projects and the importance of house connections. - Prioritize the construction and rehabilitation of branch line pipelines and house connections. - Introduce and utilize a sewerage pipeline database system to support the implementation of an effective sewerage system.

Source: The Project for Enhancing Management Capacity of Sewerage Works

This technical cooperation focuses on human resource development in the implementation, operation, and management processes of the urban planning proposed under HAIDEP. Sewerage development is a key area within the water environment sector of the subsector program. This support project enhanced Vietnam's sewerage planning and implementation capabilities through a comprehensive human

resource development initiative.

This project also contributes to the formulation of a sewerage plan for Hanoi City. However, since some of wastewater treatment plants in Hanoi are currently operated by private companies, it is difficult to directly verify the results.

6.4.6 The Project for Enhancing Capacity in Establishing Legal Framework and Management for Urban Drainage and Wastewater Treatment in Vietnam (JICA Technical Assistance)

This project, based on a technical cooperation request from the MOC of Vietnam, aims to address the complexities in the existing legal system in the sewerage sector by streamlining key legal instruments, including laws, government ordinances, and ministerial regulations. The project also seeks to elevate the policy priority of sewerage projects through the establishment of clear legal provisions. Implementation of the project is planned for 36 months, commencing in October 2023.

HAIDEP also emphasized the critical need for developing human resources capable of supporting the implementation, operation, and management of urban planning systems. Although sewerage projects were proposed, progress has been constrained by legal and institutional bottlenecks. In response to these challenges, the MOC recognized the need to strengthen sewerage development at the national level in Vietnam and initiated a comprehensive project focused on both human resource development and legislative reform.

The principal beneficiary of this support is the Administration of Technical Infrastructure (ATI) under the MOC, with activities carried out to achieve the following results.

Table 6.4.3 Project Result

Output
1. Laws governing sewerage projects have been established.
2. Government ordinances related to sewerage projects have been established.
3. The necessary infrastructure for collecting statistical data has been established.
4. Infrastructure enabling local government to formulate sewerage project management ordinances has been established.

Source: Technical Cooperation for Capacity Enhancement in Legal Framework for Management of Urban Drainage and Wastewater Treatment

This project aims to raise the policy priority of sewerage development in Vietnamese cities and accelerate its implementation, building on lessons learned from Hanoi.

6.5 Target Indicators Proposed by HAIDEP

The target indicators for the water environment subsector program are based on the objectives and targets outlined in the Hanoi City Socio-economic Development Plan for 2006-2010 and are as follows.

Table 6.5.1 Target Indicators for Water Environment Subsector Program

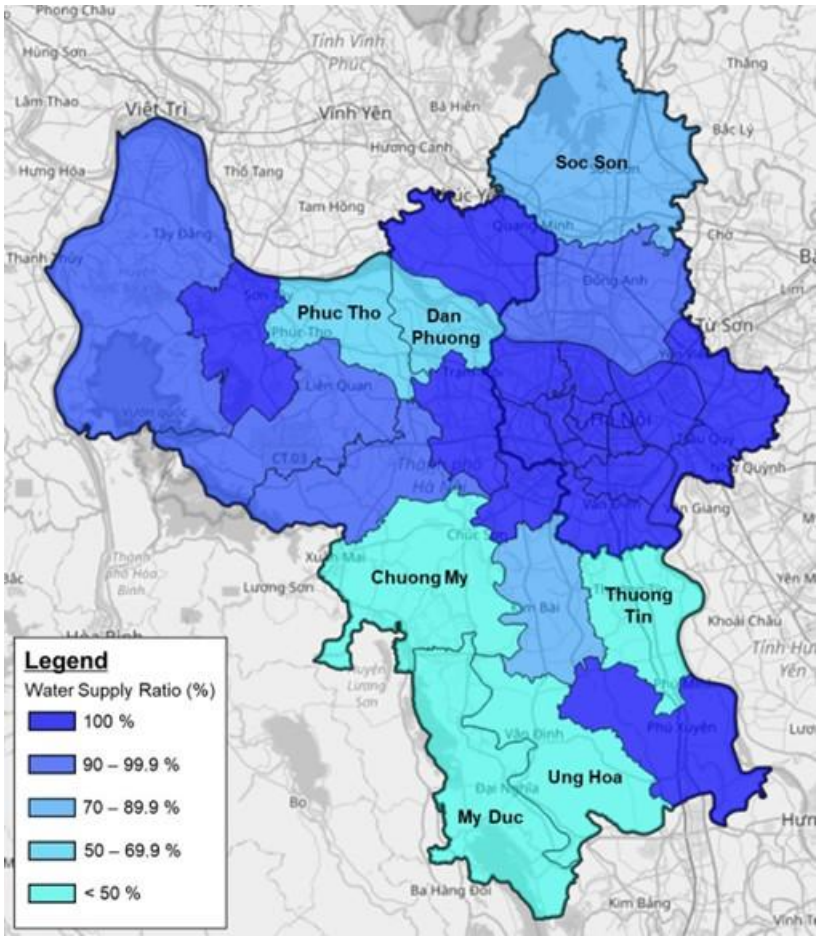
Index	Year 2020
Coverage of Water Supply (%)	99
Drainage Service Area (system able to respond to rainfall volume of 310 mm/2 days) (ha)	45,291
Coverage of Sewage (%)	49

Source: HAIDEP

The following table shows the status of each of the items listed above for the year 2020. Note that these indicators correspond to an area of 921 km^2, reflecting the boundaries of Hanoi prior to its expansion in 2008.

6.5.1 Coverage of Water Supply

Figure 6.5.1 shows the water supply coverage rate in Hanoi in 2020. Prior to the 2008 expansion, coverage in Hanoi exceeded 90% or even 100% in most areas, except for Soc Son District in the north, where it was 70%, close to the target indicator. In the western districts of Hanoi, coverage remains high at over 90%. However, in Dan Phuong and Phuc Tho districts in the north, coverage rates were lower at 68% and 54%, respectively. In the southern districts of Chuong My, My Duc, Ung Hoa, and Thuong Tin, coverage rates were 45%, 40%, 38%, and 45%, respectively. These districts still rely heavily on private wells, highlighting the need to develop water supply systems using surface water from rivers. The ongoing transition of water sources is presented in Table 6.6.1 in Section 6.6.2.



Source: Evaluation Team

Figure 6.5.1 Coverage of Water Supply in 2020

In addition, the capacity of water treatment plants increased to 1,389,400 m^3/day in 2025, compared with 938,000 m^3/day in 2010, representing an approximately 1.5-fold increase over 15 years.

6.5.2 Drainage Service Area

By 2020, drainage improvements had been implemented over 7,750 ha in the To Lich River basin through the Drainage Project for Environment Improvement in Hanoi and 2,950 ha in part of the Donh Anh Basin through the Thang Long North–Van Tri Urban Infrastructure Development Project, totaling 10,700 ha. This represents an achievement rate of less than 24% of the target of 45,291 ha. The To Lich River area serves as Hanoi's political and economic center, while the Dong Anh area was developed as one of Vietnam's earliest industrial zones. The implementation of these priority projects, funded by Japanese loans, has been highly significant for improving drainage across the expanded Hanoi capital area.

As shown in Table 6.3.3 in Section 6.3.2, the completion rates of retention basins and pumps are 41% and 51%, respectively. These figures indicate that the reservoirs and pumps are progressing in line with the targets set by HAIDEP.

Regarding urban drainage improvement work, the under-completion is presumed to be due

to insufficient funding, as drainage development in Hanoi has historically received low priority. Nevertheless, it is desirable that drainage improvement work be carried out in accordance with HAIDEP to reduce flooding in other areas and to minimize adverse impacts on citizens' lives and urban activities.

6.5.3 Coverage of Sewerage

Sewerage coverage is calculated as the ratio of the population served by the sewerage service area to the total population of Hanoi. Sewerage infrastructure comprises two system types: combined and separate. For population served by combined system, the effective coverage is calculated by applying a factor of 90%. The population figures used to derive the sewerage coverage rate are shown below.

Table 6.5.2 District Population

Unit*: 1,000 persons

District	a. HAIDEP*	b. Hanoi Statistical Yearbook*	b / a (%)
Ba Dinh	199.0	225.6	113
Hoan Kiem	118.0	139.3	118
Hai Ba Trung	229.0	303.5	133
Dong Da	257.0	375.0	146
Tay Ho	182.0	164.2	90
Thanh Xuan	182.0	295.9	163
Cau Giay	217.0	295.2	136
Hoang Mai	428.0	521.9	122
Long Bien	358.0	330.2	92
Tu Liem	629.0	619.8	99
Thanh Tri	251.0	285.5	114
Soc Son	305.0	351.6	115
Dong Anh	757.0	411.7	54
Gia Lam	389.0	290.9	75
Total	4,501.0	4,610.3	102

Source：HAIDEP, Hanoi Statistical Yearbook

Of the 14 districts, nine had populations higher than those projected by HAIDEP, with the total population approximately 2% above the HAIDEP projection.

The population served by sewerage systems is shown in Table 6.3.4 in Section 6.3.3. In 2020, the population served by sewerage systems was 872.4 thousand, resulting in a coverage rate of 19% for the total population of 4,610.3 thousand shown in Table 6.5.2, which falls short of the HAIDEP target of 49%. However, with the completion of the Yen Xa Wastewater Treatment Plant in 2025, which has a treatment capacity of 270,000 m^3/day, and serves the Lu River basin and the lower To Lich River basin, the sewerage coverage rate increases to 38%. This reflects that the sewage system in central of Hanoi has been largely developed, particularly with support from Japanese ODA.

The development of wastewater treatment plants has increased the total treatment capacity

by approximately 11-fold over 15 years, rising from 48,000 m^3/day in 2010 to 540,000 m^3/day in 2025.

According to interviews with the relevant ministries, delays in the development of wastewater treatment plants have been attributed to difficulties in land acquisition, challenges in securing project funding, and the complexity of establishing an implementation framework within a limited legal system. Looking ahead, in line with the 2013 Master Plan, it is expected that Hanoi's water environment will improve through the installation of interceptor pipes in the Set River and Kim Nguu River, where sewage still flows directly, and by prioritizing the construction of sewerage systems in the rapidly growing western and eastern districts of Hanoi. However, overcoming the challenges remains a critical issue for realizing these improvements.

6.6 Objectives of Subsectors in HAIDEP

The three main objectives of HAIDEP, as outlined in Section 6.1.1, have been verified based on the data collected during the survey and the results of the community interviews conducted.

6.6.1 Ensure the People's Safety and Health

The interview survey was conducted at a total of 15 locations, including nine sites around the lake improvement areas and six sites around the channel improvement areas in the To Lich River basin, which were developed as part of the Drainage Project for Environment Improvement in Hanoi. The results of the survey are summarized in Appendix C.

The objective of the Drainage Project for Environment Improvement in Hanoi was to "improve drainage so that it can handle 310 mm of rainfall over two days." Prior to the project's completion in 2016, severe flooding caused significant damage including inundation of houses, deterioration of sanitary conditions, and disruption of traffic. The following photo illustrates the flooding situation in Hanoi before the project.

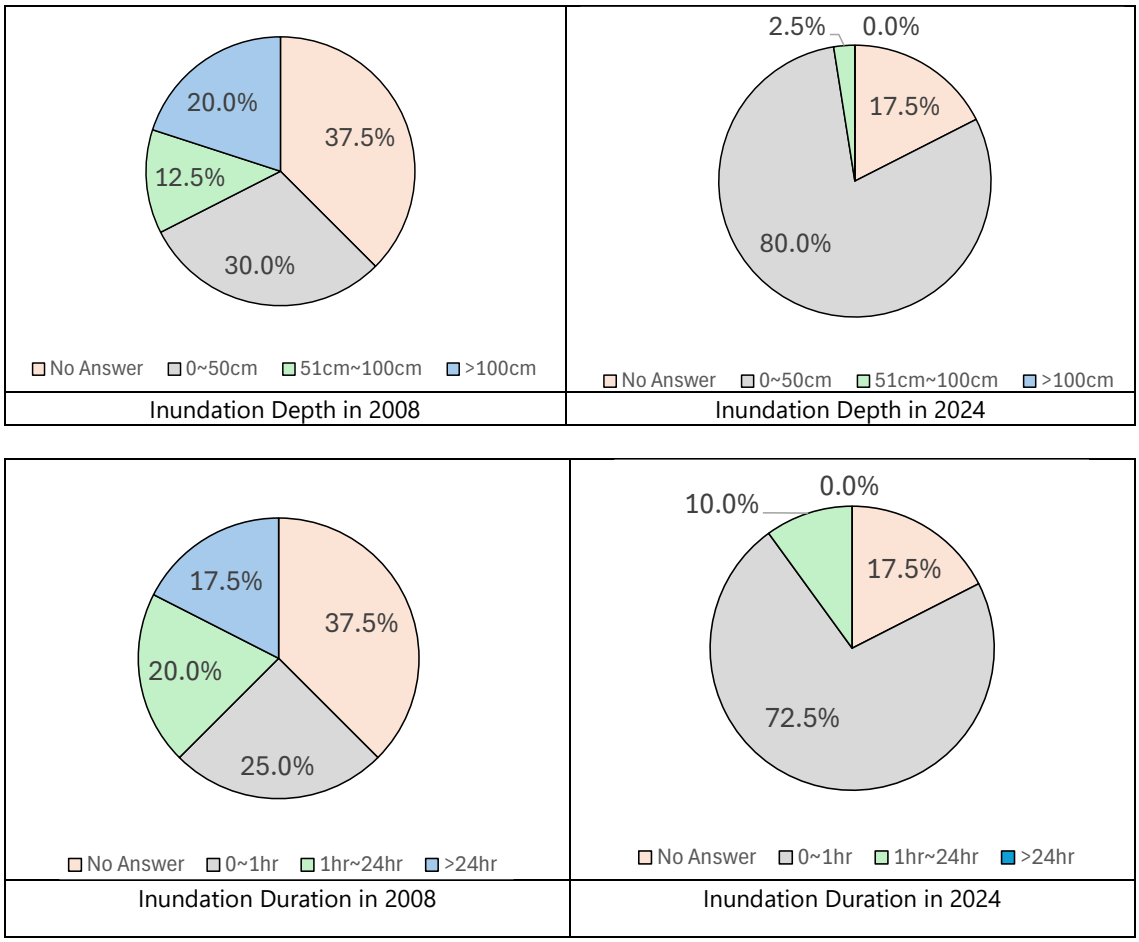
May 20, 1994

August 3, 2001

Source: Evaluation Team

Figure 6.6.1 View of Inundation Damages

Regarding the effects of flood control improvements, the following summarizes the results of interviews with 40 residents concerning the depth and duration of flooding before the project in 2008 and after the project in 2024. In both years, rainfall exceeded 310 mm over a two-day period.



