MINISTRY OF PLANNING AND INVESTMENT
SOCIALIST REPUBLIC OF VIETNAM

THE STUDY FOR IMPROVEMENT OF LIVING CONDITIONS FOR WORKERS AROUND INDUSTRIAL AREAS IN SOCIALIST REPUBLIC OF VIETNAM

FINAL REPORT

JULY 2016

JAPAN INTERNATIONAL COOPERATION AGENCY

NINE STEPS CORPORATION
ORIENTAL CONSULTANTS GLOBAL CO., LTD.
INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INCORPORATED
AZUSA SEKKEI CO., LTD.

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Table of Contents

List of Figures and Tables
List of Annexes
Location Map
Abbreviations

1. INTRODUCTION 1

1.1. BACKGROUND OF THE STUDY 1
1.2. OBJECTIVE AND OUTCOMES OF THE STUDY 1
1.2.1. Objectives of the Study 1
1.2.2. Outcomes of the Study 1

2. CURRENT LEGAL FRAMEWORK FOR IMPROVEMENT OF WORKERS AROUND INDUSTRIAL PARKS 2

2.1. RELATED ENTITIES OF INDUSTRIAL DEVELOPMENT AND LIVING ENVIRONMENT IMPROVEMENT 2
2.2. LEGAL SYSTEMS FOR SOCIAL HOUSING PROJECTS 3
2.2.1. Legal Frameworks for Social Housing 3
(1) Legal Frameworks for Social Housing 3
(2) Housing Law No. 65/2014/QH 13 4
(3) Decree No.100/2015/ND-CP 4
2.2.2. Business Scheme and Related Entities from Social Housing Development 4
(1) Related Entities for Social Houses for Industrial Workers and Development Scheme 4
(2) Incentives for Social Housing Projects 6
(3) Pricing Conditions 8
(4) Relevant Regulations 8
2.3. LEGAL SYSTEMS FOR INDUSTRIAL ZONE DEVELOPMENT 9
2.4. LEGAL FRAMEWORKS FOR CONSTRUCTION 9
2.4.1. For Vietnam Construction Standards 9
2.4.2. Building Grade and Classification 10
2.4.3. Legal Frameworks for Social Housing 10
(1) Construction Requirements in the Decree No. 100 11
(2) Area for Social Housing Households 11
(3) Obligated Car, Motorcycle and Bicycle Parking Related to Social Housing 12
(4) Legal Systems to be Introduced for Construction Standard 13

3. CURRENT LIVING SITUATION OF INDUSTRIAL PARK WORKERS 14

3.1. OUTLINE STUDY OF THE CURRENT SITUATION 14
3.2. GENERAL SITUATION IN INDUSTRIAL DEVELOPMENT AND SH PROJECTS 14
3.2.1. Transition of Approved IPs and Economic Zones 14
3.2.2. Occupancy Rate of Factories in IPs 15
3.2.3. Social Housing Project Trends 17
3.3. INTERVIEW RESULT TO GRASP THE LIVING SITUATION AND RELATED ISSUES 18
3.3.1. Outline of the Interview 18
3.3.2. Major Findings from the Interviews 19
3.3.3. Summary of Interview 20
3.4. TYPOLOGY OF IPS AND THE SITUATION OF HOUSING SUPPLY 21
3.4.1. Typology of IPs 21

(1) IPs in Suburban Areas Around Large Cities/ Metropolitan Areas (type 1) 21
(2) IPs in Vicinity Rural Areas Around Large Cities/ Metropolitan Areas (type 2) 21
(3) Isolated IPs in Rural Areas (type 3) 21
(4) IZ Development Integrated with IPs and Surrounding Cities and Villages (type 4) 22
3.4.2. Issues by Type of Location of IPs 24
(1) IPs in Suburban Areas Around Large Cities/Metropolitan Areas (type 1) 25
(2) IPs in the Vicinity of Rural Areas Around Large Cities/ Metropolitan Areas (type 2) 25
(3) Isolated IPs in Rural Areas (type 3) 26
3.5. SITUATION OF RESIDENTIAL AREA DEVELOPMENT 28
3.5.1. Outline of Analysis 28
(1) Objectives of the Analysis 28
(2) Analysis and its Result 29
3.5.2. Analysis from the View of Urban Development 29
(1) Research of IPs for Analysis 29
(2) Analysis on Workers' Living Environment 35
(3) Situation of Workers' Housings 42
(4) An Evaluation Summary of Spatial Relation between IPs, Residential Facilities for Workers and Surrounding Areas 43
3.5.3. Analysis on Residential Areas around IPs in the View of Detailed Planning 47
3.6. SITUATION OF LIVING ENVIRONMENT AROUND IPS 52
3.6.1. Situation of Housing Development and Living Environment around IPs 52
3.6.2. Issues for Living Environment 54
3.7. SITUATION OF BUILDING FOR IP WORKERS 56
3.7.1. Cases of Housing for IP Workers 56
(1) Private Owned Apartment near Thang Long IP II (Hung Yen Province) 56
(2) Corporation Dormitory in Phuc Dien IP (Hai Duong Province) 57
(3) Corporation Dormitory in Yen Phong IP (Bac Ninh Province) 57
(4) Hanoi Social Housing near Thang Long I IP (Ha Noi City) 58
(5) Corporation Dormitory near Kim Hoa IP (Vinh Phuc Province) 58
(6) Social Housing Sales for Low-Income Earners by Private Developers near Kim Hoa IP (Vinh Phuc Province) 59
(7) Housings and Dormitory near Dai An IP (Hai Duong Province) 60
(8) The Privately-Run Apartment around Dong Van II IP (Ha Nam Province) 61
(9) The Privately-Run Apartment around Noi Bai IP (Ha Noi City) 62
(10) High-Rise Social Housings near Thang Long IP I (Ha Noi City) 63
(11) Row Housing for Industrial Worker near Tan Huong IP (Tien Giang Province) 63
(12) Industrial Worker's Dormitory near Long Hau IP (Long An Province) 64
(13) Industrial Worker's Dormitory in Ascendas Protrade Singapore Tech Park (Binh Duong Province) 64
(14) Industrial Worker's Housings near My Phuc Industrial I, II & III (Binh Duong Province) 64
(15) Industrial Workers Housing near Vinh Loc IP (HCMC) 65
(16) Industrial Worker's Dormitory near Long Thanh IP (Dong Nai Province) 65
(17) Industrial Worker's Dormitory near Phuoc Dong IP (Tay Ninh Province) 66
3.7.2. Housing Issues for IP Workers 68
3.8. BUSINESS MODEL OF HOUSING DEVELOPMENT FOR IP WORKERS 69
3.8.1. Stakeholders and their Roles in Housing Development 69
(1) Department of License Related to the Industrial Worker Housing and IP Development 69
(2) Three Classifications of Private Sector Owners Providing SH for Workers 69
3.8.2. Housing Development Business Models in Vietnam 70
(1) Workers' Housing Development by Production Companies for Their Own Workers 71
(2) Workers' Housing Development by IP Operators 71
(3) Workers' Housing Development by Third Parties except IP Operators/Companies in IP Vicinities 72

3.8.3. Case of Coordinating Implementation of SH Project 72
3.9. AFFORDABLE HOUSING COSTS FOR RESIDENCE FOR INDUSTRIAL PARK WORKERS 73
3.9.1. Results of the Interview Survey of the Living Condition 73
(1) Outline of the Survey 73
3.9.2. Employment Condition and Economic Situation of Workers 83
(1) Employment Period 83
(2) Affordability of Housing Costs to Workers 84
3.10. EXAMPLES OF THE IMPROVEMENTS OF HOUSING DEVELOPMENT IN VIETNAM 87
3.10.1. Introduction of Low Rise Housing in the Development 87
3.10.2. Improvement of Housing Management 88
3.11. SUMMARY OF ISSUES 89

4. HOUSING DEVELOPMENT MEASURES IN SURROUNDING COUNTRIES 91

4.1. SUMMARY OF HOUSING AND FINANCIAL POLICIES 91
4.1.1. Challenges and Supports to Low-Income Housings 91
4.1.2. Historical Transition of Housing Policy in South Asian Countries 91
4.1.3. Current Housing Programs 92
4.1.4. Public Housing Entities 94
4.1.5. Financing Mechanisms 95
4.2. INDUSTRIAL PARK DEVELOPMENT AND HOUSING DEVELOPMENT FOR WORKERS 97
4.2.1. The Current Situation of Labors, Residence and Dormitories in Southern Asian Countries 97
4.2.2. The Type of Factory Workers' Housing 98
4.3. SUPPORT MEASURES FOR RESIDENTIAL DEVELOPMENT IN OVERSEA COUNTRIES TO BE INTRODUCED IN VIETNAM 100
4.3.1. Financial System Measures of Primary Level 100
(1) Rule no. 10 (Ashray Nidhi (Shelter Fund)) in India (In 1988- Amended in 2000) 101
4.3.2. Spatial Control System Measure of Primary Level 101
(1) 1:3:6 Ratio and its Amendment 1:2:3 Rule for Mix Settlement (Indonesia) 101
(2) Housing Land Supply by KASIBA /LISIBA (Indonesia) 101
4.3.3. Administrative System Measure of Primary Level 102
(1) Role of the Community Organizations Development Institute in Thailand 102
(2) Role of Government in Rental Housing Development Process (Thailand): 104

5. RECOMMENDATIONS FOR IMPROVEMENT OF THE LIVING ENVIRONMENT OF INDUSTRIAL PARK WORKERS 105

5.1. RECOMMENDATIONS FOR SPATIAL PLANNING AND BUILDING DESIGN 105
(1) Facilitation and Tightening Enforcement of the Current Legal System 105
(2) Introduction of New Measures 106
(3) Recommendations for Improvement of the Current Legal System 109
5.2. RECOMMENDATIONS FOR THE INSTITUTIONAL AND LEGAL SYSTEM 110
(1) Facilitation and Tighten Enforcement of Current Legal System 110
(2) Introduction of New Measures 111
5.3. RECOMMENDATIONS FOR BUSINESS AND FINANCIAL PLANNING 113
(1) Facilitation and Tightening Enforcement of the Current Legal System 113
(2) Introduction of New Measures 114
(3) Recommendations for Improvement of the Current Legal System 115

5.4. IMPLEMENTATION PRIORITY OF POLICIES 116

6. SITUATION IN THE MODEL SITE 118

6.1. SITE SELECTION 118
6.2.1. Locational Situation (e.g. Facilities) Around the Model Site 120
6.2.2. Road Traffic Situation Around the Model Site 121
6.2.3. Living Environment Situation Surrounding the Model Site 121
6.3. NATURAL ENVIRONMENTAL SITUATION 123
6.4. RELATED CONSTRUCTION PLAN 123
6.4.1. Regional Construction Planning of the Hung Yen Province 123
6.4.2. General Construction Planning and Zoning Plan for My Hao District 124
(1) General Construction Planning for My Hao District, Hung Yen Province, Vision 2020 to 2030 124
(2) Zoning Plan for My Hao Urban Center in My Hao District, Hung Yen Province 126
(3) Planning Issues Based on the Results from Discussions 128
(4) General Construction Plan for Pho Noi Town 2025 128
6.5. URBAN PLANNING DOCUMENTS AND DRAWINGS PREPARED IN THE STUDY 129
6.6. RELATED REGULATION ON PLANNING STANDARDS AND PLANS 133
6.6.1. Planning for Residential Units 133
(1) Planning Requirements for Residential Unit: 133
(2) Land Use Planning Regulations for Residential Unit 133
6.6.2. Planning for the System of Urban Service Works 133
(1) Requirements for the Structure of the System of Urban Service Works 133
6.6.3. Planning for the System of Urban Service Works 133
6.6.4. Urban Greenery Planning 134
(1) Regulations on the Area of Public-Use Greenery Land 135
6.6.5. Permitted Maximum Net Building Coverage 135
(1) Residential Houses: 135
(2) Educational, Healthcare, Cultural Facilities and Markets: 135
6.6.6. Gross Building Coverage 136
6.6.7. Ratio of Land for Greeneries in Land Lots for Work 136

7. PLANNING FOR THE MODEL SITE 137

7.1. PLANNING POLICY 137
7.1.1. Policy on Housing Supply Policy 137
7.1.2. Spatial Planning Policy 137
7.1.3. Architectural Planning 139
7.2. FRAME WORK AND LAND USE SPECIFICATION 139
7.2.1. Potential Housing Demand in the Model Site. 140
(1) Potential Demand for Housings by IPs 140
(2) Assumed Increase of Population and Housing Supply of Upper Plans 140
7.2.2. Planning Specifications of a Typical Residential Unit in the Model Site 141
(1) Preparatory Study on Adequate Population Size and Planning Specifications 141
(2) Conclusion from Discussions with Related Entities 144
7.2.3. Adjustment of Land Use Distribution and Planning Population 145
(1) Issues to be Considered When Planning for the Model Site 145
(2) Results of Land Use Distribution and Planning Population 145
7.3. PROPOSED DESIGN PLAN 147