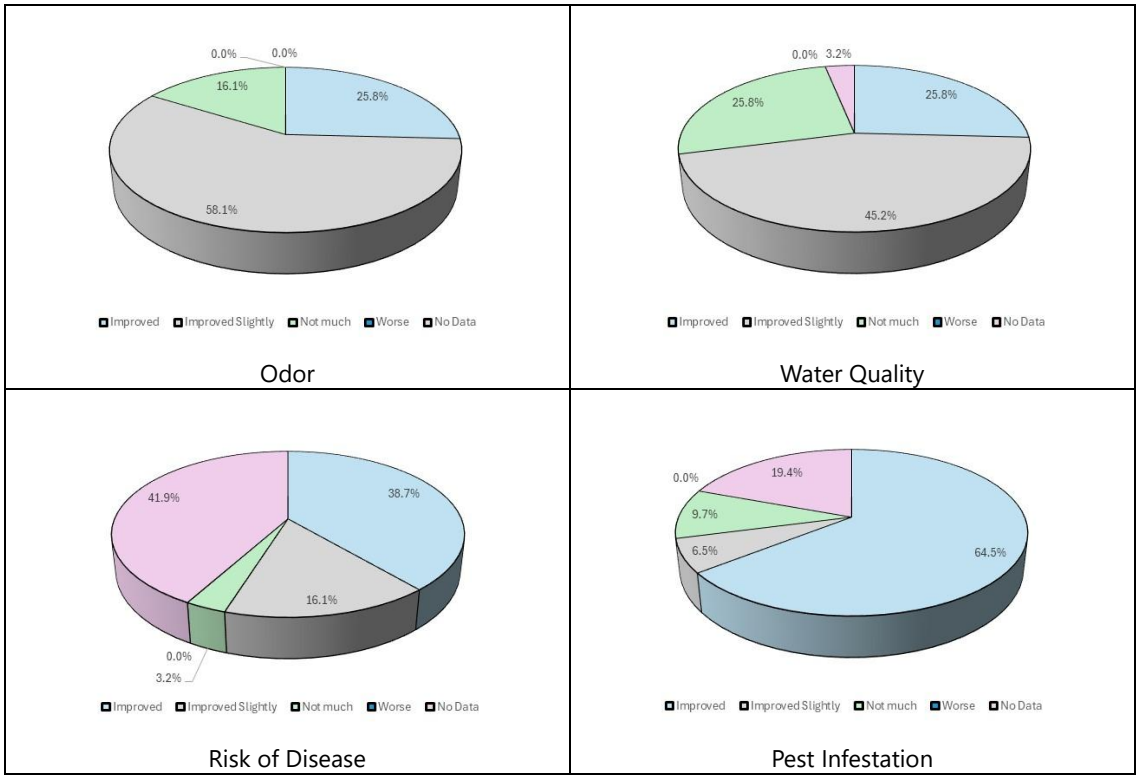
Source: Evaluation Team

Figure 6.6.2 Inundation Depth and Duration Before and After Implementation of the Project

Before the project, areas with inundation depths of 51 cm or more accounted for over 32% of the total, whereas after the project, this proportion decreased to less than 3%. The proportion of areas where inundation duration was less than one hour increased from 25% to 73%, demonstrating the effectiveness of the flood control measures implemented by the project.

The contribution of the Hanoi Water Environment Improvement Project, which prioritized drainage measures in the To Lich River area—the political and economic heart of Hanoi—covering approximately 78 km^2, has been significant. It is expected that this achievement will contribute to improving drainage across the entire city, which has expanded to 3,344 km^2. However, as shown in Table 6.3.3 in Section 6.3.2, the development of retention basins and pumps has reached only about half of the planned level, which is insufficient to cover the expanded Hanoi capital area.

The following figure presents the results of interviews regarding the residents' health. Thirty-one residents from areas where lakes and channels were improved were interviewed about the status of odors, water quality, diseases, and pests.



Source: Evaluation Team

Figure 6.6.3 Hearth Assessment After Implementation of the Project

With respect to lake improvement, sewage inflow was prevented through the removal of lakebed sludge and the installation of interceptor pipes. For channel improvement, sludge was removed from the channel bed, and culverts were installed in selected areas. As a result, 84% of residents reported improvements in odors, and 71% reported improvements in water quality. In addition, 55% and 71% of residents reported improvements in disease risk and pests occurrences, respectively—both key public health indicators—suggesting that the implementation of HAIDEP has contributed to improving the safety and health of residents. However, 65% of the 85 lakes have not yet been improved, and many lakes and ponds still require rehabilitation.

In addition, wastewater treated in household septic tanks is directly discharged into channels, rivers, and lakes. The following photos show the current conditions of the To Lich River, Set River, and K5B Canal, which were improved under the Drainage Project for Environment Improvement in Hanoi. Although more than a decade has passed since the project was completed, the revetments remain in good condition. However, water quality is poor, and unpleasant orders persist due to the direct discharge of sewage into these water bodies.

To Lich River

Set River

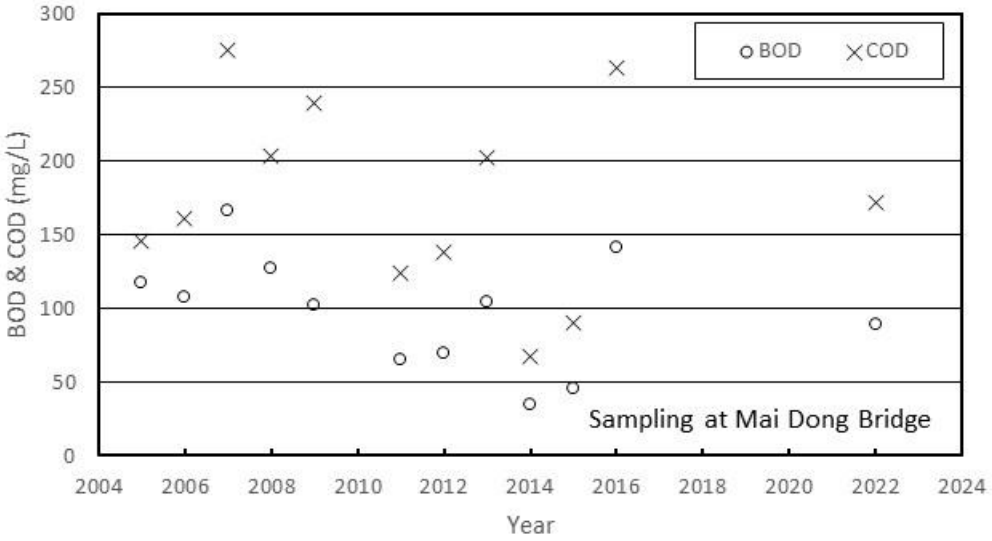
K5B Canal

-

Source: Evaluation Team

Figure 6.6.4 View of River and Channel

HAIDEP proposed a sewerage system in which interceptor pipes would be installed to collect sewage from households and convey it to wastewater treatment plants; however, the current implementation of this system remains insufficient (an interceptor pipe has been installed in the To Lich River under the Yen Xa Wastewater Treatment Plant Project). The allowable limits for river water quality standards are ≤25 mg/L for biochemical oxygen demand (BOD) and ≤35 mg/L for chemical oxygen demand (COD), but the water quality of the Upper Kim Nguu River, shown in Figure 6.6.5, does not meet these standards.



Source: Evaluation Team

Figure 6.6.5 Water Quality of Upper Kim Nguu River

However, as mentioned in Section 6.4.5, there are examples in cities such as Buon Ma Thuot and Da Lat, and Binh Duong Province, where systems to prevent sewage discharge into rivers have been established under the technical cooperation. Therefore, it is possible to follow these advanced examples in constructing systems to prevent sewage from entering rivers.

6.6.2 Promote Sustainable Use of Water Resources

HAIDEP proposed a gradual shift in water supply sources from underground to surface water from rivers. This approach is based on reducing groundwater abstraction while meeting increasing water demand driven by population growth with urban development and to conserve underground water resources. The table below compares the current state of water source development with HAIDEP.

Table 6.6.1 Variation of Water Source

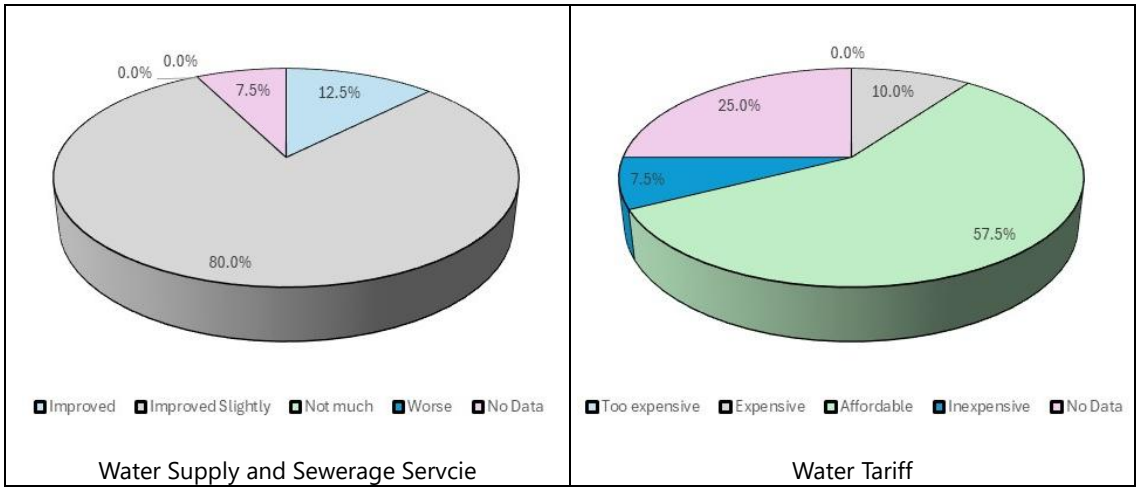
Status	Water Source	1. Year 2020	2. Year 2024	2. – 1.
HAIDEP	a. Underground Water (m^3/day)	721	-	-
	b. Surface Water (m^3/day)	1,150	-	-
	c. = a. + b. (m^3/day)	1,871	-	-
	b. / c.	61%	-	-
Actual	d. Underground Water (m^3/day)	592	492	-100
	e. Surface Water (m^3/day)	566	747	181
	f. = d. + e. (m^3/day)	1,158	1,239	81
	e. / f.	49%	60%	11%

Source: Evaluation Team

In 2020, HAIDEP planned that river surface water would account for 61% of total water intake;

however, the actual share was 49%. From 2023 onwards, water intake from the Duong River has increased significantly, and intake from the Da River has continued to increase annually. In 2024, river surface water accounted for 747 m^3/day, equivalent to 60% of total water intake. Overall, in line with the HAIDEP Plan, the water source is gradually shifting to river surface water to meet growing water demand while conserving underground water resources.

The following data present residents' assessment of water supply and sewerage services. Compared with the situation around 2000, 93% of residents reported that current services have improved. In addition, 65% of residents indicated that the current water tariff is cheap or acceptable.



Source: Evaluation Team

Figure 6.6.6 Assessment of Water Supply and Sewerage Service

As described above, residents' positive evaluations of water services are attributed to the achievement of a stable water supply based on the conservation of water resources. As noted in Section 6.2.1, the water source is expected to continue shifting from groundwater to the surface water of major rivers, including Duong, Da, and Red rivers in accordance with the master plan.

6.6.3 Enhance the City's Image by Improving Water Environment and Sanitation Conditions

Regarding urban improvements, the lake and channel enhancement works carried out under the Drainage Project for Environment Improvement in Hanoi serve as typical examples.

The main interventions for lake improvement including dredging sludge and prevention sewage inflow. As a result of these measures, water quality improved, and the surrounding areas were landscaped with greenery and parks, enhancing the urban environment and providing recreational amenities for residents. For example, Figure 6.6.7 shows Thien Quang Lake, which was developed under the same project. The area was designed to accommodate walking, jogging, and other recreational activities. Additionally, the number of cafes and

other commercial establishments in the surrounding area increased, and infrastructure such as trees, flower beds, drinking fountains, trash bins, and informational signboards were installed to enhance usability and raise awareness of proper park etiquette.

Garden

Drinking Fountain

Garbage Box

Enlightening Signboard

Source: Evaluation Team

Figure 6.6.7 Thien Quang Lake Turned Into Park

According to interviews with 20 residents living adjacent to eight lakes improved under the Drainage Project for Environment Improvement in Hanoi, many reported that local service businesses and property values have increased as a result of enhanced landscapes following the lake improvement works (Appendix C).

Lake improvements not only enhance water storage capacity for flood mitigation but also create urban amenities through greening and park development, while increasing the economic value of the surrounding areas. Consequently, it is expected that many of Hanoi's valuable lakes will be developed in accordance with the HAIDEP plan.

However, in lakes where fish stocking has been released after improvement and designated fishing areas are provided for recreation, odors from dead fish have emerged as a concern. Many anglers were observed even in lakes where "No Fishing" signs were posted. This problem not only causes unpleasant odors from decomposing fish, but also contributes to the deterioration of environmental sanitation. Therefore, it is necessary to consider government regulations on fishing services, including the release of fish into lakes.

People Fishing in Giang Vo Lake

Dead Fish in Bay Mau Lake

People Fishing in Khung Trung 2 Lake

-

Source: Evaluation Team

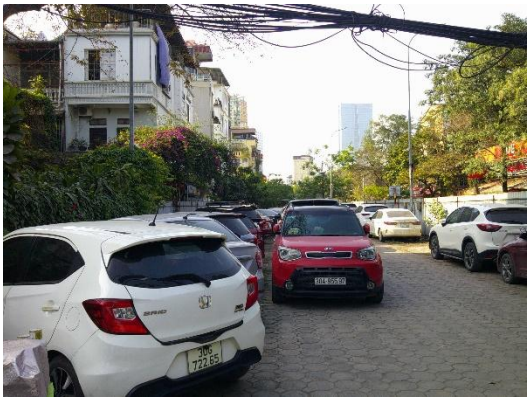
Figure 6.6.8 Lake Improvement and Fishpond

The channel improvement works involved dredging sludge from the channel beds and reinforcing the bank to increase flow capacity, with culverts installed in certain locations. In the survey, nine residents living near the three improved channels under the Drainage Project for Environment Improvement in Hanoi were interviewed regarding their assessment of the project. Many respondents reported that the landscape had improved, the number of stores and businesses along the channels had increased, and the local economy had become more prosperous (Appendix C).

On the other hand, although a wastewater treatment plant is under construction in Hanoi, sewage from household septic tanks continues to flow directly into rivers and channels improved under the Drainage Project for Environment Improvement. This ongoing discharge contributes to odor and public health problems. Therefore, it is highly desirable to install interceptor sewer systems, as proposed in HAIDEP and the master plan, at the earliest opportunity.

Some channels with installed culverts are being utilized for roadways and parking (Figure 6.6.9). While closing off channels with strong odors have improved hygiene and contributed to the city's image, from a resident-centered perspective, simply filling in open channels solely for land use is not ideal. Instead, installing interceptor sewers and preserving channels

that prevent sewage inflow would more effectively enhance the image and functionality of urban waterways.



Parking

Road

Source: Evaluation Team

Figure 6.6.9 Channel Status After Installation of Culvert

6.7 Conclusion

HAIDEP compiled improvement proposals across five sectors: water supply, urban drainage, sewerage systems, lake and pond management, and flood control. Prior to HAIDEP, flood control for urban rivers and lake management was particularly inadequate, and many of the planning methods and baseline data currently in use were first collected and referenced through HAIDEP, serving as a foundation for subsequent master and project planning. While the original proposals were partially revised and alternative plans introduced to address urbanization and demographic changes, limited attention was given to the institutional framework for implementation, particularly regarding the clarification of responsible agencies and budget allocation mechanisms.

Based on these proposals, the central government needed to clarify how it would advance legal and institutional reforms. For its part, Hanoi City should have defined its role in sewerage development and established a clear direction for fostering human resources responsible for planning and technical operations. At the time, discussions on concrete implementation schedules and institutional arrangements were limited.

Large-scale drainage and sewerage improvement projects supported by JICA, and planned in conjunction with HAIDEP, were implemented and yielded results including mitigation of flooding during typhoons, improvement of lake water quality, and promotion of surrounding urban development. However, these projects experienced significant delays. The Hanoi Drainage Project for Environmental Improvement, for example, took approximately twenty years to complete. The delays were attributed to several factors, including procedural complexity associated with Hanoi's first Japanese ODA loan project, design changes resulting from delays in urban development planning, and difficulties in land acquisition and coordination with residents in densely populated urban areas.

The sewerage system proposed by HAIDEP envisioned collecting household wastewater through interceptor sewers and conveying it to wastewater treatment plants. However, the current level of development remains insufficient. Installing interceptor sewers along the Set River and Kim Nguu River is particularly critical. Relevant agencies widely recognize the need to prioritize the development of sewerage systems in Hanoi's rapidly growing western and eastern areas. In areas where sewerage development has progressed, residents have highly appreciated the improvements in public health, such as reduced odors, pests, and disease risks.

To accelerate project implementation, it is essential to revise financial schemes—including public-private partnerships, clarify the roles of implementing agencies, establish the necessary legal frameworks, and address challenges related to land acquisition. As urbanization continues rapidly, effective responses to these issues are increasingly imperative.

7. From Urban Master Plan to Impact: Understanding the Path to Results

7.1 Analyzing the Process from Urban Master Plan to Impact

This chapter analyzes the process from formulating HAIDEP, an urban development master plan, to the emergence of development outcomes using the Theory of Change (ToC). ToC establishes the pathway from activities to expected outcomes and illustrates the trajectory of behavioral changes among ultimate beneficiaries, as well as the conditions enabling such changes. In other words, ToC allows the identification of causal relationships in quantitative outcome realization and enables the verification of intervention effectiveness through qualitative approaches.

On the other hand, as mentioned in Chapter 4, HAIDEP, as a development-type technical cooperation, aimed primarily at formulating a "Creative Urban Development Plan" and proposed actions from both hard (infrastructure) and soft (institutional) aspects to realize the envisioned urban future. However, it did not involve implementation interventions. In this regard, it differs significantly from specific infrastructure projects under yen loan schemes or technical cooperation projects involving concrete activities.

Furthermore, the HAIDEP's proposed urban vision reflects Hanoi's socio-economic development, involving interrelated factors such as industry, society, politics, and international relations. Therefore, identifying the outcome realization process or the impact of JICA interventions is highly challenging.

Given the above and based on the general steps for outcome realization of a comprehensive urban MP (refer to Chapter 4), this chapter selects cross-sectoral priority themes where JICA has provided support and develops specific ToC models for each theme to verify the effects of the JICA projects.

7.2 Building a Public Transport-Oriented City and Society

The formation of a city and society centered on public transport is a significant goal not only for HAIDEP but also for its transportation sector. Figure 7.2.1 shows the assumed process toward achieving this outcome.

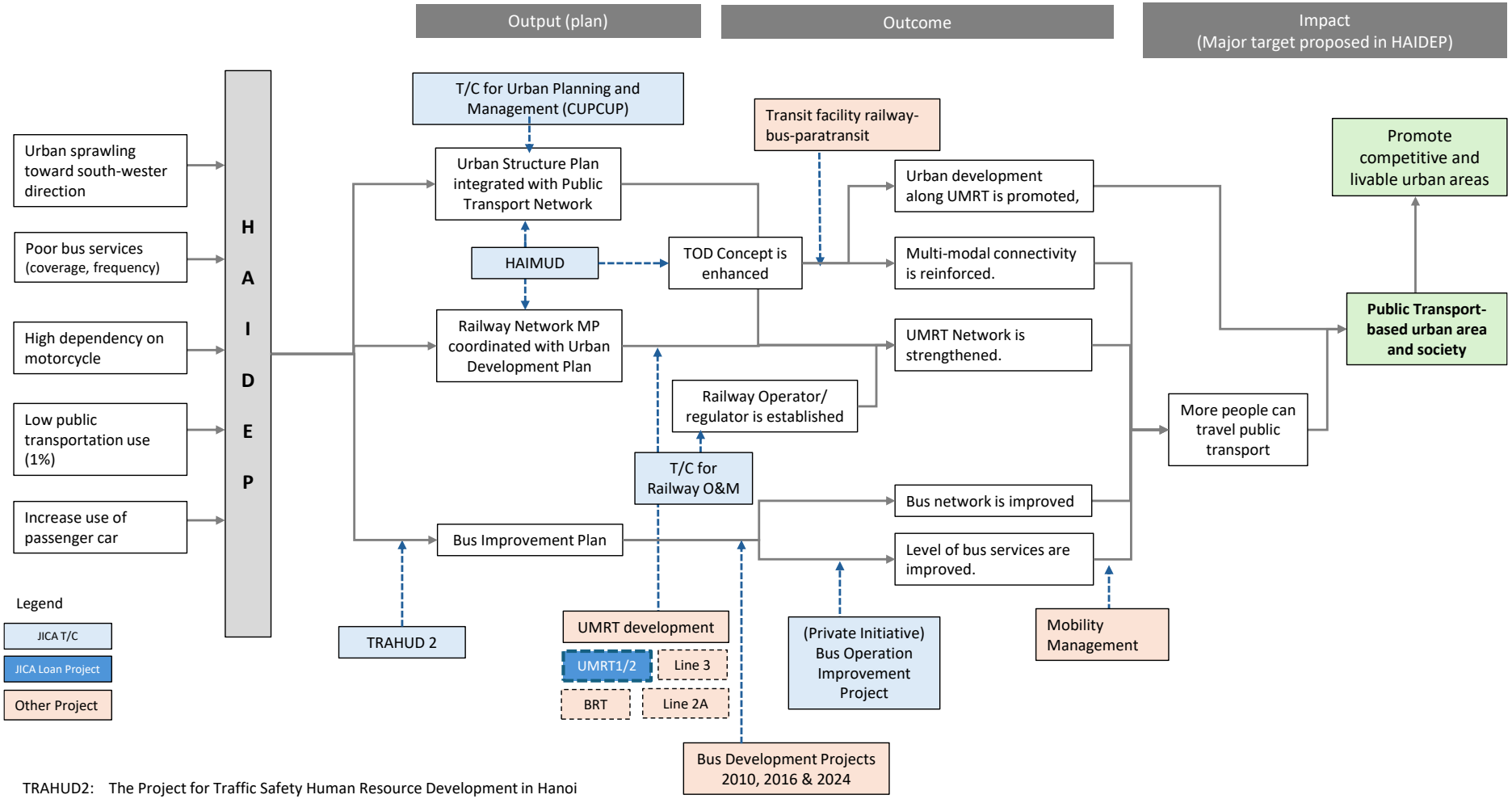
As detailed in Chapter 5, although some of the urban railway network proposed by HAIDEP has been developed, the core lines (Line 2, which is under implementation through a yen loan project, and Line 1, which was planned) have not yet been constructed. As a result, the urban railway network, the backbone of a public transport-oriented society, remains underdeveloped.

Meanwhile, through projects such as the "Public Transport Improvement Project (TRAHUD)," efforts have been made to expand the bus network and improve bus services, leading to an increasing trend in the number of public transport users.

In addition, initiatives such as HAIMUD and HAIMUD2 have positioned the promotion of TOD

as a major development issue. Urban development in conjunction with urban railway construction is expected to progress in the future.

Furthermore, as part of efforts to promote the use of public transport, activities such as mobility management under technical cooperation projects like TRAHUD have enhanced public awareness of its convenience. As railway construction progresses and bus service improvements continue, it is anticipated that the increased convenience will further boost public transport use, thereby realizing a city and society centered on public transport.



TRAHUD2: The Project for Traffic Safety Human Resource Development in Hanoi
CUPCUP: The Urban Planning Formulation and Management Capacity Development Project in the Socialist Republic of Vietnam
HAIMUD: The Project on Integrated UMRT and Urban Development for Hanoi
UMRT: Urban Mass Rapid Transit

Source: Evaluation Team

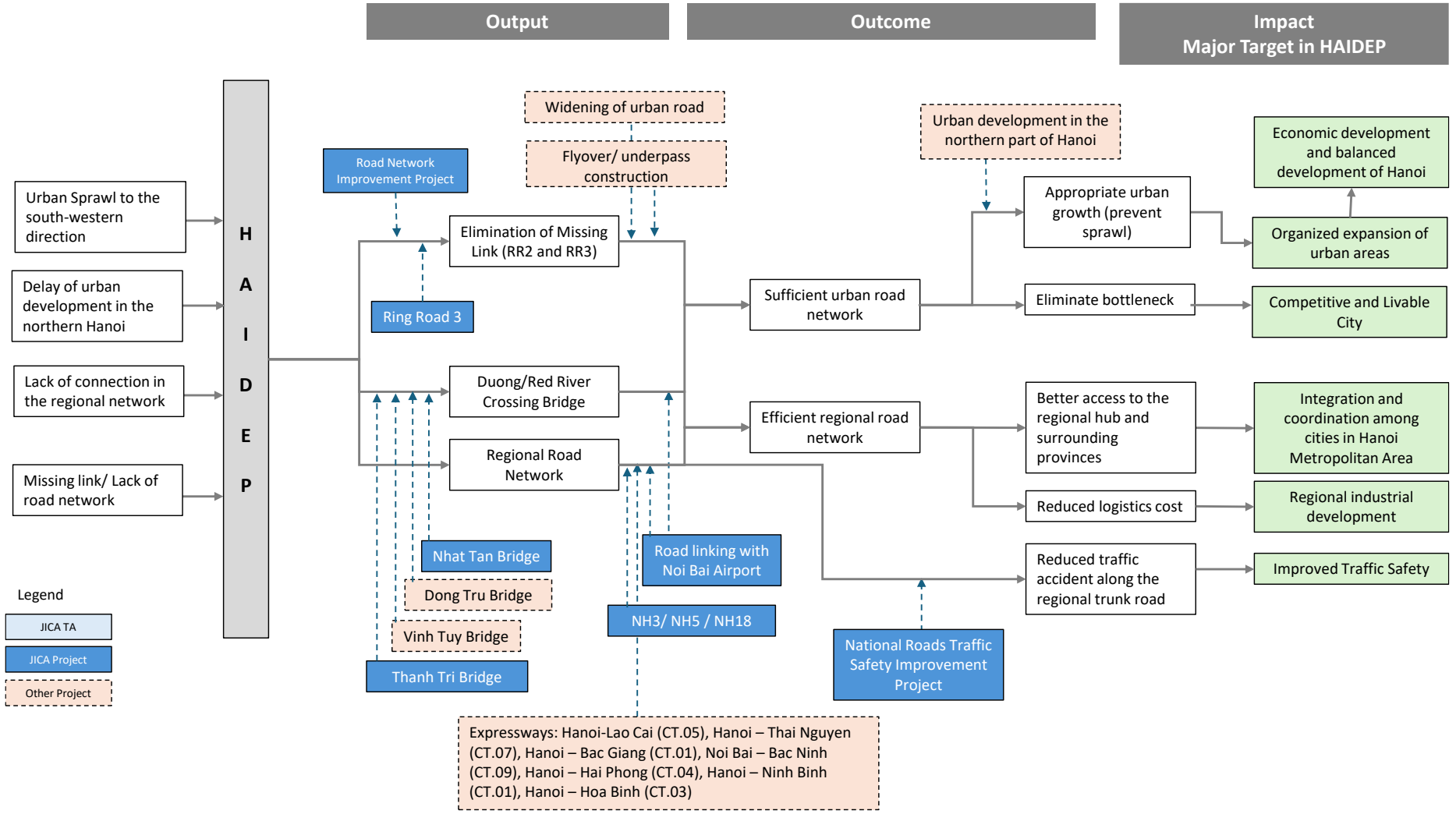
Figure 7.2.1 Building a Public Transport-Oriented City