7.3.1. Land Use Planning 147
(1) Spatial Issues to be Considered During Land Use Planning 147
(2) Approach to Spatial Planning in the Model Site 148
7.3.2. Block and District Spatial Plans 149
(1) Approach to Block and Spatial Plans 150
(2) Approach to Spatial Planning for Each Zone 150
7.3.3. Housing Plan 152
7.3.4. Building Plan 160
(1) Planning Principle 160
(2) Architectural Concepts 160
(3) Motor-Cycle Parking Lots 162
(4) Structural Design and Technology 162
(5) Construction and Housing Plans 162
7.3.5. Exterior and Public Space Planning 165
(1) Approach to Exterior and Public Space Planning 165
(2) External and Public Space Planning for Each Zone 165
7.3.6. Road Plan 167
(1) Related Regulations and Planning Standard 167
(2) Related Plans 169
(3) Details of the Model Site and Surrounding Areas 170
(4) Solutions and Considerations for Housing Development 174
7.3.7. Water Supply Planning 176
(1) Related Regulations and Planning Standards 176
(2) Related Plans 177
(3) Analysis on the Study Site and Surroundings 178
(4) Solutions and Considerations for Housing Development 178
7.3.8. Waste Water Treatment Planning 181
(1) Related Regulations, Planning Standard 181
(2) Related Plans 182
(3) Analysis on the Study Site and Surroundings 182
(4) Solutions and Considerations for Housing Development 182
7.3.9. Drainage Planning 184
(1) Related Regulations, Planning Standard 184
(2) Related Plans 185
(3) Analysis on the Study Site and Surroundings 185
(4) Solutions and Considerations for Housing Development 186
7.3.10. Electricity Planning 189
(1) Related Regulations, Planning Standard 189
(2) Related Plans; (Pho Noi New Residential Town Development) 190
(3) Solutions and Considerations for Housing Development 192
7.3.11. Landing Plan 198
(1) Related Laws and Regulations, Specifications and Standards 200
(2) Related Plans 200
(3) The Model Site and its Surrounding Condition 202
(4) Outlook and Consideration on Housing Development 203
7.3.12. Construction Plan 204
(1) Construction Period Based on the Difference of Construction Request Form 204
(2) Construction Schedule (Civil and Building) 204
(3) Installation Plan 206

8. COST ESTIMATION 209

8.1. ACCURACY OF COST ESTIMATION 209
8.2. COST ESTIMATION AND UNIT PRICE BASIS 209
8.3. EVALUATION OF INFRASTRUCTURE CONSTRUCTION COST 212
8.4. CONSTRUCTION UNIT COSTS PER SQUARE METERS OF INDUSTRIAL WORKER'S HOUSINGS 212
8.4.1. Construction Unit Cost 213
(1) Residential Construction Investment Unit Cost for adapted unit cost in Architectural Works 213
(2) Residential Construction Investment Unit Cost in MOC (Reference) 213
(3) Residential Construction Investment Unit Cost Issued by Privately Construction Consultants (Reference/Include Price Escalation) 213
(4) Social Housing Sales Price on Website Published by Developers. (Reference) 213
(5) Condominium Sales Price on Website Published by Private Real Estate. (Reference) 214
8.5. RESULT OF COST ITEMS AND UNIT PRICE 214
8.6. CONSTRUCTION COST COMPARISON BY HOUSING TYPE 217

9. BUSINESS PLANNING 218

9.1. BUSINESS SCHEME 218
9.1.1. Business Stakeholders and Role Sharing 218
9.1.2. Possibilities and Measures as Coordinated Business with Public- Private Collaboration 219
9.1.3. Coordinated Business Scheme among Private Entities (Scheme with Master Developer) 220
(1) Summary of Business Scheme 220
(2) Benefits of Related Entities 220
(3) Issues of the Business Forum 221
9.1.4. Public Housing Entities 221
9.1.5. Examination of Business Scheme 222
(1) Condition of the Cost Burden in the Model Site Business 222
(2) Stakeholder's Situation regarding Business Schemes 223
(3) Basic Business Scheme 224
(4) Other Business Schemes 225
9.2. PRECONDITION OF BUSINESS PLAN 225
9.2.1. Examination of the Affordable Housing Cost of Workers 226
9.2.2. Commercial Facilities in Business Planning 226
9.2.3. Affordability and Cost Comparison in the Model Site 226
9.3. FINANCING PLAN 227
9.3.1. Financing Sources (Business Cost Allocation) 227
(1) Conditions for Consideration 227
(2) Results of Allocation of Fund for the Basic Scheme 228
9.3.2. Sensibility Analysis 230
(1) Case that 20 % of Housing Land or Residential Unit is Allocated to General Profit Business 230
(2) The Contribution of Initial Project Cost by Factory Owners 230
(3) Case of Decreasing Interest Rate (Applying Preferential Interest Rate) 231
(4) Conclusion 231
9.4. EXAMINATION ON FUNDING RESOURCES 233
9.5. FEASIBILITY OF SOCIAL HOUSING BUSINESS IN MODEL SITE 234

10. RECOMMENDATIONS TO THE IMPLEMENTATION OF DEVELOPMENT 235

10.1. RECOMMENDATIONS FOR IMPLEMENTATION OF DEVELOPMENT OF THE MODEL SITE 235
10.1.1. Support for Coordination of Candidate Residents 235
(1) Promotion at Support Desk for IP Operators 235

(2) Arrangement Support of Residents for Worker Housings Including Surrounding IPs 236
10.1.2. Support for Development Promotion 236
(1) Execution of Land Acquisition 236
(2) Giving Publicity of the Plan to the Candidate Operators, and Inviting the Development Operators (Information Sharing and One-Stop Services) 236
(3) Securing of Financial Capital 236
(4) Application of the Business Operation Incentives 236
10.1.3. Support for Development Coordination 236
(1) Organization Support for Housing Related Operators 236
(2) Information Sharing Support between Master Developer and Individual Operator 237
10.1.4. Support for Spatial Development Coordination 237
10.1.5. Support for Construction of Building 237
(1) Advising of Construction Regulations for Current Villages 237
(2) Assisting for Cost Down of Subsidized Construction Materials and Group Buying 237
10.1.6. Support for Residential Facility Management 237
10.2. THE INTRODUCTION ORDERS 238
10.2.1. Short-Term Support 238
10.2.2. Mid and Long-Term Support 238

11. CONCLUSION 240

11.1. RESULT OF THIS STUDY 240
11.1.1. Study Summary 240
11.1.2. Study Result and Analysis 240
11.2. RECOMMENDATION FOR LIVING ENVIRONMENT IMPROVEMENT OF IP WORKERS 241
11.2.1. Measures of Living Environment Improvement of Workers Targeting to IPs throughout the Vietnam 241
11.2.2. Measures of Living Environment Improvement of Workers Targeted to the Model Site (Hung Yen Province) 241
11.3. URBAN PLANNING OF THE ZONING PLAN, DETAIL PLAN, AND DRAFT BUSINESS PLAN REGARDING IP HOUSING DEVELOPMENT IN THE MODEL SITE 241
11.4. LESSONS FOR FUTURE 241

List of Figures and Tables

Figure 3-1 Occupancy Rate of Factories in IPs in Vietnam (North Area) 16
Figure 3-2 Occupancy Rate of Factories in IPs in Vietnam (South Area) 17
Figure 3-3 Distribution Map for IP Types (Northern Area) 23
Figure 3-4 Distribution Map for IP Types (Southern Area) 24
Figure 3-5 Location of the IPs in the Northern Area of Vietnam 30
Figure 3-6 Location of the IPs in the Southern Area of Vietnam 32
Figure 3-7 Location of the IPs in the Central Area of Vietnam 34
Figure 3-8 Spatial Model and View of Analysis between the IP and the Surrounding Residential Area 36
Figure 3-9 Thang Long IPII 37
Figure 3-10 Thang Long IP I 38
Figure 3-11 Tan Truong IP 39
Figure 3-12 VSIP Back Ninh, Dai Dong, Tien Son, Hanaka IPs 39
Figure 3-13 Kim Hoa IP 40
Figure 3-14 Binh Xuyen IP 41
Figure 3-15 Residential Developments Around the IPs 45
Figure 3-16 Apartment in Private House Premises 57
Figure 3-17 New Apartments nearby Thang Long IP II 57
Figure 3-18 The Dormitory Room 59
Figure 3-19 Canteen in the Dormitory 59
Figure 3-20 Apartments for Low-Income People 60
Figure 3-21 Housing Layout Design in Apartment 60
Figure 3-22 Apartment for Foreign Manager Class 61
Figure 3-23 Dormitory as Converted Family Types 61
Figure 3-24 Social Housing (Outside) 62
Figure 3-25 Social Housing (Inside) 62
Figure 3-26 Inner Court 63
Figure 3-27 Social Housing (Inside) 63
Figure 3-28 Volleyball Court in Courtyard 65
Figure 3-29 Motorcycle Parking 65
Figure 3-30 Worker's Dormitory 66
Figure 3-31 Canteen 66
Figure 3-32 Relating Departments of Licensing IP Workers' Housing and Establishment of IP 69
Figure 3-33 Business Model of Workers' Housing Development 71
Figure 3-34 Percentage of Gender 75
Figure 3-35 Distribution of Age 76
Figure 3-36 Distribution of Working Experience 77
Figure 3-37 Reasons for Choosing Job at the Industry Park 77
Figure 3-38 Length of Time Living in Current Accommodation 78
Figure 3-39 Type of Accommodation 78
Figure 3-40 Living Space Distribution 79
Figure 3-41 Facilities Status 79
Figure 3-42 Reasons for Remaining at Current Accommodation 80
Figure 3-43 Percentage of Facilities to be Improved 80
Figure 3-44 Differences in Facilities to be Improved 81
Figure 3-45 Urban Environment Factors to be Improved 81
Figure 3-46 Differences in Environment Factors to be Improved 82
Figure 3-47 Reason for Changing Accommodation 82
Figure 3-48 Distribution of Percentage of Monthly Income 83
Figure 3-49 Monthly Housing Cost 83
Figure 3-50 Spatial Planning with Low Rise Rental Housing and Example of Design Guideline 88
Figure 3-51 Rent Room Housing by Individual Investors with Service Facilities and Open Space 88
Figure 3-52 Case of Relaxing the Operational Rules by Automatic Security System (Ascendas IP) 89
Figure 4-1 Housing Land Supply by Kasiba / Lisiba 102
Figure 4-2 CODI Structure 103
Figure 4-3 Rental Housing Management Scheme in Thailand 104
Figure 5-1 Considerations for Location Selection in View of Spatial Planning View (Case: Model Site) 107
Figure 5-2 Image Showing Common Space 108

Figure 5-3 Considerations in Architectural Building: for Renovation 109
Figure 5-4 Program for Rental Residential Buildings with Certified Conditions 112
Figure 6-1 Location of Pho Noi 118
Figure 6-2 Candidate Site 119
Figure 6-3 Situation around the Model Site 120
Figure 6-4 Living Environment of the Neighboring Community Located in the North of the Model Site 122
Figure 6-5 Spatial Plan of Construction Planning for the Hung Yen Province 124
Figure 6-6 Spatial Plan of the General Construction Planning of My Hao District 125
Figure 6-7 Spatial Plan of the Zoning Plan for My Hao Urban Center 127
Figure 6-8 The Development Plan of Pho Noi, Hung Yen Province 129
Figure 7-1 Basic Idea of Shared Use of Public Facilities as per Their Function 138
Figure 7-2 Basic Planning Process for Land Use Plan 139
Figure 7-3 Assumed Increase of Population in the Upper Plans (Zoning Plan for My Hao Urban Center) 141
Figure 7-4 Population Requirements of the Related Law 142
Figure 7-5 Considerations During Model Site Planning 145
Figure 7-6 Examples of Apartment Housing (Medium Rise) and Row Housing (Low Rise) 146
Figure 7-7 Considerations for Spatial Configuration around the Model Site 148
Figure 7-8 Land Use Plan 149
Figure 7-9 Image of a Shared Space in Low-Rise Housing Site 150
Figure 7-10 Image of Common Space 151
Figure 7-11 Numbering of Each Land Lot 153
Figure 7-12 Architectural Planning for Each Land Lot 154
Figure 7-13 Image of Bird's-Eye View 156
Figure 7-14 Drawing Plan (Low-Rise Housing) 163
Figure 7-15 Drawing Plan (Medium-Rise Housing) 164
Figure 7-16 Image of the Building Line Setback 165
Figure 7-17 Example of Utilization of a Courtyard 166
Figure 7-18 Example of Pocket Space 166
Figure 7-19 Example of Green Way 167
Figure 7-20 Typical Cross Section of Internal Roads 169
Figure 7-21 My Hao District Road Plan from 2020 - 2030 170
Figure 7-22 Road in the East of the Model Site 170
Figure 7-23 Road in the South of the Model Site 171
Figure 7-24 Pedestrian Overpass on QL5 171
Figure 7-25 QL39 172
Figure 7-26 Commuting Situation of Workers 172
Figure 7-27 Dinh Bang Communal House 173
Figure 7-28 Case of Japanese Company "C" Workers' Dormitory 174
Figure 7-29 Dai An IP: Stalls and Workers Leaving a Factory 174
Figure 7-30 Structure of Pavement and Sidewalk 175
Figure 7-31 Plan of Distribution Pipes 180
Figure 7-32 Example for Pre-Fabricated FRP Packaged On-Site Wastewater Treatment 183
Figure 7-33 Plan of Sewer Pipe 184
Figure 7-34 Irrigation System around the Model Site 186
Figure 7-35 Plan of Drainage Pipe 188
Figure 7-36 Existing Substation 190
Figure 7-37 Orientation for Electrical Power Supply until 2025 and Future 191
Figure 7-38 Study Site Map 192
Figure 7-39 Conceptual Single Line Diagram for 22/0.4kV Substations 196
Figure 7-40 Power Layout 197
Figure 7-41 Details for NPC's Tie-In Point to the Study Site 197
Figure 7-42 Image of Ring Levee 198
Figure 7-43 Land Preparation Drawing 199
Figure 7-44 Assumed Site Section (TLIP-2 – Model Site) 200
Figure 7-45 Drawing of Current Condition of the Model Site 203
Figure 7-46 Construction Division Plan 205
Figure 7-47 Construction Installation Access 206
Figure 8-1 Consumer Price Index Change 209