7.3 Urban Growth Management through Road Network Development

In the transport sector, although HAIDEP's proposed urban railway network has been delayed, road network development has made progress. With support from JICA's yen loan projects, key infrastructure, such as Ring Roads No. 2 and No. 3, and major Red River crossings, including Nhat Tan Bridge and Thanh Tri Bridge have been developed. As a result, missing links have been eliminated, and the arterial road network within the city has been significantly improved. Furthermore, Hanoi City has steadily undertaken efforts such as large-scale intersection improvements, including grade separations through yen loan projects, and identifying and resolving traffic congestion bottlenecks.

The road network improvement, as described above, is expected to support suburban urban development, slow the worsening congestion in the city center, and make Hanoi a more competitive and livable city. On the other hand, considering the current traffic situation in Hanoi, with a population exceeding 8 million and a rising vehicle ownership rate from 1.6% in 2005 to 15% due to economic growth, traffic volume is increasing, and congestion is worsening. The lack of consistent traffic volume and congestion surveys over time makes evaluating congestion in absolute terms challenging.

Regarding the regional road network, the development of National Highways No. 5, No. 18, and No. 10, which connect Hanoi, Hai Phong, and Ha Long, has also progressed. This development has contributed to strengthening industrial competitiveness within the Hanoi regional zone, and as identified in Chapter 3, has been linked to regional economic growth.



Source: Evaluation Team

Figure 7.3.1 Urban Growth Management through Road Network Development

7.4 Improving Traffic Safety

Improvements in traffic safety in Hanoi are widely recognized in terms of reduced number of accidents and injuries, as well as improved people's traffic behavior, as confirmed through interview results.

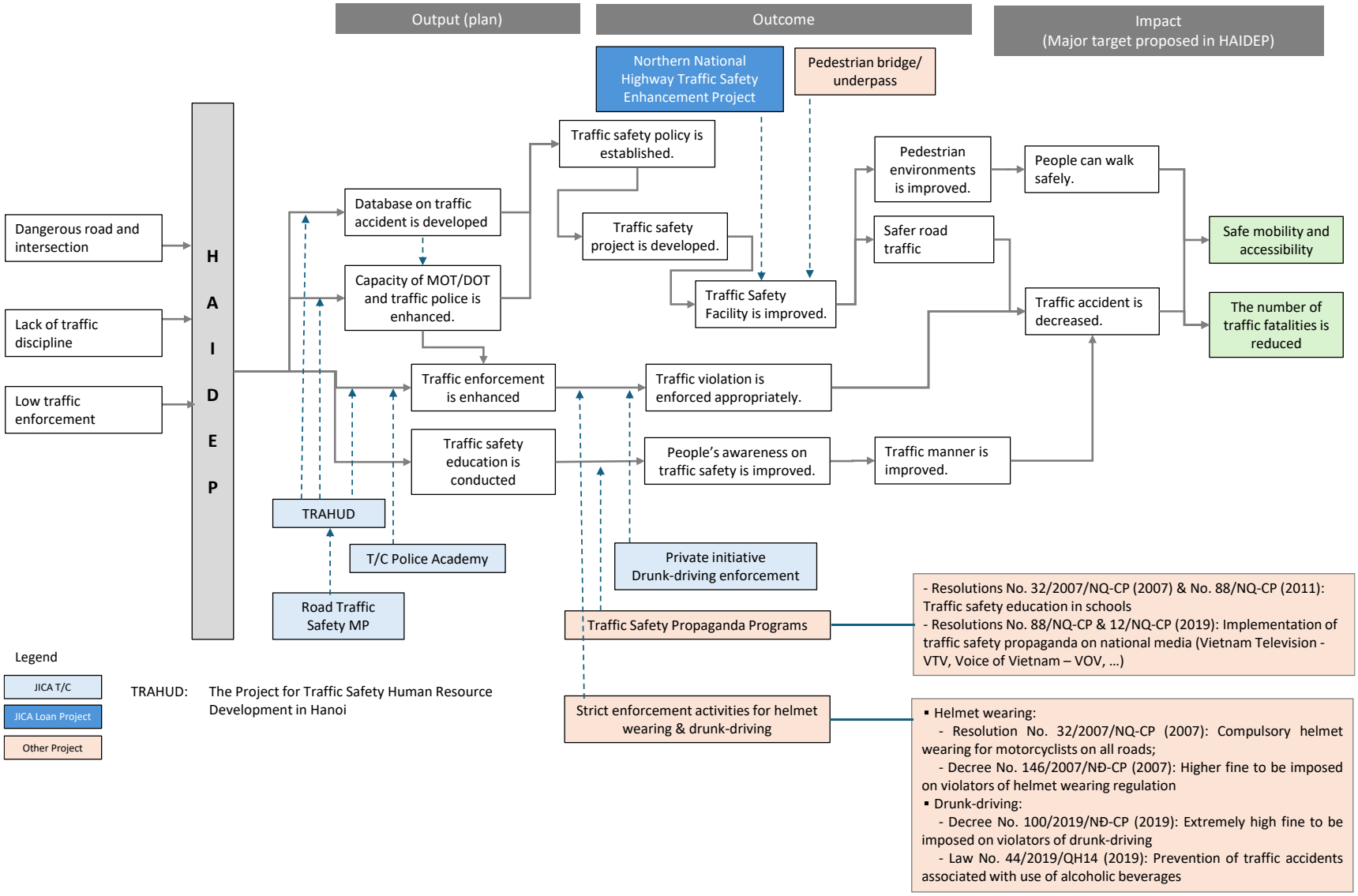
Traffic safety requires a comprehensive approach based on the "3Es:" Engineering, Enforcement, and Education. A traffic safety policy and a master plan that provides overall direction are essential, and in this regard, the technical cooperation projects implemented by JICA have made a significant contribution.

Regarding **engineering**, traffic safety facilities along major roads were developed through the Northern Vietnam Road Traffic Safety Enhancement Project. Additionally, Hanoi City has constructed multiple pedestrian overpasses and underpasses, enhancing safe road spaces and pedestrian environments.

Regarding **enforcement**, JICA has supported the capacity development of the traffic police. Legislation was introduced on mandatory helmet use and drunk driving, and stricter enforcement, along with increased penalties, have led to a significant reduction in traffic violations.

As for **education**, various traffic safety awareness campaigns have been promoted not only through a series of JICA technical cooperation projects but also through Vietnam's own initiatives. As a result, public awareness of traffic safety is strengthened.

These combined efforts have contributed to the reduction in traffic accidents and the realization of safe mobility and accessibility.



Source: Evaluation Team

Figure 7.4.1 Building a Traffic-Safe Society

7.5 Improvement of the Water Environment

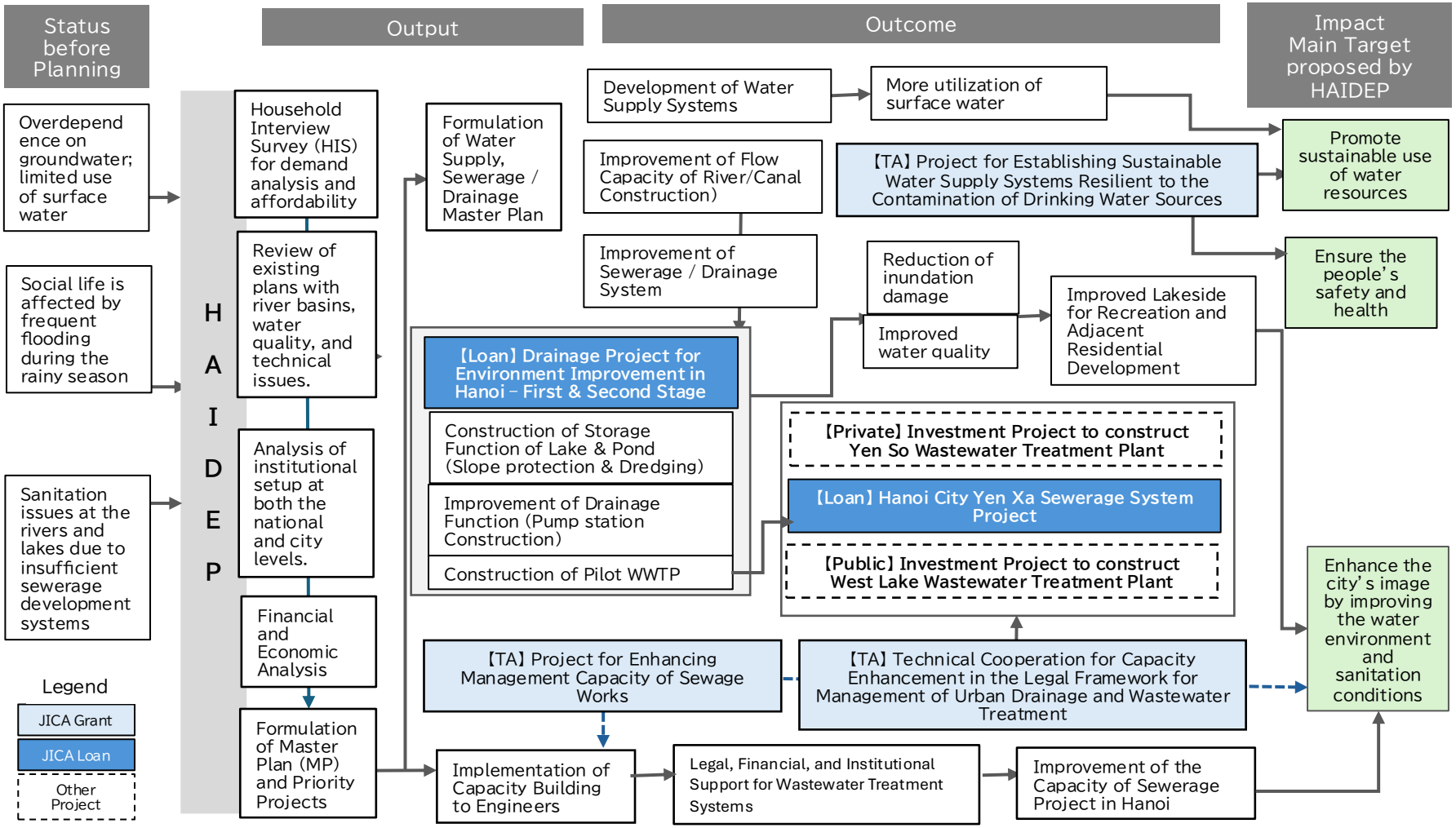
In the water environment sector, based on HAIDEP, a master plan for water supply was formulated in 2013 and revised in 2021, mandating key infrastructure. As of 2024, 33 water treatment plants (with a total capacity of approximately 1.32 million m^3/day) and 92 km of transmission pipelines have been developed and are in operation. Regarding water sources, while groundwater was the primary source, the share of river surface water in total intake increased from 29% in 2016 to 60% in 2024. This shift has contributed to groundwater conservation and promoted the sustainable use of water resources.

Similarly, a master plan for sewerage and drainage was formulated in 2013. In 2016, the drainage environment improvement project, with support from JICA, was implemented in the central area of Hanoi, covering approximately 78 km^2. The project was designed to accommodate 310 mm of rainfall over two days. It included the construction of the Yen So Pumping Station (capacity: 90 m^3/sec), about 33 km of river rehabilitation, and improvements to 20 lakes. Prior to these improvements, the city center frequently experienced flooding from heavy rain, resulting in house inundation and traffic disruptions. However, with enhanced water retention and drainage capacities, the city's ability to manage rainwater improved significantly, reducing damage and contributing to greater safety in citizens' lives.