Figure 9-1 Supposed Project Schemes in Model Site....225

Table 2-1 Relating Entities of Developments of IZs and its Surroundings....2
Table 2-2 Building Classification and Grade....10
Table 2-3 Numbers of Residents per Households....12
Table 3-1 Summary of Survey of Current Living Situation....14
Table 3-2 Number of Approved IPs and Economic Zones....15
Table 3-3 List of Interviewee....18
Table 3-4 List of IPs in the Northern Area of Vietnam....30
Table 3-5 List of IPs in the Southern Area of Vietnam....33
Table 3-6 List of IPs in Da Nang City....35
Table 3-7 Correspondence of IPs' Spatial Features from Two Planning Scales in Vietnam....42
Table 3-8 Evaluation of the Current Situation in Residential Facilities Around IPs Sampled Depending on the Distance between the Three Elements (IP, Villages, and Development Residential Area)....46
Table 3-9 Planning Standard and Design Criteria in Thang Long I IP....47
Table 3-10 Planning Standard and Design Criteria in Tien Son IP....48
Table 3-11 Planning Standard and Design Criteria in Yen Phong IP....49
Table 3-12 Planning Standard and Design Criteria in Dinh Tram IP....49
Table 3-13 Planning Standard and Design Criteria in Phuc Dien IP....50
Table 3-14 Planning Standard and Design Criteria in Dai An IP....50
Table 3-15 Planning Standard and Design Criteria in Kim Hoa IP....51
Table 3-16 Summary of the Detailed Planning Index in the Residential Areas Development....51
Table 3-17 Examples of Residential Development around Industrial Zones (Northern Vietnam)....53
Table 3-18 Tasks on Establishing the Living Environment of IPs Workers....54
Table 3-19 Summary of Building Analysis....67
Table 3-20 Confirmed Problems in Social Housing for Industrial Workers....68
Table 3-21 Classification of Owners of Social Housing for Workers....70
Table 3-22 Question Items and Contents....74
Table 3-23 Survey Sampling....74
Table 3-24 Distribution of Gender....75
Table 3-25 Distribution of Age....75
Table 3-26 Distribution of Marital Status....76
Table 3-27 Comparison of Household Income in 2010 & 2012....85
Table 3-28 Minimum Wage Record....85
Table 3-29 Conditions for Housing Mortgage....86
Table 3-30 Affordable Housing Price Setting (Affordable Rate: 15%)....87
Table 3-31 Affordable Housing Price Setting (Affordable Rate: 20%)....87
Table 3-32 Issues on Living Environments for Workers....90
Table 4-1 Experiences of Housing Policies for Low-Income Groups in Southeast Asia and Asia....92
Table 4-2 Public Housing Entities in South Asian Countries....95
Table 4-3 Experiences of Financial System for Low-Income Housing in Southeast Asia and Neighboring....95
Table 4-4 Type of Factory Workers' Housing Based on the Type of Payment and Providers....99
Table 4-5 Policies and Mechanism from Southeast Asia and Neighboring to be Reflected on Vietnam Situation....100
Table 5-1 Relationship between Nation Wide Recommendations and Current Legal System....105
Table 5-2 Increase in Affordability Ratio by Reducing Interest Rate....116
Table 5-3 Implementation Priority of Nationwide Policies for Improvement Social Housing....117
Table 6-1 Analysis on Candidate Site....119
Table 6-2 Planning Details of the Model Site in the Zoning Plan....126
Table 6-3 Outline of the New Town Development Project for Pho Noi, Hung Yen Province....128
Table 6-4 Table of Contents for Zone Plan Amendment Report....129
Table 6-5 Table of Contents for Detailed Plan....130
Table 6-6 List of Drawings for Zoning Plan Amendment....132
Table 6-7 List of Drawings for Detailed Plan....132
Table 6-8 Minimum Requirements for Basic Urban-Service Works....134
Table 6-9 Public-Use Greenery Land Occupancy Outside Residential Units in Urban Areas....135
Table 6-10 Building Coverage of a Land Lot for the Construction of Groups of Adjoining Houses or Separate Houses (Garden Houses, Villas, etc.)....135

Table 6-11 Maximum Building Coverage of Groups of Apartment Buildings According to Land Lot Area and Work Height135
Table 6-12 Minimum Ratio of Land for Greeneries in Land Lots for Work Construction 136
Table 7-1 Long-Term Housing Needs of the Labor Force 140
Table 7-2 Assumed Planning Population for Workers' Housing and Constitution 142
Table 7-3 Assumed Public Facilities for a Typical Residential Unit 143
Table 7-4 Assumed Land Use Distribution of the Model Site for Typical Residential Purpose 144
Table 7-5 Land Use Distribution and Planning Population 146
Table 7-6 Building Coverage/Floor Area Ratios for Each Housing Type 153
Table 7-7 Residents Summary Sheet in Each Building Types in the Model Site 155
Table 7-8 Information and List of Land Lots 157
Table 7-9 Information and List of Land Lots (Cont'd) 158
Table 7-10 Information and List of Land Lots (Cont'd) 159
Table 7-11 Design Guideline for a Worker's Apartment 160
Table 7-12 Road Lighting Design Criteria 175
Table 7-13 Water Supply Standard of General Construction Plan for My Hao District 177
Table 7-14 Conditions of Water Supply Demand Calculation 178
Table 7-15 Conditions of Water Supply Demand Calculation 179
Table 7-16 Specification of Deep Well 179
Table 7-17 Specification of Pump Station 180
Table 7-18 Outline of Water Supply Plan 180
Table 7-19 Wastewater Volume Projection 182
Table 7-20 Discharge Standard for Domestic Wastewater: QCVN14 183
Table 7-21 Outline of Wastewater Treatment Plan 184
Table 7-22 Return Period 186
Table 7-23 Constants Value for Rainfall Intensity 187
Table 7-24 Runoff Coefficient 187
Table 7-25 Outline of Rainwater Drainage Plan 188
Table 7-26 Related Regulations, Standards and Basics in Vietnam 189
Table 7-27 Condition of Land Preparation for the Similar Cases 202
Table 7-28 Obstacles on the Planned Site 203
Table 7-29 Construction Schedule Outline 204
Table 7-30 Construction Division Plan & Outline 205
Table 7-31 Case-A Construction Schedule (36 Months) 207
Table 7-32 Case-B Construction Schedule (42 Months) 208
Table 8-1 Main Construction Items and Quantity 211
Table 8-2 Comparison of Infrastructure Construction Cost 212
Table 8-3 Adopted Construction Unit Cost in this Project 213
Table 8-4 Construction Unit Price Issued by Ministry of Construction 213
Table 8-5 Construction Unit Price Issued by the Construction Consultant 213
Table 8-6 Social Housing Unit Sales Price Issued by the Developers 214
Table 8-7 Condominium Unit Sales Price Issued by the Real Estates 214
Table 8-8 Summary of Cost Estimation 215
Table 8-9 Cost Estimation by Area 216
Table 8-10 Comparison Construction Cost by Housing Type (for 1,000 Residents) 217
Table 9-1 Business Stakeholders and Role Sharing 218
Table 9-2 Roll Sharing of Stakeholders in the Public-Private Collaboration Business Form 220
Table 9-3 Roles of Entities in Coordinated Business Scheme among Real-Estate Entities 221
Table 9-4 Shares of Expenses and Expected Roles in Workers' Housing Business 223
Table 9-5 Situation of Stakeholders for Business Schemes 224
Table 9-6 Affordability of Residents 226
Table 9-7 Balance of Housing Project Cost and Expected Income by Rent and Sales 227
Table 9-8 Result of Investment Fund Allowance 229
Table 9-9 Result of Provisional Allocation of Investment Funds (Sensibility Analysis) 232
Table 9-10 Funding Sources for Initial Business Cost 233
Table 9-11 Feasibility of Social Housing Business in Model Site 234
Table 10-1 Recommended Policies for Housing Development in Model Site 235
Table 10-2 Implementation Priority of Recommended Supports for Model Site Business 239

Annexes

Annex

Annex 1 - Member of the JICA Study Team
Annex 2 - List of Participants JST
Annex 3- Consideration of Architecture Design in Vietnam
Annex 4 - Surveys Related to Industrial Workers Living Environment and Housing in Vietnam
Annex 5- Process of Affordability Analysis
Annex 6 - Foreign Direct Investment to Vietnam and ASEAN Countries
Annex 7 - Policy Review for Living Environment Improvement in ASEAN and Neighbors Asian Countries
Annex 8 - Natural Environmental Situation
Annex 9 - Set of Architectural Planning Condition
Annex 10 - Environmental and Social Considerations for Model Study
Annex 11 - Cost Estimation Process of Business Cost
Annex 12 - Seminar (2016/07/01) Minutes

Abbreviations

Abbreviations	English
ACB	Air Circuit Breaker
AFTA	ASEAN Free Trade Area
AH	Affected Household
ASEAN	Association of South‐East Asian Nations
ATM	Automated Teller Machine
BCR	Building Coverage Ratio
BOD	Biochemical Oxygen Demand
BTN	State Saving Bank
BT	Build-Transfer
CCTV	Closed- Circuit Television
COD	Chemical Oxygen Demand
CODI	Community Organizations Development Institute
DO	Dissolved Oxygen
DOC	Department of Commerce
DPI	Department of Planning and Investment
DRC	District Resettlement Committees
EIA	Environmental Impact Assessment
EPZ	Export Processing Zone
EPZA	Export Processing Zone Authority
EV	Elevator
EWS	Economically Weaker Section
EZ	Economic Zone
FAR	Floor Area Ratio
FDI	Foreign Direct Investment
FL	Floor Level
FRP	Fiber Reinforced Plastics
GDP	Gross Domestic Product
GHB	Government Housing Bank
GL	Ground Level
HCMC	Ho Chi Minh City
HEPZA	HCMC Export Processing & Industrial Zones Authority
IBBL	Islamic Bank Bangladesh Limited.
IEC	International Electrotechnical Commission
IEE	Initial Environmental Examination
IOL	
IP	Industrial Park
IRR	Internal Rate of Return

Abbreviations	English
IT	Information Technology
IZ	Industrial Zone
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JST	JICA Study Team
KASIBA	Kawasan Siap Bangun: Ready to Build Area
LDK	Living-Dining-Kitchen
LFDC	Land Fund Development Center
LISIBA	Lingkugan Siap Bangun: Ready to Build Environment
MCCB	Molded Case Circuit Breaker
MOC	Ministry of Construction
MPI	Ministry of Planning and Investment
NGO	Non-Governmental Organizations
NHA	National Housing Authority
NPC	Northern Power Corporation
ODA	Official Development Assistance
PPC	Provincial People's Committee
RC	Reinforced Concrete
SEA	Strategic Environmental Assessment
SH	Social Housing
TOR	Terms of References
TSS	Total Suspended Solids
TWG	Technical Working Group
USD	U.S. dollar
VCB	Vacuum Circuit Breaker
VIAr	Vietnam Institute of Architecture
VIUP	Vietnam Institute for Urban and Rural Planning
VND	Vietnam Dong
VOV	Voice of Vietnam
WB	World Bank
WTO	World Trade Organization
xLDK	x Room Living Dining Kitchen

****

1. INTRODUCTION

1.1. Background of the Study

Foreign direct investments in the Socialist Republic of Vietnam (hereinafter referred to as "Vietnam") have increased through efforts of developing industrial zones (hereinafter referred to as "IP") and appealing to foreign companies in recent years. The efforts have also contributed in creation of jobs for the youth.

The workers in these IPs are compelled to settle in poorly conditioned housing with insufficient floor space, comparatively high rent against income. Furthermore, there are concerns over unhygienic settings and deficient public services such as medical facilities and schools. Accessibility to cultural and sports facilities and social amenities such as shopping and entertainment are quite limited. The inferior settlement conditions of the IP workers have become a hindrance for the companies operating in the parks therefore steps to secure skilled workers by expediting their permanent settlement and providing reliable employment contracts.