For the improvement of the lake, sludge removal and installation of interceptor sewers have prevented sewage inflows, resulting in noticeable improvements in water quality. The COD value, which indicates the level of organic pollution in water, has decreased to about 10% of the 2004 level. The greenery around the lakes has also been enhanced, transforming them into recreational spaces for residents. In some cases, new residential areas are being developed around them.

Furthermore, to improve public health amid urbanization, JICA constructed the Yen Xa Wastewater Treatment Plant (treatment capacity: 270,000 m^3/day), serving approximately 900,000 people (covering about 4,874 ha). The development of wastewater treatment plants by private companies has also progressed, leading to further improvements in the water environment and sanitary conditions.

Although challenges remain in securing budgets and acquiring the necessary land for sewerage development, JICA's technical cooperation has been contributing not only to the capacity development of engineers but also to strengthening legal systems, budget frameworks, and institutional arrangements.



Source: Evaluation Team

Figure 7.5.1 Improvement of Water Environment

7.6 Challenges in Utilizing ToC in the Preparation of the MP

The HAIDEP master plan, formulated 20 years ago, served as the foundation for subsequent urban development projects. Evaluating its overall impact requires untangling complex socio-economic relationships, which present significant challenges. This study identified four priority themes and applied a ToC framework to systematically assess causal links between interventions, outputs, outcomes, and long-term impacts.

To evaluate the process by which projects proposed in the master plan led to development impacts after implementation, it is necessary to clarify elements, such as the establishment of legal frameworks for project execution, consensus-building for land acquisition, human resource development, and securing financial resources. In evaluating HAIDEP, the validity of these interventions and the relevance of subsequent outcomes can be partially verified by focusing on priority themes, such as the transport and sewerage/drainage sectors. However, since nearly 20 years have passed since HAIDEP concluded and given the constraints arising from changes in city boundaries, it has been difficult to comprehensively organize quantitative results, assess institutional changes, and identify factors that hindered the realization of outcomes. In other words, by preparing priority programs at the formulation stage of the MP, it becomes possible to identify at which stage the monitoring indicators should be checked, to capture medium- and long-term effects, and to use it as a basis for considering proposed project interventions.

Furthermore, as a roadmap for outcome realization that is easy to understand, this framework can be utilized by diverse stakeholders, including the government, residents, and private enterprises, to comprehend the goals and causal relationships of the MP and support consensus-building and accountability. The potential for monitoring the outcomes of JICA's MPs will be compiled in Part II.

8. Remaining Challenges for Sustainable Development in Hanoi

8.1 Implementation of Feedback Seminar on Evaluation Results

The HAIDEP Evaluation Feedback Seminar took place on 6 November 2025 to reassess HAIDEP's achievements and long-term impacts and to discuss future directions for urban development. Participants, including current Hanoi City officials and retirees who assisted with the survey as C/Ps, acknowledged that HAIDEP presented a systematic and scientific methodology and played a foundational role in the city's urban development. Nevertheless, challenges, such as persistent traffic congestion, inconvenient public transportation, air pollution, and newly emerging flood damage caused by increased rainfall due to climate change, remain unresolved. Moving forward, it is essential to speed up plan implementation through collaboration among the government, the private sector, and citizens. This will enhance international competitiveness and improve the quality of life, while preserving the city's vision of water, greenery, and culture, as proposed in HAIDEP.

Discussions reaffirmed the importance of HAIDEP's data-driven planning approach, particularly building reliable databases and conducting regular person-trip surveys, and stressed its continued necessity. At the same time, attention was drawn to railway development, which had fallen behind HAIDEP's original proposals. New directions for sustainable urban growth were also highlighted, including promoting TOD, adopting new urban finance methods, introducing public-private partnerships (PPP) and land value capture (LVC), and establishing legal frameworks and cross-sectoral coordination mechanisms. Together, these measures build on HAIDEP's original recommendations and provide concrete strategies to meet today's urban challenges.

Overall, this seminar repositioned HAIDEP's achievements, not merely as past plans, but as a foundation for current and future urban policy.

Based on the field survey results and seminar discussions, the remaining challenges for the sustainable development of Hanoi City are summarized below.

8.2 Planning Approach

A common issue across all sectors is the lack of data-based planning. In the transportation sector, regular data collection on road traffic volume is not being conducted, and the number of public transportation users is inadequately monitored. Since large-scale surveys, such as person trip surveys, are conducted only with donor support, the identification of urban transport demand necessary for transport planning has been insufficient. As a result, while traffic congestion countermeasures have been implemented by identifying congested areas and applying localized solutions, the road network has not been considered, making it highly likely that the response is inefficient. In the water sector, it was also revealed that basic data such as water quality monitoring and sewerage coverage rates are not being collected.

HIS, traffic volume surveys, and user interview surveys were undertaken during HAIDEP to analyze the current situation and forecast the projected demand for 2020, based on which evidence-based planning and infrastructure proposals were formulated. However, the latest urban railway plan calls for a total of 15 lines and a 619 km urban railway network, which may be an overly ambitious proposal given the city's size and predicted future transport demand.

It may lead to inefficient investment. Accumulating data and formulating plans based on it will be a significant challenge for Vietnam.

8.3 Achieving a Desirable Urban Structure for Hanoi

8.3.1 Realization of a multi-polar, decentralized urban structure in Hanoi centered on an urban railway network

HAIDEP's emphasis on urban development and social formation based on public transport has had a strong influence on the way the city plans for urban development, as the proposed railway network became the basis for Hanoi city's subsequent urban railway plans, and the idea of TOD centered on urban railways has become widely recognized through JICA's technical cooperation.

On the other hand, as described in Chapter 5, progress on the urban railway network has fallen significantly behind the HAIDEP plan. The formation of the envisioned urban structure has been affected. Specifically, a multipolar, decentralized urban structure centered on sub-centers at urban railway hub stations has not been realized. Instead, the urban structure remains concentrated in one area, with urban sprawl centered on residential development on the outskirts of the city, worsening chronic traffic congestion.

The Vietnamese government acknowledges the delay in railway development as a problem. In 2025, a National Assembly resolution was passed to accelerate urban railway development in the cities of Hanoi and Ho Chi Minh. Accelerating railway development has become a major policy issue.

From now on, the significant challenges include forming the urban structure of Hanoi as a whole in line with the urban railway network, developing transportation facilities such as station plazas around railway stations at the station level, and promoting an integrated urban development around stations, based on the TOD concept. The Capital Law, enacted in 2024, includes relaxation of urban development regulations with TOD in mind. In addition, the National Assembly Resolution No.188 and the Railway Act 2025 stipulate that planning and implementing TOD around railway stations shall be undertaken by Hanoi City (the local government). Specific challenges are as follows:

- **Formulation of an urban structure plan for Hanoi City linked to the urban railway network throughout the city:** Although Hanoi City has been reviewing the urban railway network, this process has not been well coordinated with the city’s overall urban structure plan.
- **Formulation of an urban structure plan for suburban area:** It is expected that urban development will gradually spread to suburban areas (such as outside the Route 4 Ring Road, the suburban areas of Hanoi city, Hoa Lac satellite city, Northern districts such as Dong Anh, etc.) where a clear vision for urban structure has not yet been drawn up. Therefore, positioning urban structure plans and railway and road networks in an integrated manner at an early stage is necessary.

- **Formulation of TOD plan linking the General Plan and the urban railway network:** In Hanoi city, in response to the above-mentioned laws and resolutions, the promotion of TOD has been considered; however, both corridor-based TOD plans for individual urban railway lines and zone-based TOD plans are primarily focused on development plans around individual stations. To maintain alignment with the citywide General Plan, a TOD plan that considers the entire urban railway network is required, including the identification of station roles and functions, such as sub-center development.
- Due to administrative reorganization, the Quan and Thi Xa districts within Hanoi will be abolished, and the Commune (Phuong) will be positioned within the urban area. The urban structure plan for Hanoi must be updated comprehensively, including the positioning of plans for "satellite cities" in the suburban areas.

8.3.2 Organizing redevelopment methods for existing urban areas

The redevelopment of the city center has not progressed, and the redevelopment of dilapidated housing complexes (KTT) remains a significant challenge. Local interviews also revealed that although HAIDEP recognized the issues in the redevelopment of existing urban areas, it was unable to propose a solution because it had not yet established a business model for redevelopment.

Due to the poor environment, structural deterioration, illegal construction, and disaster risk, reconstruction is recognized as an urgent issue. In 2021, through HPC's decision (No. 5289/QD-UBND), a survey on the renovation and reconstruction of aging apartment buildings in Hanoi was carried out, and business methods for redevelopment were considered. Furthermore, since apartment complexes are adjacent to the planned section of the urban railway in the existing urban area, it is also necessary to consider the possibility of developing them in an integrated manner with the urban railway station.

Under the abovementioned framework for Zone TOD Area Plans around railway stations, deregulation of urban planning controls at the national level is also envisaged, together with mechanisms for land acquisition and subsequent sale to be undertaken by the local government, based on presentation materials by the Metropolitan Railway Management Board (MRB). Excessive deregulation may impose unnecessary burdens on surrounding infrastructure, potentially exacerbating traffic congestion, flooding, and other related impacts. As a condition for deregulation, it is necessary to secure public contributions from private developers, such as the provision of public open spaces, enhancement of disaster resilience, installation of public/ public-interest facilities, securing of green spaces, and development of housing for low-income groups. In addition, floor area ratios must be determined based on the capacity of the surrounding infrastructure, with particular consideration given to traffic impact assessments.

8.4 Urban Transportation

8.4.1 Promoting urban railway development

Promoting the development of priority routes: As mentioned above, one notable change in urban transport in Hanoi over the past 20 years is that urban railways development has lagged while road development has steadily progressed. Accelerating railway development has become an urgent policy issue, and integrating it with urban development is essential.

- Steady progress in the construction of Urban Railway Line 2.
- Consider promoting the development of other short-term priority routes (such as Route 5).
- Integrated urban structure planning and transportation network development in suburban areas where the urban structure is not fully defined.

Review of the railway network: Through government policy, MRB, which is responsible for railway development, has formulated a development plan divided into three phases to accelerate railway development. The MRB has also been discussing the possibility of skipping pre-feasibility studies for high-priority lines and proceeding with land acquisition before feasibility studies. On the other hand, the current 15 lines and 619 km network is recognized as excessive for the size of Hanoi city and its future demand. Hence, the necessity of reviewing the railway network based on traffic demand forecasts is also recognized. Although Hanoi City is already reviewing the railway network, analyses of traffic volume and travel demand have not been conducted, raising questions about whether an effective and efficient network is being examined. As described above, reviewing the railway network based on an assessment of existing traffic conditions and future demand projections is required.

8.4.2 Improving urban transport bottlenecks

As mentioned above, road network improvement has been progressing steadily. However, as described in "4.3.1 Urban Road Projects," congestion still occurs at many intersections within cities, creating bottlenecks for urban transportation. However, these intersections have not yet been identified based on quantitative indicators such as traffic volume surveys and demand forecasts, and current responses are limited to subjective and localized approaches. Taking a bird's-eye view of urban transportation, setting priorities based on data, and formulating action plans will lead to more efficient and effective problem-solving.

Furthermore, future challenges include advancing traffic management through digital transformation (DX) and strengthening road safety measures. In particular, the collection and analysis of real-time traffic information, optimization of traffic signal control, and prevention of traffic violations can all be used to improve urban bottlenecks and create a more efficient and safer road environment.

During the transition period until the railway development is fully underway, improving the convenience of transfers between existing public transport modes (eliminating bottlenecks)

is an urgent issue. Specifically, it is necessary to strengthen cooperation between multiple modes, such as UMRT and buses, BRT and buses/motorcycles, and buses and motorcycles. By adjusting train schedules at these junctions, improving guidance information, and developing transfer spaces, public transport use is expected to be promoted, congestion will be alleviated, and the efficiency of the entire transport network will be improved.

8.4.3 Short-term bus service improvement and promotion

As mentioned above, although expanding the number of bus routes has resulted in some service improvement, the number of passengers has not increased significantly, and passenger satisfaction remains low. In addition, the financial burden of operations that rely on government subsidies continues. Achieving a sustainable increase in passengers while simultaneously improving the quality of service and restoring financial soundness are urgent concerns.

Motorbikes remain the primary means of transportation in Hanoi. However, buses have a comparatively high advantage in terms of safety and comfort; therefore, there is ample potential to increase bus usage by optimizing the bus network and comprehensively improving service levels, including service frequency, connectivity, and vehicle comfort. Going forward, strategic improvements based on urban structure and demand characteristics will be required.

8.5 Water Environment

Expansion of Drainage Facility Coverage: Although drainage capacity has considerably improved, there is a growing need to address changing rainfall patterns caused by climate change. Adaptation measures focused on urban resilience and flood control have been highlighted as key challenges in urban planning, and countermeasures for flooding are required not only in existing areas but also in newly developed zones.

Development of New Sewerage Facilities: Improving connections to sewer systems, addressing river pollution, and raising the stagnant sewage treatment rate remain significant challenges. Projects integrating wastewater treatment plants with surrounding urban development are being implemented under build-transfer (BT) schemes. However, difficulties in securing financing and acquiring land have caused delays in launching new projects.

Strengthening Institutional and Organizational Frameworks. At the time of HAIDEP's implementation, the legal and institutional arrangements for dividing roles and financing drainage and sewerage projects were insufficient. Thus, specific proposals on institutional matters were less developed than technical ones. The lack of a clearly defined role for Hanoi City in drainage development has resulted in inadequate budget allocation by the plans, and the training of personnel responsible for planning and technical operations has been insufficient. Institutionalizing these responsibilities as tasks for the city government and ensuring corresponding budget allocations remain critical challenges.