If the settlement condition stagnates at current levels, the constant turnover of skilled labour could lead to a decrease in Vietnam's competitiveness with surrounding countries. The current foreign direct investment inflows will reduce and shift to other markets thereby escalating social differences such as the gap between rich and poor.

Although the Ministry of Construction (hereinafter referred to as "MOC") in Vietnam has been promoting social housing development including industrial workers' housing through local governments and the private sector by means of providing incentives, the local governments are unable to implement the schemes due to limited financial resources. The private sector, on the other hand, has undertaken housing developments for medium to high-income segments only due to rewarding financial prospects.

The settlement conditions for IP workers and establishment of relating policies have become a nationwide pressing issue for the above stated conditions.

1.2. Objective and Outcomes of the Study

1.2.1. Objectives of the Study

Objectives of the Study are to contribute to improving settlement conditions of IP workers in Vietnam through the following two activities:

- Providing recommendations on institutional and organizational development for expediting activities towards improving settlement conditions of IP workers for Vietnam, and
- Conducting a study on the construction of housing and its applicable business model in Hung Yen Province.

1.2.2. Outcomes of the Study

The expected outcomes of this survey are twofold:

- Recommendations on institutional and organizational development for improving settlement conditions of IP workers, and
- Propose an IP workers' housing plan for the model site as zoning plans, detailed and draft business plans.

2. CURRENT LEGAL FRAMEWORK FOR IMPROVEMENT OF WORKERS AROUND INDUSTRIAL PARKS

The current laws and legal systems in Vietnam for improvement of living environment and housing development for IP workers are described in this chapter.

2.1. Related Entities of Industrial Development and Living Environment Improvement

Table 2-1 shows related entities of the planning, construction and development activities within Industrial zones and their surroundings. The activities include residential development, commercial development as well.

Provincial entities and district peoples committee have specific roles in the model study area (Hung Yen Province, My Hao District).

Table 2-1 Relating Entities of Developments of IZs and its Surroundings

Relating Entities		Major Roles
Central Government	**Prime Minister**	- To direct ministries, branches, provincial level Peoples Committees and Export processing and Industrial Zone Authorities in implementing law and policies on industrial and economic zones - To approve and amend the plan on Development of Industrial Zones (hereinafter referred to as "IZ"), Economic Zones (hereinafter referred to as "EZ") - To decide on investment in projects falling under his purview. - To decide on the establishment of economic zones: to approve general planning on construction of economic zones; to permit the expansion or narrowing of land areas or change approved land use purposes of industrial zones or functional areas in economic zones;
	Ministry of Planning and Investment	- To assume prime responsibility for, and coordinate with the MOC, concerned Ministries and provincial-level Peoples Committees in, elaborating the plans (Particular Function Zone Construction Planning etc.) for IZ, EZ and submitting them to the Prime Minister for approval; - To assume prime responsibility for, and coordinate with concerned ministries in, elaborating legal documents and policies on the development of industrial and economic zones, and submitting them to competent state agencies for promulgation;. - To assume prime responsibility for, and coordinate with the Ministry of Finance and concerned Ministries in working out tentative plans for the provision of the central budget supports for investment projects on construction and commercial operation of infrastructure in industrial zones in localities. These are defined by the Prime Minister's decisions as localities with particularly difficult socio-economic conditions. Providing tentative plans on the central budget supports for investment in the development of technical infrastructure systems in economic zones. - To grant investment certificates for projects to be implemented in form of BOT[1], BTO[2] and Build- Transfer (hereinafter referred to as "BT")
	Ministry of Construction (MOC)	- Planning of development plan, examination, approving, and implementation of relating matters on the Housing Law, the Construction Law and other related laws, and coordination of related entities. - To issue guidelines for formulation, examination, approval and amendment

[1] Build-Operation-Transfer

[2] Build-Transfer-Operation

		procedures related to general construction plans of economic zones; general construction plan of industrial zones having total land area of 500ha or more. Obtaining a number of investors for infrastructure development or integrating IPs with new urban town development or commercial towns in one development project; preparing detailed construction plans for industrial zones and functional areas in economic zones. - To formulate building codes and detailed construction plan within industrial zones and economic areas
	Ministry of Natural Resource and Environment	- To formulate national and regional land use plans; to examine and approve provincial land use plans; to give official writing opinions on land use issues in sectoral development plans - To examine and give official writing opinions on land acquisitions, compensations related to investment projects that are under the National Assembly and Prime Minister's jurisdiction. - To issue guidelines and conduct land surveys for making cadastral land maps, land use maps and land use planning; land authorization and for lease and acquisition, land purpose change; management of the land database system; land use rights; etc.
Local Government	**People's Committee**	- To formulate development plans for economic zones and industrial zones within the province. - To decide establishment and expansion of industrial zones. - To direct and approve detailed construction plans for IPs, functional areas in economic zones; to decide government budget support for technical infrastructure development within the IPs. - To formulate land use plans for resettlement areas, worker residential area and public facilities; To support worker housing construction, resettlement housing, and socio-technical infrastructure construction in compliance with Decree No.100.
	Department of Planning and Investment	- To receive, grant, amend, and revoke Investment Licenses of the investment projects outside industry Parks, Processing Zones, High-tech parks and Economic Zones.
	Department of Natural Resources and Environment	- Granting land use rights. - To provide guidance for improving and finalizing application documents for land acquisition, construction site clearance and land leasing.
	Department of Construction	- To formulate urban plan and sectoral development/urban technical infrastructure plans in compliance with provincial socio-economic master plans (urban utilities, lighting, green parks, cemeteries, waste management, IPs, export processing parks, economic zones, high-tech parks) and submit them to provincial Peoples Committee for approval or assist provincial Peoples Committee to submit them to higher authorities for approval; - To examine and approve basic designs for investment projects in construction under its control.
Others	**Export Processing and Industrial Zone Authority**	- To receive, grant, amend, and revoke Investment License of the investment projects in industry Parks, Processing Zones, High-tech parks and Economic Zones.

Source: JST

2.2. Legal Systems for Social Housing Projects

2.2.1. Legal Frameworks for Social Housing

(1) Legal Frameworks for Social Housing

As a measure to improve the balance of housing supply and demand, Decision 66/2009/QD-TT required industrial park operators (investors) to satisfy 50 % of workers' housing needs by preparation of housing facilities. Later, this legal requirement was relaxed and replaced by Decree No.188/2013/ND-CP (2013) (hereinafter Decree No.188). Moreover, to further refine its content, the Decree was replaced with Decree No.100/2015/ND-CP (2015) (hereinafter Decree No.100). The decree defined the duty of industrial park operators (investors) and operators to prepare a

development plan of adequate numbers of housing for workers according to local situation, the duty of factory (tenant) to prepare funding, and the duty of real estate developers to construct social housing by using 20 % of housing development land in the new urban and housing development. In addition, the Housing Law No.65/2014/QH13 (hereinafter the Housing Law) governs Decree No.100 and its related requirements on social housings.

(2) **Housing Law No. 65/2014/QH 13**

The Housing Law promulgated on December 8th, 2014 that has been effective since July 1, 2015, provides policies on social housings in its Chapter 3 with three Sections 18 Articles. It defines the overall aspects of social housing development, which includes social housing for IP workers.

(3) **Decree No.100/2015/ND-CP**

In Vietnam, the Decree No.100 defines the following contents. The roles of the central government and Provincial People Committees in social housings' construction are determined, and they provide various incentives in terms of tax breaks for IP operators, support for land acquisition by respective local governments. The Decree includes the following contents below.

- Business with responsible for constructing social housings: urban or IP developments with the certain capacities and sizes
- Design criteria for social housings
- Incentives for business enhancement
- Cost burden for business establishment
- Business format
- Roles for business related operators

The contents are described with the related regulations in the later sections.

In addition, in a part of social housing area, the other profiting operations for supporting the financial funds for housing project are approved. However, the housing project establishments are yet to be progressed.

The decree places responsibility of formulation of the social housing development plans on Provincial Peoples Committee. The Hung Yen province plan is pending approval.

2.2.2. Business Scheme and Related Entities from Social Housing Development

(1) **Related Entities for Social Houses for Industrial Workers and Development Scheme**

The Housing Law No. 65 endows the rights to the low-income earners having housing difficulties accessing decent housing such as Social Houses at low expenses enabled by various institutional supports. The people with such privileges include persons on public contributions, students, needy people, people affected by frequent natural disasters or climate changes, and people required to relocate and finally industrial workers (Article 49, the Housing Law).

The Industrial Park workers are eligible to enjoy the occupancy in the SHs (hereinafter referred to as "Social Housing") developed by 1) the State, 2) the bid winners of Social Housing Projects, 3) the investors of the commercial housing projects, 4) the businesses or cooperatives using the appropriate land-use rights, 5) IP infrastructure business operators, enterprises manufacturing in IPs, or the licensed real estate trading enterprises assigned by the State to act as project owners and 6) wealthy individuals.

The legal basis pertaining to the above schemes is described below.

1) **Industrial Worker's Eligibility and Possible Land Allocations for Social Housing**

The Housing Law was passed on December 8th, 2014 but took effect on July 1st, 2015. The said law defines the meaning of "IP" as economic zones, IPs, export processing zones and high-tech parks. It is supplemented by Decree No. 100 promulgated on October 20th, 2015 with effect from December 10th, 2015 to include more wider occasions of small- and medium-sized industrial complexes, industrial and cottage industry production establishments (including also exploiting and processing establishments), regardless of their trades and economic sectors. This definition of IP is employed in this report, too.

The industrial workers including those in IP are eligible to take up residency of Social Houses as "persons who are working in enterprises whether inside and/or outside IPs". This content is stipulated in the Clause 5 of Article 49 of the Housing Law.

The social houses for industrial workers are demarcated by urban master plans, rural construction master plans, master plans on construction of IPs, research and training zones. They are approved by the People's Committee as stipulated by Clause 1, Article 56 of the Land Law. Clause 1, Article 4 of the Decree No. 100 obligates the provincial-level PPC to provide land for Social Housing, to direct functional agencies to determine the specific locations and sizes of the Social Housing projects, and to ensure synchronized development of technical and social infrastructure systems for Social Housing projects.

The information regarding the land areas for social housing construction needs to be publicized on the e-portals at the provincial level PPC and housing management agencies (Cause 2, Article 56 of Land Law, and Clause 2, Article 4 of Decree No. 100). Land for the social housing construction includes:

i) Land allocated by the State for constructing houses for lease, lease-purchase or sale (Item a, Clause 3, Article 56),

ii) Land leased by the State for constructing houses for lease (Item b, Clause 3, Article 56),

iii) Residential land areas in commercial housing investment projects which shall be reserved by investors (Item c, Clause 3, Article 56), and

iv) Legal residential land belonging to organizations, households, and individuals used for constructing social houses (Item d, Clause 3, Article 56).

2) **Owners and Investors**

The Article 57 of the Housing Law defines the owner of a Social Housing Project the following way:

i) MOC or the Provincial-level housing management agencies of the State's Social Housing Projects (Clause 1),

ii) Bid winners of the Social Housing Projects who are using the lands allocated or leased by the State (Item a, Clause 2),

iii) Investors embarking upon commercial housing projects (Item b, Clause 2),

iv) Operators or cooperatives that are using their appropriate land-use rights for a social housing project (Item c, Clause 2),

v) Businesses related to IP infrastructure, enterprises which are conducting production activities in IPs, or licensed real estate trading enterprises who are assigned by the State to act as project owners of social house construction for IP workers (Item d, Clause 2), and

vi) Households and individuals who are investing in the construction of social houses (Clause 3).

3) **Schemes for the Social House Projects for IP Workers**

The typical schemes assumed by the law and the decree for the implementation of the Social Housing Projects for IP Workers are to conduct Social Housing Projects jointly with the respective IP Projects. Article 6 of the Decree No. 100 obligates the IP operators or the IP infrastructure management operators dealing in industrial park infrastructure to conduct ground clearance and construction of technical infrastructure for its Social Housing with compensation.

The Housing Law aims to achieve the provision of Social Housing for Industrial Workers through the IPs' construction master pans in conformity with approved urban planning, land use master plans and master plans on construction of rural residential areas (Clause 3, Article 4 of Decree No. 100).

According to Article 57 of the Housing Law, the 5 types of owners stated in 2.3.2 (2) 2) are potential owners for the Social Houses construction projects for IP Workers: i), ii), iv), v) and vi).

Furthermore, the households and individual investors fill the housing demands of IP workers, and they provide rental rooms in various conditions. Poor to decent levels of rental rooms are available but most of them do not meet the minimum requirements of the related laws and regulations. It means that these types are not under the law or the State.

(2) **Incentives for Social Housing Projects**

1) **Incentives Set under the Housing Law**

In order to accelerate the provision of social housings, the Article 58 and 59 of the Housing Law stipulates the incentives for the owners of the SH projects. Article 58 states the incentives for businesses and cooperatives, and for households and individuals in Clause 1. Clause 2 lists the conditions required before the incentives to households and individuals can be claimed.

The incentives stipulated in the Clause 1 are:

i) Exemption from the land-use levy or rental for land areas allocated or leased by the State for construction of SHs (Item a),

ii) Exemption from or reduction of the value-added and the enterprise income tax in accordance with the tax laws[3]. Construction of social housing for lease is entitled to the value-added and enterprise income tax reductions greater than those for construction of social houses for lease-purchase or sale (Item b),

iii) Access to preferential loans from the Social Policy Bank or the credit institutions operating in Vietnam. Construction of social houses for lease are entitled to loans with at interest rates lower and for the terms longer than those for construction of social houses for lease-purchase or sale (Item c),

iv) Financial support from the PPC for a part or the whole of the investment in the construction of technical infrastructure systems within the social housing projects. Construction of social houses for lease entitles one to financial support for the entire investment (Item d), and

v) Other incentives prescribed by law (Item dd).

The conditions for households and individuals investing in the Clause 2 are:

[3]Lease-purchase prices: It is a lease contract that lessee can ask to purchase the housing to the owner, and the total amount of rent fee that lessee have paid so far would be subtracted from the price of housing.

i) Households and individuals must construct their houses under the construction master plans approved by competent agencies and ensure the presence of infrastructure connection in their housing areas (Item a),

ii) Houses achieve the construction standards, abide by the regulations and the housing area standards (Item b), and

iii) House sale prices, rental rates or lease-purchase prices are conformable to the price frames promulgated by the PPC of localities where the houses are being constructed (Item c).

Article 59 specifies the incentives for organizations that undertake provision of housing for their employees. There are incentives for the economic entities operating factories or economic value adding facilities to provide SHs to their workers. Clause 1 relates to purchasing or renting houses for the purpose while Clause 2 states the case for investing in the construction of houses. Both cases concede that reasonable costs for the investments are incurred therefore a proper cost from a profit-loss calculation for taxation purposes is made, prior to the incentives entitled by Article 58.

2) **Incentives Entitled under the Decree No. 100**

In order to improve the profitability of the social housing business, Article 9 of the Decree No. 100 provides details of the incentives stipulated in the Article 58 of the Housing Law. Among them are exemption of land levies or land rents for the area of land within the approved project. These include:

- The land areas for building businesses approved by competent agencies within social housing projects (Point a, Clause 1) and,
- The 20 % of the total land area for house construction under the social housing projects for building commercial houses (Point b, Clause 1) or
- The 20 % of total floor area of houses built under the projects for commercial houses (Point c, Clause 1).

3) **Vietnamese Steering Committee for Housing and Real Estate Market Housing policy**

The Minister for Construction in 2014 stated that it is necessary to deal with issues of financing the subsidies for private residential facilities for renting, promoting readjustment of town lots, expediting the building permission issuance for construction of residential facilities for renting, and tax reduction measures in a combined manner as well as exploring other individual and comprehensive approaches. Moreover, the Vietnamese Steering Committee for Housing Policy and Real Estate Market was established under the MOC and other related entities, after which the committee formulated policies for improvement of living conditions and has been taking necessary actions for its implementation.

The result will be informed broadly by holding seminars.

4) **VND 30 Trillion Package for Preferential Loan**

The Vietnam Government started spending the 30 trillion VND package for investing and purchasing/ renting houses with floor areas less than 70 m^2 or at costs less than 15 million VND per square meter through the State Bank of Vietnam Circular No. 11/2013/TT-NHNN in 2013. The interest rate applied to a loan is a maximum of 6% per annum at a fixed rate subject to change on an annual basis with loan periods up to a maximum of 10 years for SH developer or purchaser/ renter and maximum of 5 years for investors.

This program will be terminated on June 1, 2016, and the operation of this program after June 2016 is not confirmed when this report is written (March 2016).

(3) **Pricing Conditions**

1) **Pricing Framework Stipulated by the Housing Law**

In order to provide SHs at an affordable price to workers, Article 61, the Housing Law, stipulates the ways of determining rental rates, lease-purchase prices or sale prices of SHs constructed by non-State entities. The basic concept of the rate/ price determination is that they have to consist of the expenditures directly born by the owners plus profits stipulated by the government except for the SHs invested by households and individuals. Incentives or benefits entitled by the Law, Decree and Regulations may not affect the expected volumes of the projects' profits (the Clause 1 of the Article 61).

Clause 2 of the Article stipulates that rental rates, lease-purchase prices or sale prices of SHs constructed by households and individuals are determined by them within the framework of conformity to the PPC locales where houses are constructed.

2) **Profit Limitations Stipulated by the Decree No. 100**

Article 21, the Decree No. 100 limits the profit level of the SHs projects including their commercial works (Item b and c, Clause 1, Article 9) against their total expenditures without the incentives prescribed in the Article 58 of the Housing Law.

- Clause 1, 2, and 3 stipulate the sale prices, lease purchase prices, and lease prices of social houses investing in non-public capital as follows:

i) Sales prices of SHs are limited to reap more than 10% of the total investment, (Clause 1), and

ii) Lease and lease purchase prices of SHs are limited to reap less or equal to 15% of the total investment. The capital retrieval period for the lease case must be 15 years from the contract date. The factory owners instalment payments commences with 20% of the total price and a minimum duration of five years for the lease-purchase case (Clause 2 and 3).

- The above prices are evaluated by the local PPC (Clause 4).
- For the cases of households and individual investments, the prices of SHs are limited by the local PPC's price bracket (Clause 5).
- The lease agreement has a principle range of deposits that the tenant can pay which is the amount between three to twelve times against the monthly rent price with the exception of amounts higher than the range of mutual agreements between landlords and tenants that goes up to 50% of the value of leased houses. By paying the deposit, a reduction in rent or an exemption of rent for a certain period becomes possible (Clause 6).
- Buyers and tenants of SHs are able to attain a concessional loan from the Vietnam Bank for Social Policies or state-designated credit institutions to pay for the purchase, lease or lease-purchase in accordance with Chapter III of the Decree No.100 (Clause 7).

The detailed calculation methods incorporating the time factor are provided under Circular No. 08/2014/TT-BXD, May 23, 2014 according to the concept defined by the Decree No. 188 and its substituting Decree No. 100. The Circular is assumed to be in effect under the new Housing Law until the respective new one for the Law promulgated is affected.

(4) **Relevant Regulations**

Article 62 of the Housing Law provides basic conditions of the lease, lease-purchase and sale of SH. The following are its conditions:

i) The Industrial Workers are permitted to rent, to rent-purchase, or to purchase only one social house (Clause 1),

ii) The minimum term of a SH rent contract is five years, and it limits completion of the payment for lease purchase at five years from the contract date (Clause 2),

iii) Sales, sublease, or lease by the lessees of the SH to themselves is prohibited (Clause 3),

iv) Sales of the acquired SH by the lessees-purchasers or purchasers are prohibited for five years after the total payment completions; During the period, sales are only limited to social house management units in principle with an exception of the units' refusal; In the event of refusal the sales are possible to entities eligible to purchase SH; The sales are exempted from personal income tax; (Clause 4), and

v) After the five years from the payment completion of the SHs and having obtained certificates for such houses, re-sales of the acquired SHs are possible under the market mechanism; In cases that the buyer is an eligible entity for SH and the price is reasonable, the personal income tax for the deal is exempted; Resettled households and individuals are able to resell the acquired SHs under the market mechanism with the payment of the land-use levy and income tax (Clause 5).

According to the Article 63, after complete construction of house foundations with completion of the road, water supply and drainage, daily life and public lighting electricity supply systems, in housing areas (Item b, Clause 2), the owners of the social SH projects are able to attain down payment for the rental not exceeding one year value of expected monthly rental fee (Clause 4), and advance payment for sales according to the housing construction progress up to 70% of the SH values until hand over and up to 95% before receiving certificates (Clause 5) before completion of the SH construction.

In addition, the Clause 3 of the Article 54 defines that at least 20% land of the project area for SH project has to be reserved for lease SH if the project is not specialized in SH for lease.

2.3. Legal Systems for Industrial Zone Development

The IPs and IZ areas investigated by this study obtain the approvals based on the following laws.

- Legislation of Industrial Zone and Export Processing Zones

The Law on Enterprise No. 65/2014/QH13 (replaced the Unified Law on Enterprises 60/2005/QH11) and Law on Investment No. 67/2014/QH13 (replaced the Law on Foreign Investment No. 59/2005/QH11) govern the foreign direct (and indirect) investment in Vietnam. To bring the twin laws into practice, dozens of government decrees and an even greater number of lower level legal documents have already been issued, covering all aspects of the entire process from business registration to operations.

The Law on Investment and the Law on Enterprises constitute the principal legal base for the establishment and operation of Export Processing Zones (hereinafter referred to as "EPZ"), IZs, and EZ. Guiding the laws is Decree No.29/2008/ND-CP dated 14 March 2008 of the government issuing regulations on EPZs, IZs and EZs, as amended and supplemented by Decree No.164/2013/ND-CP dated 12 November 2013; and several implementing circulars in connection to environment, construction, labour, taxation, customs procedures, etc. in these zones.

2.4. Legal Frameworks for Construction

2.4.1. For Vietnam Construction Standards

The "Collections of Vietnam Construction Standards" contains the construction standards.

These standards are applicable to all construction sectors in all regions of Vietnam. They are used for construction approval/appraisal.

A distinction between the general constructions standards, "Construction Standards" and the detailed technical construction regulations, "Building Code" was issued in 2001 after reorganizing the previous construction standards. “Construction Standards" as advisory and voluntary in nature, on the other hand "Building Code" specifies the requirements as mandatory through law enforcements. (They especially require compliance for fire prevention regulations) Therefore, not all standards for construction are strictly applied to designs for all buildings.

In Vietnam, mostly large-scale projects follow/meet the regulations for construction approval (equivalent to building permits in Japan), but small-scale projects, such as detached houses and small apartments, have not applied the standards in local regions yet. There are penalty stipulations in the current Vietnamese laws and regulations, but there are currently limited budgets and personnel to carry out construction approvals and building completion inspections. The checks ought to begin at the design stages such that the strict inspections are applicable which unfortunately not the case is. As a result, buildings that fall outside the criteria have been constructed.

2.4.2. Building Grade and Classification

In Vietnam, QCVN 03:2009 / BXD Building Code on Classifications and Grading of Civil and Industrial Buildings and Urban Infrastructure are classified by building stories, height and the number of seats. The building codes of Vietnam have been compiled in consideration of classifications such as architectural regulations and fire protection provisions in detail. However, there is no classification specifically for social housing. Social housing has classified in A1.1.1Condominium. Although the social housing is often built in form of low-rise housing, high-rise apartments functioning as social housing is normally classified in grades of III or IV. The social housing grades are applied with respect to the basic building standards codes. Below is a summary for grades of housing and education facilities, hospitals and sports facilities. There have been no major revisions since 2009 to the building codes, but corresponding amendments through issuance of individual regulations have been done recently.

Table 2-2 Building Classification and Grade

Building Classification			Grade standard	Grade				
				Particular	I	II	III	IV
A.1.1 Housing	A.1.1.1 Condominium		Stories	-	> 25	25-9	8-4	≤ 3
	A.1.1.2 Detached house			-	-	-	Villa[1] or, ≥ 4	≤ 3
A.1.2 Public facilities	A.1.2.1 Education facilities		Building Height (m)	-	> 28	>28-15	15-6	< 6
	A.1.2.2 Hospital		Building Height (m)	-	> 28	>28-15	15-6	< 6
	A.1.2.3 Sport facilities	Outside	Game level or, Capacity seats (1,000seats)	International、domestic level or, > 40	>40-20	20-5	< 5	-
		Inside		> 7,5	> 7,5-5	5-2	< 2	-

[1] Vietnamese Biệt thự

Source：QCVN03:2009

2.4.3. Legal Frameworks for Social Housing

In this section, the JST referred to the design requirements related to social housing, which is defined by the relevant laws and regulations. The design regulations would be about floor area, building materials and obligated parking lots.

According to Article, 7, Design standards for social houses Decree No. 188 dated November 20th, 2013 on developing and managing social houses are written about the design criteria of social housing.

Recently, on 15 October 2015, it was announced that changes would be made to Article 7 type and standard areas of social houses in the Decree 100.

(1) **Construction Requirements in the Decree No. 100**

Design standards for social housing are laid out below.

1) **Social Housings Design Standards:**

a) Social housing condominium apartments shall be designed and constructed as self-contained according to construction standards, regulations and construction master plans approved by state agencies; each apartment must have a floor area of at least 25 m^2 and at most 70 m^2. Project owners may increase the construction density or land use coefficient by up to 1.5 times that prescribed in current standards and regulations promulgated by competent agencies.

b) Social houses that are low semi-detached must conform to construction master plans approved by designated state agencies; the construction land area of each house must not exceed 70 m^2 and the land use coefficient must not exceed 2 times.

c) Social houses built by households and individuals must meet construction quality standards, minimum construction conditions and conform to published master plans. The Ministry of Construction shall specifically direct design standards and promulgate regulations on minimum construction conditions applicable to individual houses used as social houses.