8.6 Toward a Comprehensive Implementation Framework for Development Projects

8.6.1 Collaboration with the private sector

Collaboration with the private sector is fundamental to urban development projects. During HAIDEP's implementation, prior to 2007, the build-operate-transfer (BOT) regulations were introduced, and road construction projects under BOT schemes led by the central government began. Following the 2011 BOT Decree (Decree No. 78/2007/ND-CP), several PPP pilot projects were proposed in Hanoi.

With the enactment of the PPP Law (No. 13/2021/QH15) in 2021, PPP schemes for projects such as Ring Road No. 4, urban railways, and smart transportation systems have begun to be discussed in Hanoi. However, challenges have been pointed out regarding land acquisition, risk allocation, and revenue compensation.

Examples of BT implementation include the Yen So wastewater treatment facility, Ring Road No. 2, and expressway development projects, which have been carried out using diverse schemes integrated with surrounding development rights.

To mobilize private capital for redevelopment projects in existing urban areas, implementation approaches that align with urban planning and ensure integration with urban rail systems are expected to be established.

8.6.2 Improvement of the land acquisition system accompanying development

In large-scale infrastructure development, land acquisition becomes unavoidable. During HAIDEP's implementation, public protests occurred due to the lack of transparency in compensation amounts and land allocation methods. Structural issues were also identified, such as a lack of a mechanism for community participation during the project planning stage. HAIDEP addressed these concerns by providing recommendations, summarized in Table 8.5.1.

Subsequently, after considerable deliberation, legal and institutional reforms related to land have progressed since 2024. The land expropriation process has become more straightforward. One significant institutional improvement is the mandatory provision of information to local residents at each stage of the process.

However, challenges remain, including securing resettlement sites in urban areas and the limited effectiveness of livelihood restoration efforts. Furthermore, discrepancies persist between actual market prices and compensation estimates made during the pre-feasibility study stage. Because relocation destinations are often unclear at the initial stages of a project, budget allocations for developing resettlement housing tend to be insufficient.

Table 8.6.1 HAIDEP's Recommendations for Land Acquisition and Status as of 2024

	HAIDEP Recommendations (2008)	Legal and Implementation Status as of 2024
1	Conduct social impact assessments at early stages and reflect them in planning.	Under the 2024 Land Law and Environmental Protection Law, Environmental Impact Assessments (EIA) now include social considerations, and community consultation has become mandatory.
2	Resettlement planning must be formulated with community participation from the early stages.	Independent resettlement projects are legally permissible, and community consultation is mandated (e.g., Article 87 of the 2024 Land Law).
3	Develop resettlement plans with independence and technical expertise.	Legal provisions do not exist; while institutional backing is technically feasible, it remains unclear.
4	Institutionalize information disclosure and community participation.	The Public Investment Law and the Land Law mandate progressive disclosure of information and community consultation.
5	Establish a clear legal framework and compensation and resettlement guidelines.	Procedures are formalized in the 2024 Land Law and Decree No. 88.
6	Introduce a realistic and transparent compensation system based on market value.	The "Specific Land Price" system was introduced during the expropriation, and a shift toward compensation based on market value is underway.
7	Ensure community participation in housing design and provision of essential infrastructure.	Standards (urban and new rural criteria) have been clarified, but community participation has not yet been institutionalized.
8	Achieve substantial livelihood restoration and employment security.	Vocational training and job search support have been strengthened. However, residents often prefer cash compensation, limiting the effectiveness of livelihood restoration.
9	Allow a flexible coordination authority to local governments and promote collaboration with residents.	Discretionary authority for local governments has expanded, and resettlement procedures are locally led. However, there is a lack of institutionalized flexible coordination mechanisms.

Source: HAIDEP, based on interview results

Under the new legal framework, strategic measures are required to address these challenges and ensure future urban development. Specifically, a "land bank for resettlement" that allows advance acquisition of potential relocation sites is necessary to avoid impacts on budget planning and project schedules. Additionally, to cope with the land shortage in urban areas, promoting high-rise apartment-style resettlement should be pursued to make efficient use of limited land resources.

Furthermore, to correct the lack of transparency and delays in the land acquisition process, it is desirable to establish a professional and neutral body capable of conducting fair and prompt reviews. These efforts are expected to contribute to the development of a sustainable and reliable land acquisition system.

S

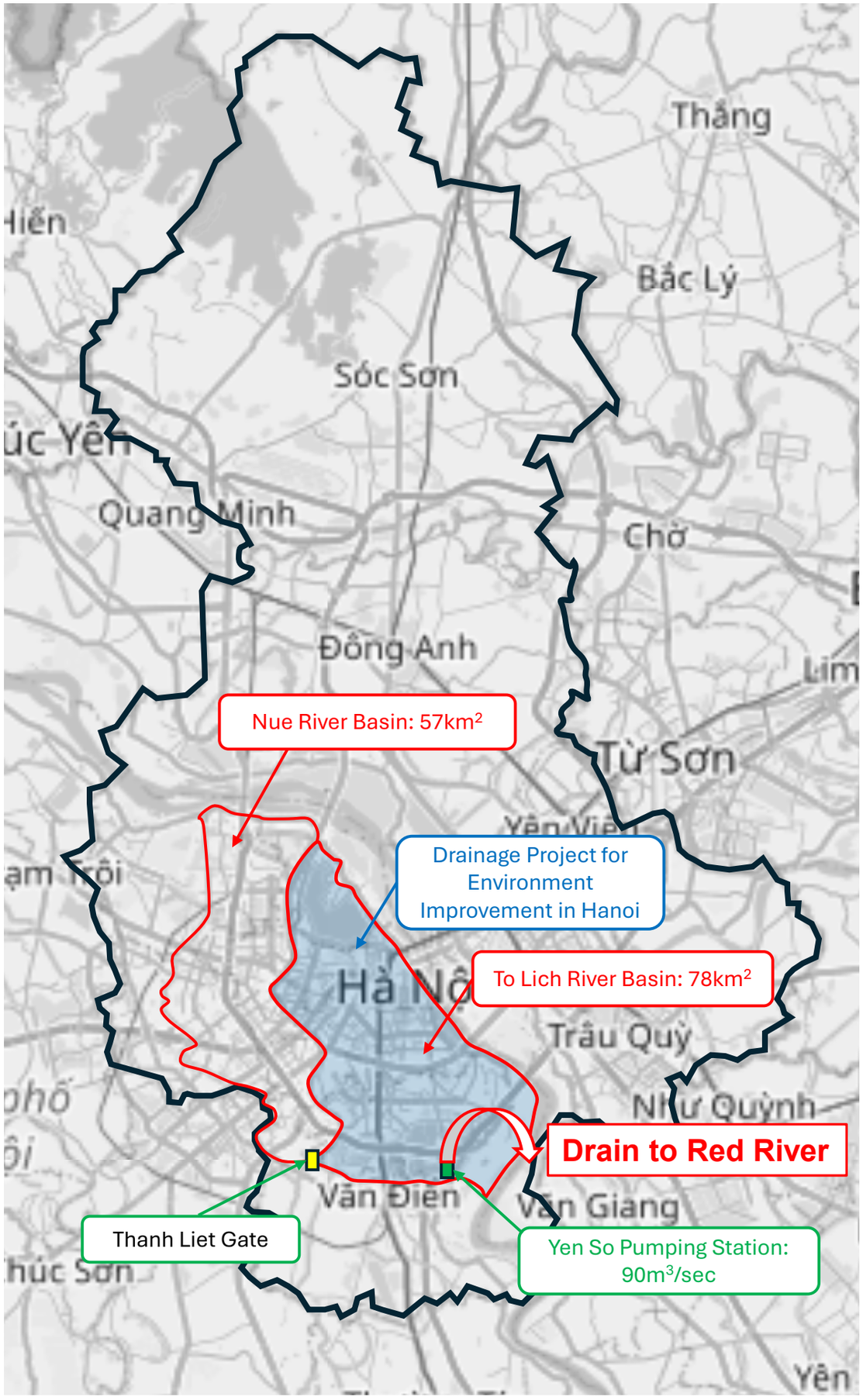
APPENDIX A

Pump Operation Record in September 2024

Drainage Operation Steps at Rainy Season

- **Catchment Area: 78km^2 (To Lich River Basin)**
- **Pump Capacity at Yen So Pumping Station: 90m^3/sec.**
- **2-day rainfall in a 10-year return period amounts to 310mm**

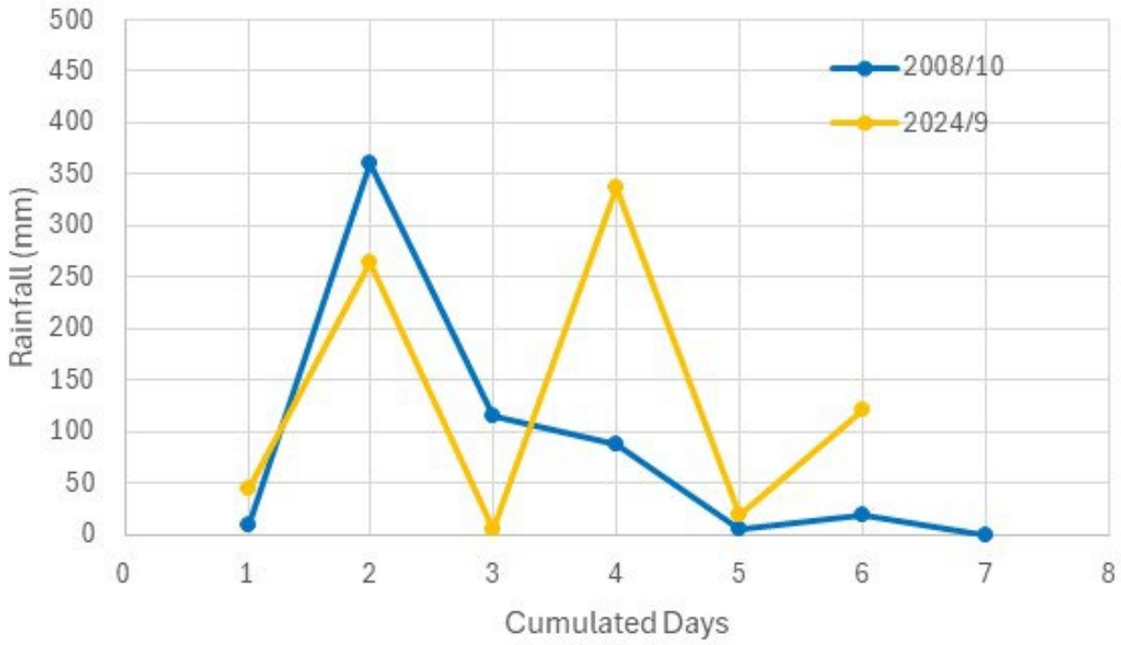
- **Be lowering the Water Level of the Lakes in the City before the Rainy Season**
- **Close Thanh Liet Gate to stop the drain from Nhue River Basin**
- **Once, storage at Yen So Reservoirs and Lakes in the City**
- **Drain to Red River by Pump Operation**



Typhoon Damage in September 2024

- The following shows the record of rainfall and pump operation.

Date	Rainfall (mm)	Operation Capacity
Sep. 6, 2024	44.3	50m^3/sec
Sep. 7, 2024	264.7	90m^3/sec
Sep. 8, 2024	5.3	90m^3/sec
Sep. 9, 2024	336.7	90m^3/sec
Sep. 10, 2024	18.5	90m^3/sec
Sep. 11, 2024	121.6	90m^3/sec



- Pumps in Yen So Pumping Station operated full capacity for 5 days from Sep. 7.
- There was almost no flooding in the To Lich River Basin.
- Thanh Liet Gate was opened to receive drain water from the Nhue River Basin.
- Approximately 40,000 trees were fallen in the city.

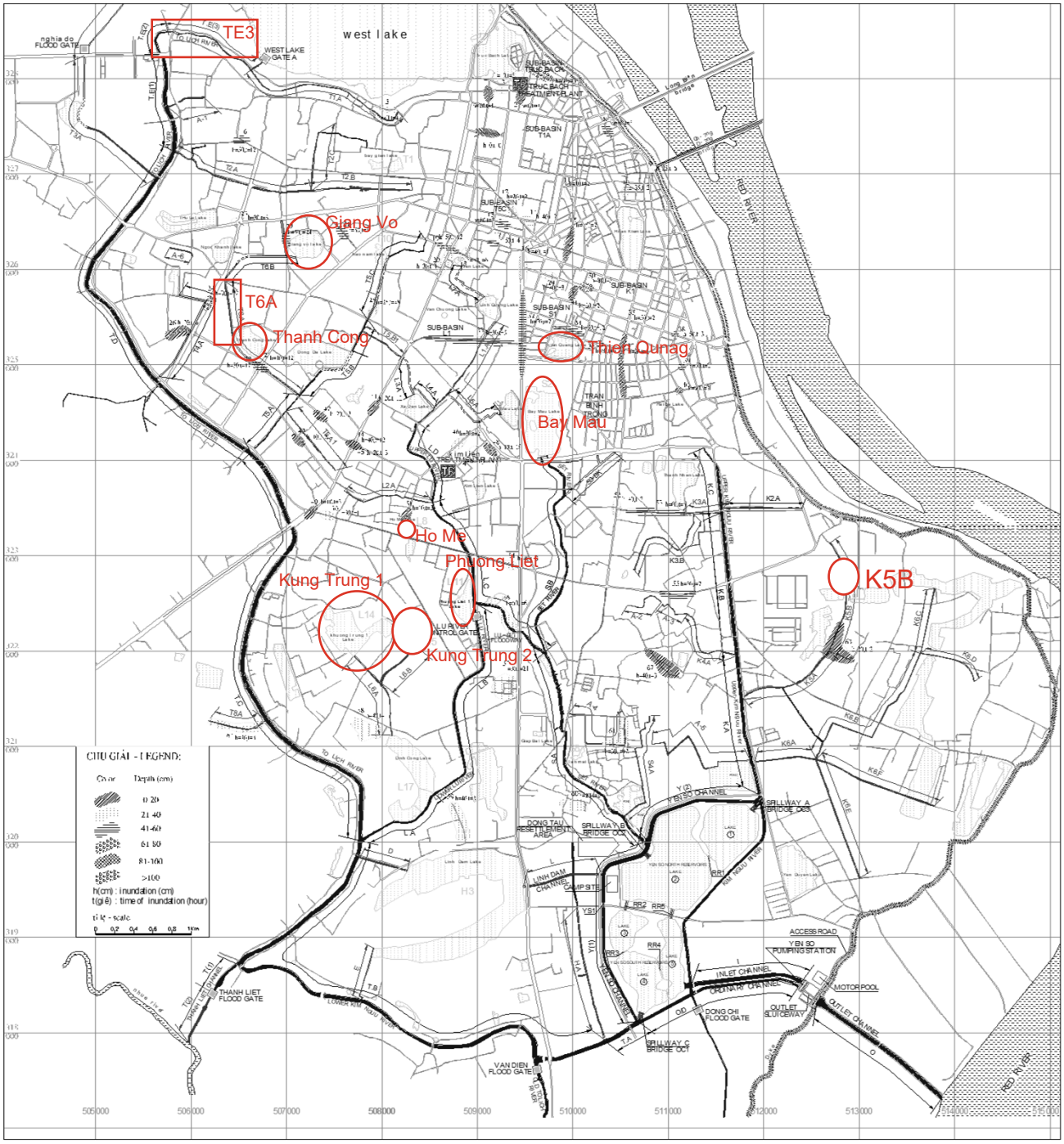
Appendix B

Status of Water Sector Facilities

Before and After Implementation

by

Drainage Project for Environment Improvement in Hanoi



Location of Water Sector Facilities

Facility: Channel Improvement Work / TE3

Before 2011/10/25	After 2025/4/11
	

Facility: Lake Improvement Work / Giang Vo Lake

Before 2003/9/25	After 2025/4/14
	

Facility: Lake Improvement Work / Giang Vo Lake

Before 2003/10/6	After 2025/4/14
	

Facility: Lake Improvement Work / Giang Vo Lake

Before 2003/10/6	After 2025/4/14
	

Facility: Channel Improvement Work / T6-A

Before 2011/7/1	After 2025/4/15
	

Facility: Channel Improvement Work / T6-A

Before 2011/5/31	After 2025/4/15
	

Facility: Lake Improvement Work / Thien Quang Lake

Before 2003/8/25	After 2025/4/16
	

Facility: Lake Improvement Work / Thien Quang Lake

Before 2003/8/18	After 2025/4/16
	

Facility: Lake Improvement Work / Thien Quang Lake

Before 2003/8/25	After 2025/4/16
	

Facility: Lake Improvement Work / Thanh Cong Lake

Before 2003/7/16	After 2025/4/15
	

Facility: Lake Improvement Work / Thanh Cong Lake

Before 2003/7/30	After 2025/4/15
	

Facility: Lake Improvement Work / Thanh Cong Lake

Before 2003/7/24	After 2025/4/15
	

Facility: Lake Improvement Work / Bay Mau Lake

Before 2009/7/8	After 2025/4/22
	

Facility: Lake Improvement Work / Bay Mau Lake

Before 2009/8/3	After 2025/4/22
	

Facility: Lake Improvement Work / Bay Mau Lake

Before 2009/7/8	After 2025/4/22
	

Facility: Lake Improvement Work / Ho Me Lake

Before 2009/8/14	After 2025/4/16
	

Facility: Lake Improvement Work / Ho Me Lake

Before 2009/8/11	After 2025/4/16
	

Facility: Lake Improvement Work / Ho Me Lake

Before 2009/8/13	After 2025/4/16
	

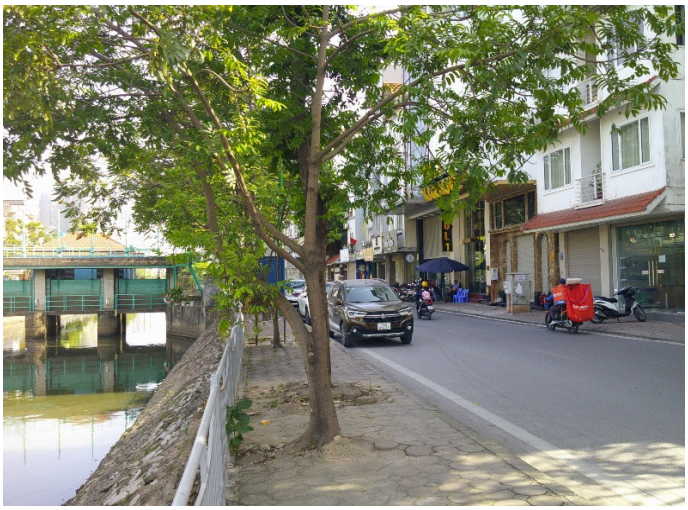
Facility: Channel Improvement Work / K5-B

Before 2012/7/10	After 2025/4/17
	

Facility: Channel Improvement Work / K5-B

Before 2012/7/10	After 2025/4/17
	

Facility: Road Construction / Lu-Set Floodway

Before 2011/11/10	After 2025/4/16
	

Facility: Lake Improvement Work / Phung Liet Lake

Before 2013/3/19	After 2025/4/16
	

Facility: Lake Improvement Work / Phung Liet Lake

Before 2013/3/19	After 2025/4/16
	

Facility: Lake Improvement Work / Khung Trung 1 Lake

Before 2015/3/14	After 2025/4/22
	

Facility: Lake Improvement Work / Khung Trung 1 Lake

Before 2012/9/27	After 2025/4/22
	

Facility: Lake Improvement Work / Khung Trung 1 Lake

Before 2014/11/7	After 2025/4/22
	

Facility: Lake Improvement Work / Khung Trung 2 Lake

Before 2012/2/24	After 2025/4/22
	

Facility: Lake Improvement Work / Khung Trung 2 Lake

Before 2012/2/24	After 2025/4/22
	

Appendix C

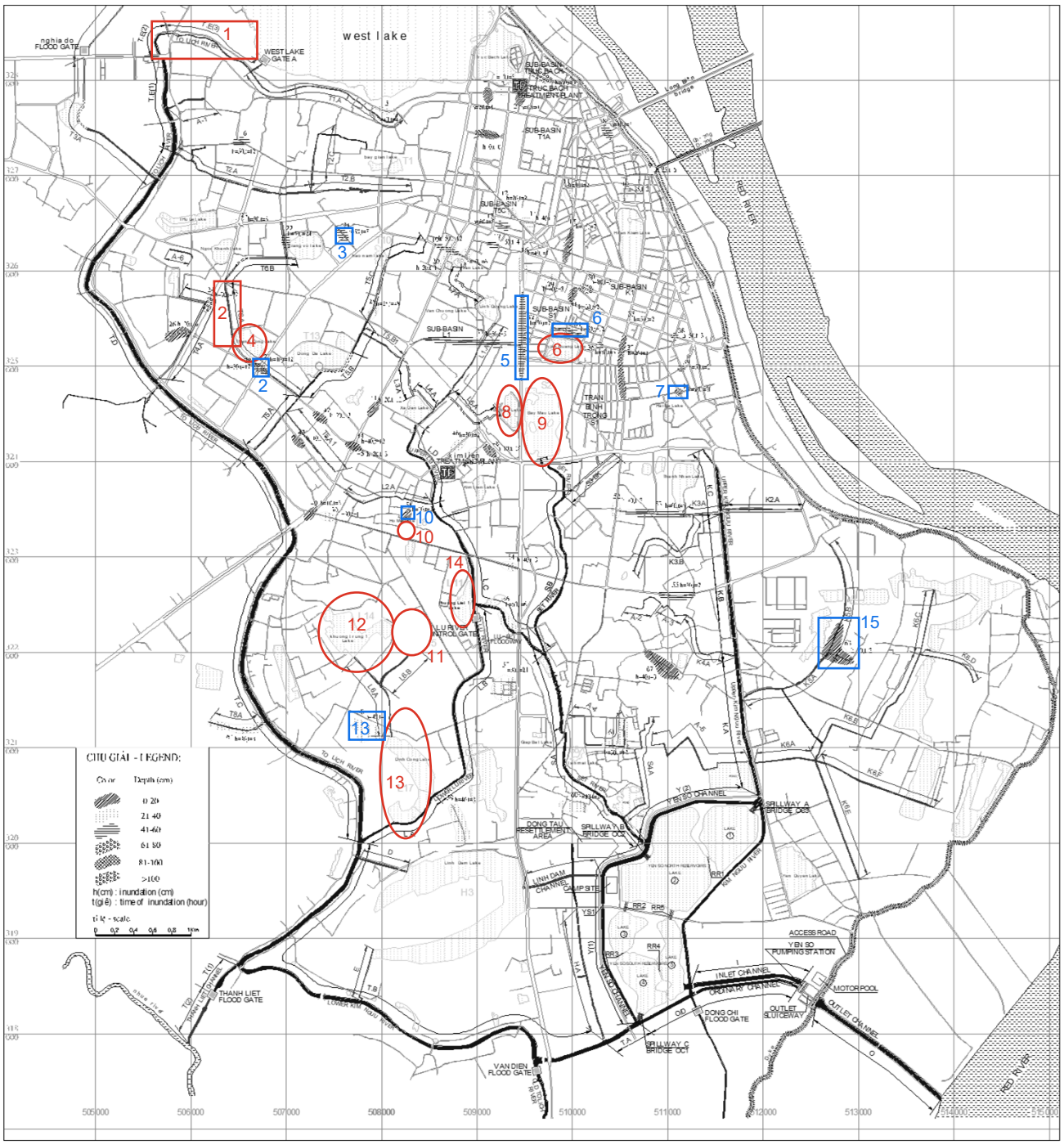
Result of Interview for Beneficiary Survey

Interview Location

No	Improved by Project*		Commune Name	Interview Item & Location**	
	Channel/ Sewer	Lake		Odor & Landscape	Drainage Improvement
1	TE3	-	Buoi commune	Thuy Kue	-
2	T6-A	-	Thanh Cong commune and Lang Ha	Nguyen Hong	Huynh Thuc Khang
3	Nui Truc	-	Giang Vo commune	-	Nui Truc
4	-	Thang Cong	Thanh Cong commune	Thang Cong	-
5	Le Dun	-	Cua Nam commune (Hoan Kiem District), Nguyen Du commune (Hai Ba Trung District)	-	Le Duan
6	-	Thien Quanag	Nguyen Du commune (Hai Ba Trung District)	Thien Quanag	Nguyen Gia Thieu
7	Lo Duc	-	Pham Dinh Ho commune	-	Lo Duc/Nguyen Cong Tru
8	-	Ba Mau	Phuong Lien commune	Ba Mau	-
9	-	Bay Mau	Le Dai Hanh commune	Bay Mau	-
10	-	Ho Me	Khuong Thuong commune	Ho Me	Ton That Tung
11	-	Khung Trung 2	Khuong Dinh commune	Khung Trung 2	-
12	-	Khung Trung 1	Khuong Dinh commune	Khung Trung 1	-
13	-	Dinh Cong	Dinh Cong commune	Dinh Cong	Phuong Liet
14	-	Phuong Liet	Phuong Liet commune	Phuong Liet	-
15	K5-B	-	Vinh Hung commune	-	Minh Khai

*: DRAINAGE PROJECT FOR ENVIRONMENT IMPROVEMENT IN HANOI - FIRST & SECOND STAGE

**: See Attachment



◯ : Interview of odor & landscape

◯ : Interview of drainage improvement

Attachment: Interview Location

Guidance for interview for beneficiary survey

Project Context (Brief explanation of the interview purpose:)

Japan International Cooperation Agency (JICA) has supported the development of Comprehensive Urban Development Programs (Urban Master Plans) in various cities in Vietnam and "***Comprehensive Urban Development Program in Hanoi Capital City (HAIDEP)was published in 2007.*** This HAIDEP has contributed to shaping the urban structure, enhancing urban management capacities, and implementing essential infrastructure, including water-related infrastructure such as sewerage and drainage systems in Hanoi. The JICA evaluation team conducts beneficiary survey to assess the impact in the project implemented area. The Study's results will serve as lessons to strengthen the monitoring and evaluation of JICA's technical cooperation and formulate future projects. Thanks for your cooperation!