(2) **Area for Social Housing Households**

1) **The Floor Area of Social Housing**

According to the information from a local engineering company, the provisions of area for social housing were amended with a revision to the Decree No.100 dated October 15, 2015 for the mitigation of restricted area from "the lower 30 m² - upper limit 70 m²" of social housing under Article 7 of Decree No.188 to "at least 25 m² - 70 m²". Dwelling units above 70 m² in floor area have been defined and shall not exceed 10 % of the total number of dwelling units.

Exceptionally, there exists a social housing dormitory in Hanoi PPC, but the 100 m² rooms are designed as rooms for 16-persons instead of under 70 m^2 rooms. This case is unique because it falls under the Hanoi City authority (It would be approved approx.100 m^2 rooms instead of under 70 m^2 for this case).

2) **Number of Stories for Social Housing**

Since social housing is classified as grade III or IV, they are normally designed under seven floors that is low cost.

Although the first floor of the social housing/company dormitories are often designed for shops, meeting rooms etc., the rents for first floor would be the highest. In cases that a dormitory has the first floor designed for common use facilities like meeting rooms, the rent for the second floor would be the highest for those without elevators. The rent would become cheaper as one occupies the upper floors. Dormitories with elevators have the upper floor as the most expensive, while the rent would become cheaper as one occupies the lower floors. This situation applies only to social housing rent.

3) **Number of Rooms for Social Housing**

TCVN4450: 1987; prescribe building layout for apartments that are detached and courtyard building type, designed for functional households with specific requirements and room designs based on the number of household members.

TCVN353:2004; Row houses design standards: is applied to design requirements of row houses that have the consistency of architecture and infrastructure, to meet the requirements of urban design.

TCXDVN 323:2004; the regulations for number of households in the building (not yet updated the regulation): the appropriate number of apartments in a single floor of a building should be 4 to 6, which are arranged around elevators and staircases.

Indicative numbers of residents in terms of dwelling unit type for social housing following a standard design are shown below.

Table 2-3 Numbers of Residents per Households

Dwelling Unit Type Floor Area	Number of Rooms	Number of Residents
30 m²	1	2-3 persons
50 m²	2	4-5 persons
60 m²	3	6-7 persons
70 m²	4	More than 8 persons

Source：JST and local consultants

Although the minimum required area for each person was 5 m² in previous regulations, the minimum required area currently has been amended to 8-10 m² according to revision of regulation - article 1.9 TCVN 4449:1987 Urban Construction Planning – Design standards and Decision No. 07/2014/QD-HDND dated 28/7/2014 issued by Hung Yen Province "housing development program 2020-2030 plan" in recent years.

Upon the layout of social housing in Vietnam, there is an absence of hallways, which directly lead to the kitchen and living rooms in what is called “the living-in type households” without entrance space. As over 100 m² rooms developed by private developers seemed to be very popular with the inclusion of hallways, there is no hallway space in family type households.

Although toilets and bathrooms are separately planned from the family shared bathroom, there is some kind of shower in the main bedroom. The continuous balcony is rare in design, however the bay balcony is very popular as Vietnamese-specific “loggia”.

(3) **Obligated Car, Motorcycle and Bicycle Parking Related to Social Housing**

In table 2-2, the building grade and classification, social housing is classified as determined by the grade III or IV. There is no regulation for the numbers of car parking according to Circular 14/2008 /TT-BXD that requires car parking, but the number of motorcycle parking spaces have been defined and designed for 2 motorcycle spaces per dwelling unit. The area of the motorcycle parking should be 2.5 to about 3.0 m² per parking. The number of bicycle parking lots for each dwelling unit is one. Area for a bicycle space is about 0.9 m².

For Grade I or II condominiums, either the indoor or the outdoor parking is allowed. It has been stipulated to plan for one parking space for every 4-6 dwelling units. The area of the parking space is about 25 m² per a vehicle.

The obligation to provide car parking was issued in 2008, since Vietnam is shifting rapidly to an automobile society because of the economic development. In the central districts of Hanoi city and new urban developments, the parking of vehicles has interrupted pedestrians because they are parked in front of the condominiums and on pedestrian walkways. Owing to the fact that there is a shortage of parking space in Hanoi city, multi-story car parking systems are beginning constructed,

despite the fact that they are still unpopular. The typical Vietnamese building has narrow entrances yet the structure is long and very wide. This makes multi-storey car park design challenging. Furthermore, the courtyard entrances lack a road-facing frontage. While under taking revision of the regulations of obligated car parking, it is necessary to consider designing variable spaces and ensure sustainability for 10 and 20 year periods. Parking lots are planned first and then the design should be reconfigured for parking systems in the future.

(4) **Legal Systems to be Introduced for Construction Standard**

In current construction standards in Vietnam, the details are obscure except for the general design standards mentioned above. Therefore, building regulations are lax compared with those in advanced nations. While the lighting and ventilation in living rooms of SH that should be considered on the design are defined in these regulations, application of these regulations for each housing is limited and it is not applied strictly.

These construction standards are observed in large sized projects, but not in the small sized projects located in local areas. The individual housings and small sized apartments are particular perpetrators. Due to the lack of human resources and budgets, the evaluation of the plan applications are not always carried out. As a result, many buildings are constructed without compliance to the standards.

3. CURRENT LIVING SITUATION OF INDUSTRIAL PARK WORKERS

3.1. Outline Study of the Current Situation

In this study, the following surveys are conducted in order to comprehend the IP workers' living environment.

- Site visit survey: visit IPs (approx. 120 locations) in the northern, central and southern regions of Vietnam in order to grasp the workers' housing situation.
- Interview survey: Interviewed related industrial entities and undertook questionnaire surveys of workers in the model site.
- Document study: Supplementary study about the living conditions of workers

The study result is summarized as the table below shows.

Table 3-1 Summary of Survey of Current Living Situation

Viewpoint of Survey	Contents of Survey	Sections in this Chapter
General situation of Workers' Housing and Living Condition	・ Development situation of IP ・ Overall situation of workers' living and housing condition	3.2 3.3
Situation of Housing Workers Development	・ Housing development situation (within each industrial park location and housing site location) ・ Situation of residential facility ・ Situation of facility management	3.4, 3.7 3.5 3.6
Business Scheme of Housing Development	・ Business framework ・ Role sharing of related entities	3.8
Finance of Development Business	・ Affordable housing cost to workers ・ Construction cost for housing development (this is examined in the model site's case in Chapter 6).	3.9

3.2. General Situation in Industrial Development and SH Projects

3.2.1. Transition of Approved IPs and Economic Zones

In Vietnam, approval of industrial zones started in 1991 for export processing and then for industrial in 1994. In Vietnam, there are about 300 of approved IPs and 15 approved economic zones as of 2014. About half of these areas were approved over 5 years from 2005. In this period, foreign direct investment into Vietnam reached a record high in both its investment sum and in number of approvals. A lack of adequate housing facilities for workers became remarkable during this period.

After 2010, the numbers of approved IPs stagnated in comparison to the previous period. In addition, construction has not commenced in some approved IPs.

Table 3-2 Number of Approved IPs and Economic Zones

Year	IPs		EZ	
	Number	Total Surface (ha)	Number	Total Surface (ha)
2005	130	26,517	5	N/A
2006	N/A	N/A	N/A	N/A
2007	179	42,986	11	581,499
2008	N/A	N/A	N/A	N/A
2009	N/A	N/A	N/A	N/A
2010	260	71,394	15	662,249
2011	283	76,821	15	662,249
2012	289	80,718	15	697,800
2013	289	81,000	15	697,800
2014	295	84,000	15	700,000

Source: Ministry of Planning and Investment (edited by JST)

3.2.2. Occupancy Rate of Factories in IPs

The figures that follow shows occupancy rates of factories (tenants) in IPs in the North and Southern Middle area of Vietnam. The following aspects are observed from the figures.

Occupancy rate is high in the following IPs.

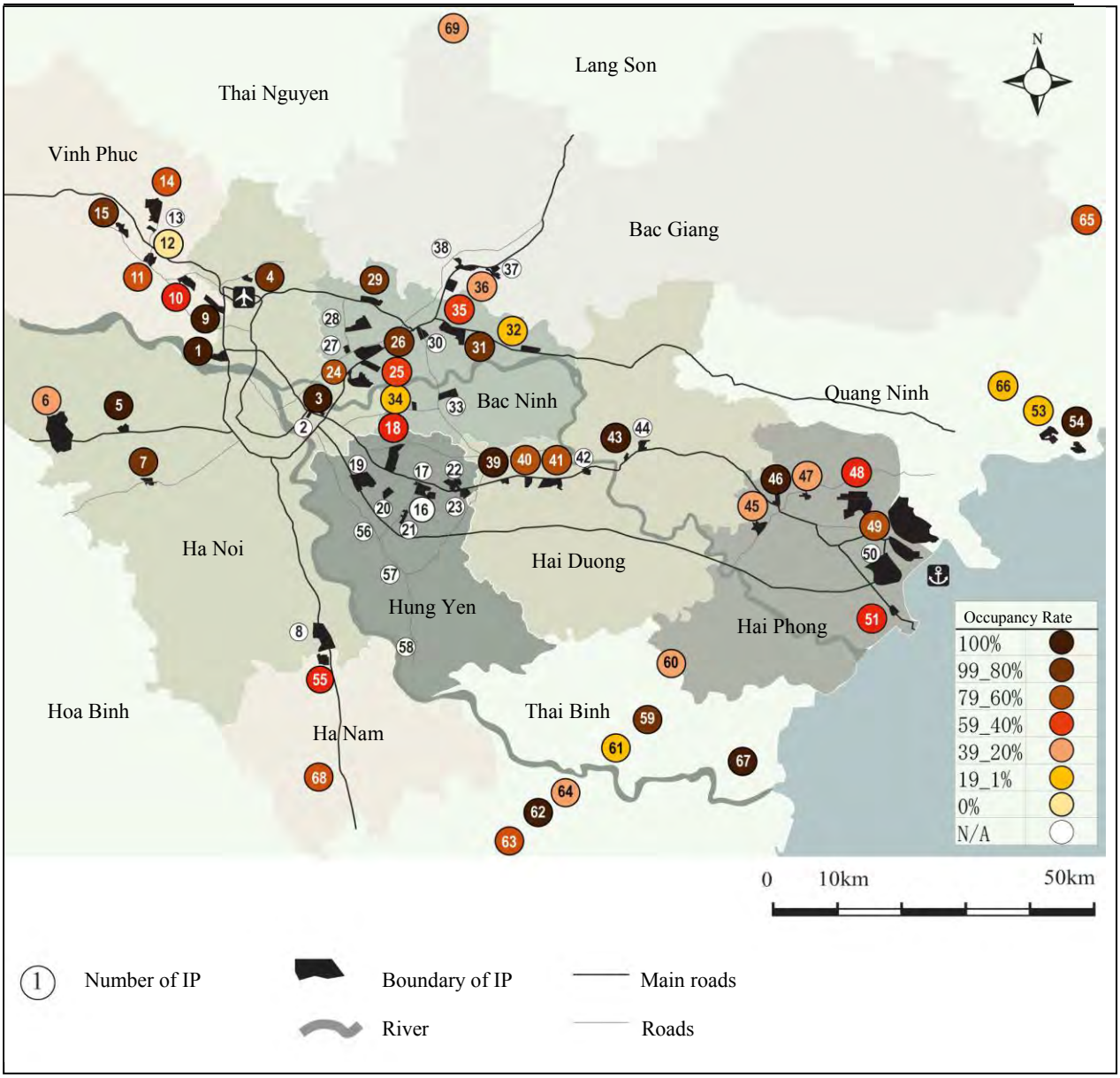
- IPs along arterial roads.
- IPs in the periphery of large cities (Hanoi, HCMC)
- IPs around cities in the rural areas, far from large cities.

On the contrary, the occupancy rate of factory owners is low in the following IPs.

- IPs in rural areas of the large city regions.