	Location of Interview	**……**	
	Respondent's address : Commune, District	Street No, etc.	
	NAME	MALE / FEMALE	AGE
	Years of living the target area……	（Telephone:…… ）	
1	Inundation Depth and Period in Normal year	(Depth) …….(cm) (Time) ……..(ngµy-day) (Damage situation)	
2	Inundation Depth and Period in XXXX	(Depth) …….(cm) (Time) ……..(ngµy-day) (Damage situation)	
3	Inundation Depth and Period in 2024	(Depth) …….(cm) (Time) ……..(ngµy-day) (Damage situation)	
4	The odor of your housing area before (around 2000s) and after the sewerage improvement.	1. Improved 2. Improved Significantly 3. Not much changed. 4. Worsen Describe the reason choosing above. ……	

5	The water quality of the ponds and canales of your neighborhood	1. Improved 2. Improved Significantly 3. Not much changed. 4. Worsen Describe the reason choosing above. ……
6	The waterborne diseases: Are there incidences of diarrhea diseases, dengue fever (indirectly water-related), Typhoid fever, Hepatitis, Cholera in your family or neighbors? Please compare before (around 2000s) and after the sewerage improvement.	1. Improved 2. Improved Significantly 3. Not much changed. 4. Worsen Describe the reason choosing above. ……
7	The problems of pests, rats and other harmful animals are issue in your neighborhood.	1. Improved 2. Improved Significantly 3. Not much changed. 4. Worsen Describe the reason choosing above. ……
8	Water supply and sewerage service Compare before (around 2000s) and after the sewerage improvement.	1. Improved 2. Improved Significantly 3. Not much changed. 4. Worsen Describe the reason choosing above. ……
9	The water tariff	1. Too expensive 2. Expensive 3. Affordable 4. Inexpensive Describe the reason choosing above. ……

10	Any livelihood change after improvement water / sewerage services	e.g. Started to run restaurants, etc….
11	Landscape of your neighborhood	Please describe the change of greenery, conditions of parks, etc.
12	Impacts of the housing resettlement of the project areas for the water related infrastructure.	Please provide us opinions if any both negative and positive.
13	Opinions towards convenience regarding transport infrastructure (bridges and maintenance roads) and land use after the projects, if any.	

Any comments beyond the questioning items.

Summary of Interview for Beneficiary Survey

No.	Location		Interviewee			Inundation						Odor Improvement				Water Quality				Health & Hygiene				Insect Occurrence				Water Service/ Sewerage Service				Water Tariff			
	No.	Name				Normal		2008		2024																									
			Living Year	Age	Sex	Depth (cm)	Period (hr.)	Depth (cm)	Period (hr.)	Depth (cm)	Period (hr.)	Improved	Improved Slightl	Not much	Worse	Improved	Improved Slightl	Not much	Worse	Improved	Improved Slightl	Not much	Worse	Improved	Improved Slightl	Not much	Worse	Improved	Improved Slightl	Not much	Worse	Too expensive	Expensive	Affordable	Inexpensive
1	1	TE3	53	50	F	20	3~4	100	10days	0	0	x				x				x				x					x					x	
2	1	TE3	10	50	M	10~20	-	-	-	0	0	x				x				x				x					x					x	
3	1	TE3	-	72	M	0	0	0	0	0	0	x				x				x				x					x			Donot know			
4	2	T6A	40	62	M	10~15	0.25~0.33	30~40	4~5	10	0.25	x				x				x				x					x					x	
5	2	T6A	52	69	M	-	-	50	5days	-	-	x								x				x					x					x	
6	3	Nui Truc	53	61	F	20~30	1~1.5	50~60	3days	10	1																	x					x		
7	3	Nui Truc	53	53	M	20~30	2~3	50	2~3	0	0	x				x				x				x				x				Donot know			
8	4	Thanh Cong	69	69	M	40~50	0.25~0.33	-	-	40~50	0.25	x				x				x				x					x						x
9	4	Thanh Cong	7	67	F	-	-	-	-	0	0		x			x				Donot Know				x					x						x
10	5	Le Duan	30	50	M	60-~70	1~2	120	12	0	0																		x						
11	5	Le Duan	30	50	M	50	0.33	110~120	0.5~1	50~60	0																		x					x	
12	5	Le Duan	50	64	F	0	0	100~110	3days	0	0																		x					x	
13	6	Thien Quang	40	57	M	40~50	1~2	100~110	-	40~50	6		x			x															Donot know			
14	6	Thien Quang	30	53	F	-	-	-	2days	0	0		x			x												x						x
15	6	Thien Quang	14	66	M	0	0	-	-	0	0		x				x																		
16	7	Lo Duc	73	73	F	50~60	0.5~1	-	-	0	0																		x					x	
17	7	Lo Duc	78	78	M	50~60	4~5	-	-	0	0																		x			Donot know			
18	7	Lo Duc	70	73	F	50~60	0	0	0	0	0																		x				x		
19	7	Lo Duc	63	63	F	0	0	0	0	0	0		x								x				x				x				x		
20	8	Ba Mau	11	60	M	0	0	0	0	0	0		x					x											x			Donot know			
21	8	Ba Mau	72	72	M	0	0	0	0	0	0			x				x								x			x			Donot know			
22	9	Bay Mau	15	66	M	-	-	-	-	-	-	x					x																		
23	9	Bay Mau	82	82	M	-	-	-	-	-	-	x					x			x				x				x							
24	9	Bay Mau	50	64	M	-	-	-	-	-	-		x				x			x				x				x					x	
25	10	Ho Me	>20	78	F	20	1~2	110~150	2	15	1		x				x			x				x					x				x	
26	10	Ho Me	>40	58	M	20~30	0.5	-	-	0	0		x				x			Donot know				x					x				x	
27	11	Kung Trung1	33	70	M	0	0	0	0	0	0		x				x			x				x					x				x	
28	11	Kung Trung1	50	50	F	0	0	0	0	0	0		x				x				x			Donot know					x				x	
29	12	Kung Trung2	70	93	M	50	0	50~60	3	0	0		x				x									x			x				x	
30	12	Kung Trung2	26	75	M	60~70	2	100	3	0	0		x				x				x			x					x				x	
31	12	Kung Trung2	27	61	F	20	3=4	100~130	3~4	20	3~4		x				x					x				x			x				x	
32	13	Dinh Cong	32	57	M	0	0	110	5~6	0	0			x				x		x				x					x				x	
33	13	Dinh Cong	53	53	F	10	0.5	0	0	0	0			x				x			x			x					x			x		
34	14	Phung Liet	16	55	F	-	-	-	-	-	-			x			x							x					x				x	
35	14	Phung Liet	52	72	F	-	-	-	-	-	-		x				x				x			x					x				x	
36	14	Phung Liet	60	60	M	-	-	-	-	-	-		x				x							x					x				x	
37	15	K5B	24	53	M	0	0	0	0	0	0			x				x											x				x	
38	15	K5B	30	55	M	100	0.5	50~60	7days	30	0.5		x					x		x				x					x				x	
39	15	K5B	20	60	M	0	0	120~130	30days	50	5		x					x			x			x					x				x	
40	15	K5B	15	84	M	20	1	-	-	20	1~2		x					x							x				x				x	

Landscape after Improvement

Positive Answer

Location	Comment	Number
Lake	The streets have been widened and cleaned.	1
	Nguyen Hong Street is more beautiful than before.	1
	The landscape has improved a lot. Hanoi city invested new project to improve the landscape around the lake.	1
	The area around the lake has lots of trees.	1
	The landscape has been significantly improved, people can walk around the lake.	1
	The landscape has improved a lot. No more drug addicts in the park area. People's awareness has improved a lot. People no longer litter in the lake. The landscape has improved a lot. People can exercise around the lake every day.	1
	The landscape has improved a lot.	1
	The streets have been widened and cleaned.	1
	The landscape has changed for the better, the sidewalks have been renovated and there are many trees.	1
	The streets and landscape are improved. The residents can walk and do exercise around the lake.	1
	The streets and landscape are improved.	2
	The environment is better. The road is cleaner than before.	1
	The landscape are improved. The residents can walk and do exercise around the lake.	1
	The Hanoi city need to invest the lighting system for Dinh Cong lake.	1
	The streets and landscape are improved. The residents can walk and do exercise around the lake. Need to overcome the situation of business households encroaching on lakeside.	1
	The streets and landscape are improved. However, environmental sanitation needs more attention.	1
Canal	the street is cleaner.	3
	The landscape has been improved, the road is cleaner. There should be measures to collect wastewater on both sides of the canal.	1
	The landscape has been improved, the road is cleaner.	1
	The landscape has been improved but the project has not been completed and handed over.	1
Street (sewer)	The streets are cleaner. The landscape is improved.	1

Negative Answer

Location	Comment	Number
Lake	The landscape has improved a lot. There is a new project to improve the landscape around the lake. However, there is still a lot of trash in the area around the lake.	1
	The roads and landscape are better than before but still need to be improved.	1
Canal	The landscaping has been improved however it would be better without the parking lot.	1
	People living in the surrounding area do not agree with the construction of a parking lot above the T6A box culvert.	1
Street (sewer)	street cleaner, but noiser due to traffi increase	1

No Change, Irrelevant Answer, No Answer

Location	Comment	Number
Lake	No answer	1
Canal	No answer	1
Street (sewer)	Not much changed	3
	All infrastructures are maintained annually.	1
	No answer	3

Livelihood Change after Improvement

Positive Answer

Location	Comment	Number
Lake	There used to be no services but now there are many new business around the lake.	5
	There are many business service around the lake.	2
	Household businesses are doing well. Many shops and services are opened.	2
	Business situation is changing in a positive direction. Homeowners can rent out the first floor area of their house.	1
	The quality of business services also improved. Homeowners can rent out the first floor area of their house.	1
	Immediately after the project was completed, the business situation around the lake improved significantly, but recently it has declined due to many other reasons (economic recession, epidemics...)	1
	People's lives have changed for the better. Many restaurants are located around the area outside Thong Nhat Park.	1
	The business situation around the lake area has not changed much, but people have space to walk and exercise, which brings health benefits to people.	1
	Household businesses are relatively busy due to the good environment and the newly built hospital.	1
	Household businesses are relatively busy due to the newly built hospital. However, traffic jams are frequent between 4pm and 7pm every day.	1
Canal	sanitary improved so new shops open	1
	land price increased	1
	Household businesses were doing well	1
	Business situation has changed in a positive direction	1
	Due to improved environmental sanitation, many new shops have opened, and business is better than before.	1
	There used to be no shops in this area, but now there are many shops open.	1
Street (sewer)	business improved	1
	Environmental sanitation conditions are better than before.	1
	Households can easily rent out the first floor. Good ability to attract tenants. Households doing good business.	1
	The resident nearby can do business in this area.	1

Negative Answer

Location	Comment	Number
Lake	-	0
Canal	hisrory&culter damages	1
	but business declined after the road on the T6A box culvert was used as a parking lot.	1
Street (sewer)	-	0

No Change, Irrelevant Answer, No Answer

Location	Comment	Number
Lake	People's business situation has not changed much.	1
	No answer	3
Canal	No answer	1
Street (sewer)	Due to various reasons, it is not possible to assess the business situation.	1
	Previously, when the project was newly completed, business was good, but in recent years, due to many reasons, business has been worse than before.	1
	After the pandemic, business was worse than before.	1
	Unable to assess business situation due to many other influencing reasons.	1
	No answer	1

Housing Resettlement Impact

Positive Answer

Location	Comment	Number
Lake	House prices have increased but I don't know the details (house prices in the alley are about 100 million/m2)	1
	House prices in this area have increased significantly.	1
	House prices in this area have increased 6~7 times.	1
	The price of house increase so much: from 2,5 billions to 10 billions (my neighbor's house).	1
	After the project is completed, many households plan to open more doors to connect access road of the lake.	1
	Many people from other places come to rent houses and open new businesses.	2
Canal	House prices are increasing, more people are coming from other places, and more people are renovating and building new houses.	1
	Real estate prices increased after the project was completed but not much.	1
	Real estate prices after the project increased so much. Before: 100 ~ 300 million for 1 house. Now: 16 billion 500 million for 1 house 66m2.	1
	Real estate prices after the project increased so much. Before: 180 million for 1 house. Now: 5 billion for 1 house 21m2.	1
	Real estate prices after the project increased 3 times. Before: 45 million/ m2. Now: 250 billion/m2.	1
Street (sewer)	-	0

Negative Answer

Location	Comment	Number
Lake	-	0
Canal	-	0
Street (sewer)	-	0

No Change, Irrelevant Answer, No Answer

Location	Comment	Number
Lake	No effect	4
	There are no sellers so I don't know the real estate prices in this area.	2
	No answer	7
Canal	No effect	1
	less impact	1
	Does not know	1
	No answer	1
Street (sewer)	The infrastructure is good but the roads are much more congested than before.	1
	Stable population. The population has no major mechanical changes.	1
	Many people from other places come to rent houses to do business.	1
	No answer	6

Others

Location	Comment	Number
Lake	Traffic connections with other areas are better than before. Cars can enter the roads around Thanh Cong Lake Park.	1
	became more convenient.	1
	The traffic is connected well with surround areas.	2
	Traffic connections with other areas are better than before. The streets have been widened and cleaned.	1
	Traffic overload.	1
	Traffic connections with other areas are better than before.	3
	Traffic connections with other areas are better than before. But increased traffic causes traffic jams.	1
	Traffic connections with other areas are better than before.	1
	Traffic connections with other areas are better than before. However, the access road around the lake has deteriorated.	1
	Traffic connections with other areas are better than before. But noisier due to more cars, motobycles.	1
	Traffic connections with other areas are better than before. The road is cleaner than before.	1
	Traffic connections with other areas are better than before (Nguyen Lan street is connected with Truong Chinh and Le Trong Tan street). The road is cleaner than before. However, noise and dust pollution have increased compared to before.	1
	No answer	5
Canal	traffic connection are better.	3
	Traffic connections with other areas are better than before. But due to the operation of the parking lot, there are many limitations.	1
	Traffic connections with other areas are better than before. But the road near by the box culvert T6A need to be expanded.	1
	Traffic connections with other areas are better than before.	1
	Traffic connections with other areas are better than before. Lots of dust and noise but acceptable	1
	Traffic connections with other areas are better than before. Lots of dust and noise but acceptable compared to improvements in environmental sanitation.	1
	No answer	1
Street (sewer)	Traffic jams due to people coming from other places.	1
	There are occasional traffic jams during rush hour.	1
	Traffic connections with other areas are better than before. The air is dusty and noisy than before but acceptable.	1
	No comment	2
	No answer	4