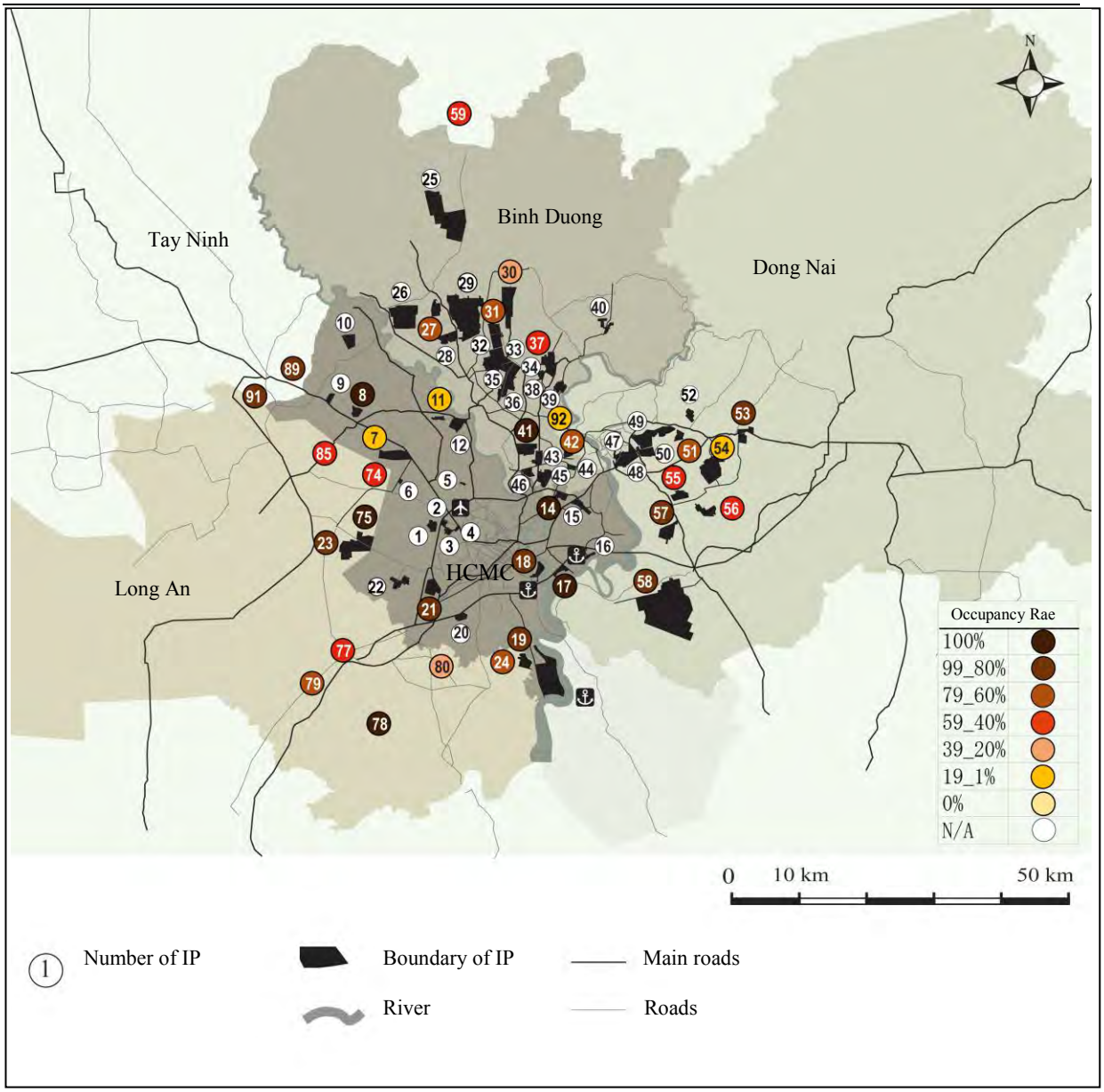
Many IPs are located in the rural areas because of the ease of acquisition of cultivated land for IPs. Because of the intensive convergence of several IPs in the same area, low occupancy rates of factories are often recorded.

In many cases, there are no suitable sizes of cities around IPs in these rural areas. The living environment of these areas is considered to have an effect not only on industrial workers, but also on choices of IP by factory owners.



Source: "Data of Industrial Parks in Vietnam", JETRO (edited by JST)

Figure 3-1 Occupancy Rate of Factories in IPs in Vietnam (North Area)



Source: "Data of Industrial Parks in Vietnam", JETRO (edited by JST)

Figure 3-2 Occupancy Rate of Factories in IPs in Vietnam (South Area)

3.2.3. Social Housing Project Trends

For those in the low-income bracket, 39 SH projects[4] have been constructed until August 2015, at a scale of 20,600 dwelling units, with their total investment at 7,460 billion VND. There are 93 SH projects for low-income earners being implemented consisting of 57,700 dwelling units, and their total investment corresponds to 28,700 billion VND.

[4]The social housing projects for low income group in local areas regulated by the Housing Law No. 49 Clause 2 and the social housing projects in urban areas regulated by Clause 4.

83 SH projects[5] for workers (corresponding to section 2.2.2 (1) 3)) consisting of 28,000 dwelling units, whose investment value is 6.6 billion VND had been undertaken as of August 2015, and their total. There are 63 SH projects for workers approved and under implementation at a scale of 69,300 dwelling units. The total investment becomes 18,790 billion VND. Some large scale housing projects have been launched in Binh Duong (Becamex Cop. consisting of 64,000 dwelling units) and Dong Nai (IDICO Cop. consisting of 10,000 dwelling units). Except these mega projects for workers, the housing supply under social housings is still at low levels.

3.3. Interview Result to Grasp the Living Situation and Related Issues

3.3.1. Outline of the Interview

In order to understand the current situation, issues and future prospects of living conditions for workers in industrial zones, interviews were conducted with the following related entities.

Table 3-3 List of Interviewee

Reference	Interviewee (Organization and Name)	Date of Interview
Investor and Operator of IP		
a	TLIPII IP	March/ 2015
b	Long Hau IP	June/ 2015
c	Pho Noi IP (Hoa Phat Group)	June/ 2015
d	Dong Tam IP Joint Stock Company	June/ 2015
e	Dai An Joint Stock Company, Manager of Administrative Department	April/ 2015
f	Ascendas Protrade	July/2015
Factory within IP		
g	Japanese Company Canon Vietnam	April/ 2015
h	Japanese Company “N” (Electrical Component) Vietnam	June/ 2015
i	Inquiry	April/ 2015
j	Japanese Company “T” Vietnam	May/ 2015
k	Inquiry	July/ 2015
Real Estate Company, Investors and Operators of Housing		
l	Becamex IDC	June/ 2015
m	Xay Dung SXDV du Lich Thien Pha	June/ 2015
n	HCMC Export Processing & Industrial Zones Authority (hereinafter referred to as " HEPZA ") (Vinh Loc IP)	June/ 2015
o	Thang Long Corporation	April/ 2015
p	Eden I Residences Vietnam	July/ 2015
Business Organization		
q	Vietnam-Japan Joint Initiative Working Team Phase V WT4	March/ 2015
Public Agency		
r	Japan External Trade Organization (hereinafter referred to as "JETRO") Hanoi	April/ 2015
s	JETRO HCMC	June/ 2015
Local Government of Vietnam		
t	Tay Ninh PPC	July/ 2015
Stakeholders in My Hao District including Rent Room Owners		
u	Three Landlords	November/2015
v	Workers’ Union Representative in My Hao	November/2015

Source: JST

[5] IP worker housings regulated by the Housing Law No.49 Clause 5 (corresponding to 2.2.2(1)3)).

3.3.2. Major Findings from the Interviews

The key results from the interviews are summarized.

- Low housing construction demand from IP operators and its factory owners:
  At one time, the demand for housing for workers was quite high during the period of high industrial growth from 2005 to 2010. At that time, recruiting employees was one of the highest concerns of the factory owners in IP. Therefore, recruiting staff from rural areas and preparing their dormitories and housings were priority issues. These phenomena are rarely observed currently. One of the reasons is the decrease in intensity of employment competition by large-scale IP factory owners commencing simultaneously. Currently, the job separation rate is lower than before, and it negatively impacts on the housing construction demand by the IP operators and the factory owners.

- Decrease in housing needs of workers:
  Many workers live in their family or relatives who already used to live there for long time and commute to IPs, with some of their commuting time taking up to half an hour using motor cycles. This trend is obvious in IPs areas. The locations of the IPs have shifted from the periphery of large cities to semi-rural areas then from semi-rural areas to rural areas, in order to obtain employees and/or adequate sites for developments. Shifting the IP locations to semi-rural areas for pursuing local labor characterizes part of the Vietnamese spatial expansion of modern industrial activities. The ratio of workers who live in family houses is about 60 to 70 % for IPs in semi-rural areas. Therefore, the demand for constructing new housing is not very high.

- Change of main target in recruiting industrial workers:
  During the high industrial growth in the past, the main target in recruiting industrial workers was unskilled workers. The need for recruiting unskilled workers has decreased significantly adding to the decreasing trend in the job separation rate of unskilled workers, thereby resulting in easier maintenance of the employed labor force. The current main concern in terms of worker employment by manufacturing industries is the recruitment of manager/superintendents. Since most of them prefer to reside in urban settings, IP factory owners offer commuting bus services for them. Therefore, at this time, provision of living facilities around the IP for unskilled workers is not an important issue for IP factory owners and IP operators.

- Real-Estate developers' views on IP workers' housing investment:
  Most of the real estate developers consider that the venture into social housings for industrial workers is not attractive mostly due to the legal caps on profitability. Some developers construct social housing and offer to IP staff. Most regard the social housing business itself as a non-profit oriented one, while they utilize it as a tool for attaining indirect benefits, such as an increase in the occupancy rate of IP factory owners. Usually, the housing developers are the same as IP investors or in the same business group.
  Furthermore, constructing low cost housing adequate for the housing needs for IP workers may not be possible with a conventional approach normally applicable to the independent housing projects. Accomplishing the housing construction cost to an extent low enough for the social housing for IP workers requires genuine cost saving efforts that may not materialize within an independent housing project.

- Other purposes of social housing supply for IP workers:
  For the ordinary private entities, the social housing and labors' dormitories businesses require consideration of direct financial profits. As stated earlier, however, the operations of the businesses are able to utilize these opportunities as tools for aiding investors' main profit earning business lines. The supporting purposes include a) Facilitating recruitment of IP

workers within remote areas for the IP by appealing to their extended consideration of their workers such as dwelling places, b) Restraining undue raises of rent for the apartments and/ or rent rooms in the respective surrounding areas by providing their own dwelling places, c) Providing decent working conditions in remote and isolated areas where the IP is located by preparing necessary dwelling places and social services, and d) Fulfilling social responsibilities of the IP operators and IP factory owners by providing social housing for IP Workers.

- Rent room related conditions in My Hao District:
  In My Hao District the rent room businesses emerged around 13 to 14 years ago when the first factory was established in the district. The number of rent room owners rose to around thirty but has since decreased due to the decline of factory owners in the district. The decline followed this sequence: a) The factory establishment and the following factory cluster formulation were the first contemporary industrial activity aggregation in the areas surrounding My Hao District, b) People wishing to work in the factories gathered in the District mainly from Hung Yen Province, c) As the factory installations increased, the workers increased in the District, d) Then the spread of factory installations to the surrounding areas enabled migrant workers from outside the District return to their home places or shifted their work and residence.
  Most migrant workers possess alienated feelings while dwelling in the native communities' rent rooms. They prefer living in newly created communities primarily for them. Insufficient supply of the social infrastructure and services, such as kindergartens, schools, and clinics negatively impact their lives.

3.3.3. Summary of Interview

As a result of interviews, challenges and factors about workers' living environment around IP have been classified into the following three aspects.

- "Quality" of living environment
  It should be taken as a priority to provide a housing environment during the era of high demand to ensure recruitment from rural areas.
- "Cost" for housing business

  While it is an indispensable effort to cost cut in SH, it is difficult for independent housing projects to realize.
- Low profitability affected on "housing affordability" of residents
  The SH business for workers is not highly profitable because profit ratios are legally restricted to meet affordable housing costs from resident's affordability.

The progress of improvement in the living environment for workers or housing supply for low-income earners are obstructed due to lack of solutions and each issue is disconnected from the other. The necessity for the improvement of residential facilities and construction demands around IPs has been outstanding because industrial investment by sophisticated to large-scale factories has declined since 2010. It has therefore become easier to secure a labor force.

3.4. Typology of IPs and the Situation of Housing Supply

3.4.1. Typology of IPs

The study team conducted a site visit survey of about 55 IPs in the northern area, 58[6] IPs in the southern area and 7 IPs in the central area. According to the results of the site observation, analysis of satellite imagery and related documents, the study classifies IPs into several groups according to their site features and spatial relations between industrial zones and housing for workers. Furthermore, their spatial characteristics are classified into four categories. It is primarily based on the time of the development and the location of the area. Spatial characteristics and their background are indicated below.

(1) **IPs in Suburban Areas Around Large Cities/ Metropolitan Areas (type 1)**

IPs in Vietnam were initiated with the advent of Tan Thuan IP in 1992. The IP establishment started in the suburban areas of large cities like HCMC and Hanoi City.

Even though when the housing needs of IP workers were satisfied by the IP operators and/or factory owners, along with individual investors by providing private rental rooms with decent conditions, the minimum living requirements were not achieved.

SH supply for the IP workers in these areas has become non-social after urbanization, which includes sufficient volume of decent rental houses and SHs, covered the areas with IPs. The phenomena can be observed in HCMC and the southern part of Binh Duong Province. In the Kim Chun Commune, Hanoi City, the state's efforts towards SHs supply have promoted the urbanization of the area adjacent to the IP effectively.

(2) **IPs in Vicinity Rural Areas Around Large Cities/ Metropolitan Areas (type 2)**

By increasing the direct investment into the industrial sector, it has resulted in IP developments in rural areas around large cities/metropolitan areas. Until recently, most IPs in the location is lacked of considerations for IP workers' SH.

As a result, dwelling places were supplied through private rental rooms adjacent to or in the vicinity of surrounding communities.

(3) **Isolated IPs in Rural Areas (type 3)**

Because of the difficulty in finding the appropriate site with enough space and requisite infrastructure, the IP developments were undertaken in isolated areas a distance away from the existing villages. These areas are located along the inter-regional arterial road, but the site originally had been used for agriculture, such as large-scale plantations and paddy fields.

These types are classified into three sub categories with their accompanying housing supply by IP operators.

1) **Isolated IPs without Living Facility (type 3-1)**

Many IPs do not have residential facilities within the IP sites for operational reasons and previous absence of current legal requirements, even if they are located far from the existing villages. This means that these IPs would use their infrastructure (water supply, sewage and electricity)

[6] A map and list are shown in section 2.5.

exclusively for factory use. This situation results in high costs for preparation for workers' housings near the IPs.

Factories in these IPs need to prepare living facilities for workers or support their commute by providing buses if they need to employ certain numbers of workers. However, it is quite difficult for small / medium-scale factories to provide these facilities.

2) **Isolated IPs with Workers Dormitories for Large Scale Factories (type 3-2)**

Some of these industrial zones are planned with consideration of workers' housing in or close to the industrial zone. Dormitories for workers are prepared from the beginning stage of operation. Most of these types of IPs are developed with large-scale factories.

Most of these residential facilities utilize the prepared land and share infrastructures that have been prepared for IPs. These residential facilities ensure living spaces for workers, but they lack social facilities in most cases.

3) **Isolated IPs with Workers Dormitory for Small/ Medium Scale Factory (type 3-3)**

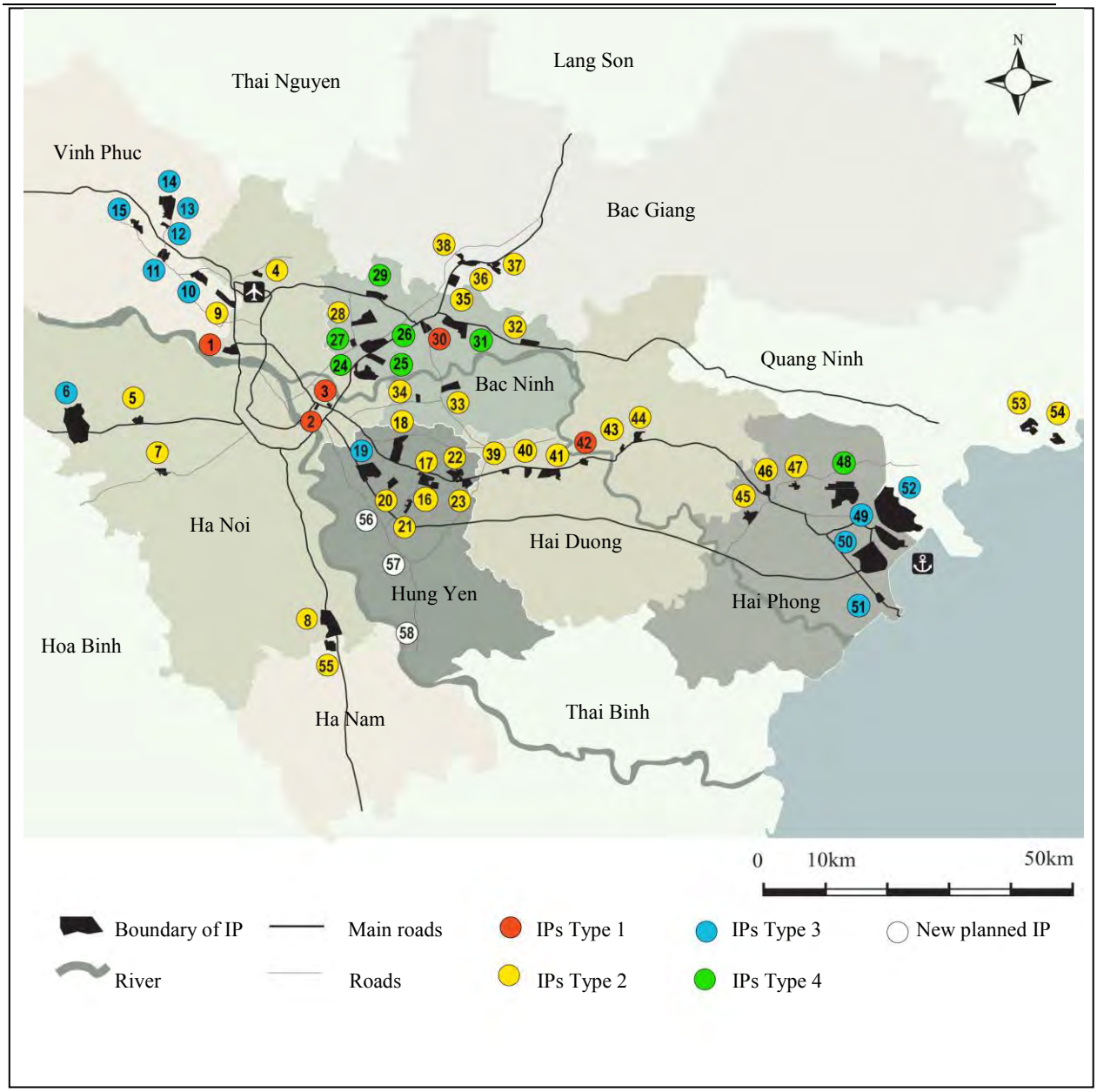
Recently, some of these industrial zones are planned with residential areas for workers' housing within the industrial zone. For example, in the Long Duc IP (Figure 3-4, Number 56), workers' residences are prepared in the industrial area, and a housing management operator manages the residents who work in different factories in the IPs. In the Ascendas Protrade Singapore Tech IP (Figure 3-4, Number 26), the accommodation for the workers are in the centre of the IP and it offers related living services.

(4) **IZ Development Integrated with IPs and Surrounding Cities and Villages (type 4)**

In certain IZs, a number of IPs and surrounding residential development are planned with spatial integration. In many cases, the IP developers and the urban developers are the same or closely related to the same business group. The development of this type enables special linkage between industrial areas and residential areas, and infrastructure caters for industry, residence, and commercial purposes.

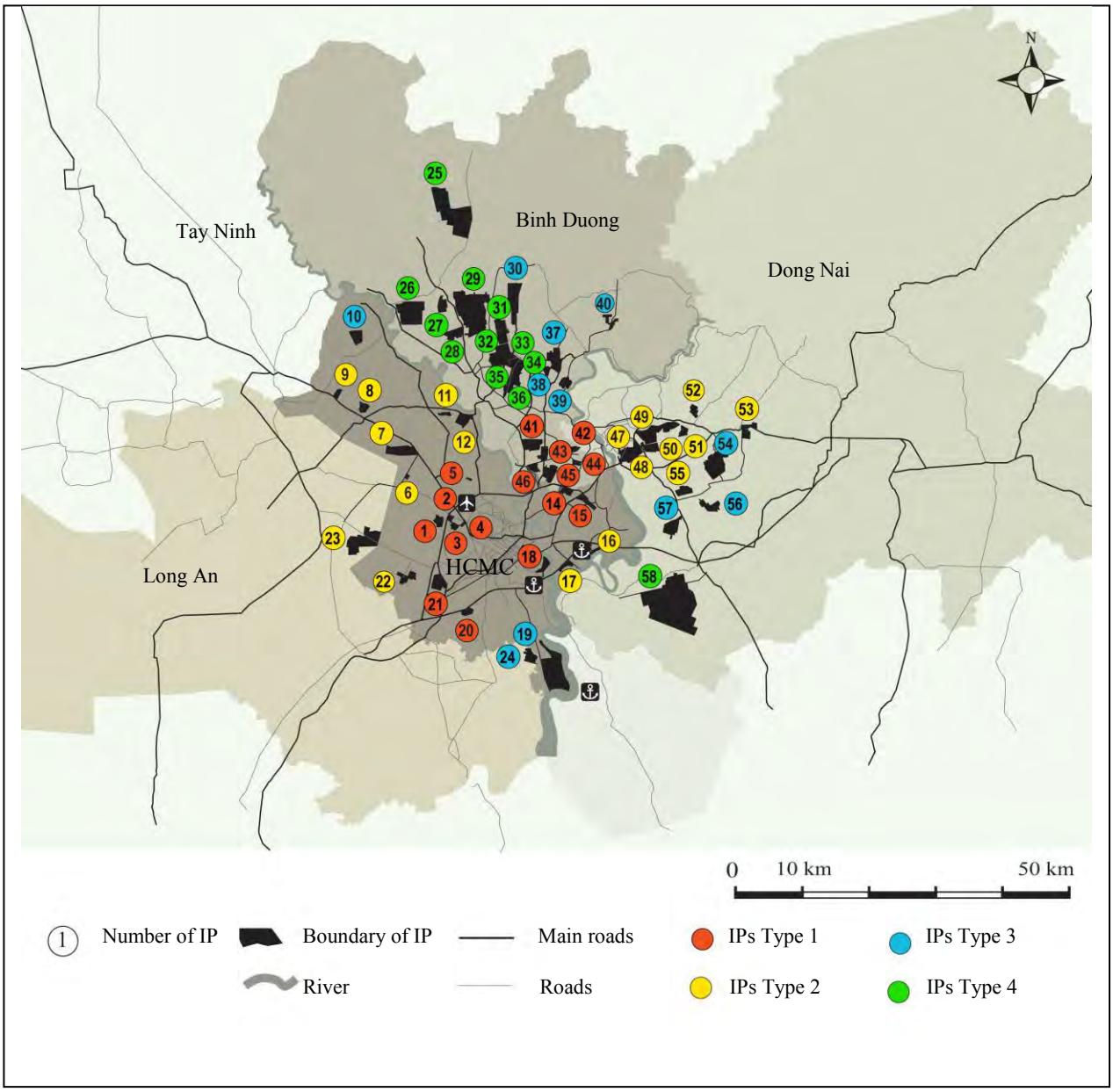
Profits from the industrial developments are redistributed in essential development sectors that require financial resources but are non-profitable. These include social housing or workers' residence, which need to be handled strategically.

In other words, the development investors/operators of these developments take on an appearance of local level governments.



Source: JST

Figure 3-3 Distribution Map for IP Types (Northern Area)



Source: JST

Figure 3-4 Distribution Map for IP Types (Southern Area)

3.4.2. Issues by Type of Location of IPs

In this section, the issues to be improved upon corresponding to the typology of IPs (2.5.1), which was reflected by the results of site survey and system research, are described below according to the following planning criteria.

- Housing supply matters:
- Spatial planning matters: involves urban and district planning pertaining to location, infrastructure and similar aspects.
- Building matters: for example architectural planning and design.
- Legal system: For example, systems for authorization and obtaining support for construction.

- Business planning matters: consist of financial resources, planning, business schemes, etc.

(1) **IPs in Suburban Areas Around Large Cities/Metropolitan Areas (type 1)**

a. Housing Supply

The housing supply situation for type 1 is relatively good, compared with other types. This is so because factories and IZ of type 1 are located around large cities and metropolitan areas, so workers can find residence in the city easily.

b. Spatial Planning

In some areas, an overcrowding living situation and traffic congestion were observed. However, these are due to general urban conditions of large cities.

c. Building

Generally, there are a minimal number of rooms for rent in these areas. In addition, buildings are well regulated in the city areas or are undergoing renovation.

d. Legal System

Real estate investors and developers tend to construct housings for high and middle-income earners. Moreover, the legal system discourages them from constructing social housings.

e. Business Planning

In view of the small profit margins of the social housing business and its instability, most of investors and developers are not interested.

- Expensive costs for landing and infrastructure
- Low profit and business instability
- Low price competition with the surrounding rent rooms due to its low quality

f. Conclusion

The living condition problems in type 1 are common to social housing supply nationwide, and are mostly caused by low business planning and business cost implications.

(2) **IPs in the Vicinity of Rural Areas Around Large Cities/ Metropolitan Areas (type 2)**

a. Housing Supply

Almost half of the workers live in surrounding areas of the IP and commute to work. The other half live in rent rooms and dormitories. There are residential developments around IPs, but many have low occupancy rates. Neither IP operators nor real estate companies are interested in a certain scale of housing construction, except for the projects that were planned in the development boom in the early 2000s. In this type, local rent rooms serve an important role in satisfying demand from workers.

b. Spatial Planning

A poor and insufficient capacity of infrastructure exists in the area. Most IPs set up the infrastructural facilities for their own use primarily, and their supply services are not offered to residents out of the IPs. As a result, many workers living in rent rooms around the surrounding villages might cause a negative environmental impact.

c. Building

There are many low quality rent houses around villages. They have problems of scale, safety and sanitation.

d. Legal System

There is no effective measure of controlling quality of the buildings containing the rent rooms. Many buildings with poor living conditions are constructed as a result of price competition. In addition, these low quality buildings obstruct the spread of improvement in room buildings.

e. Business Planning

Large / middle scale real estate investors shun investment in these areas for the following reasons.

- High cost in land preparation and construction of infrastructure
- Low profit margins and business instability
- High competitiveness with low quality buildings of rent rooms

f. Conclusion

The living condition problems of type 2 relate to principally planning matters, which are complex. Cooperation among related entities and a strategic program are indispensable to resolve these issues.

(3) **Isolated IPs in Rural Areas (type 3)**

1) **Isolated IPs without Living Facility (type 3-1)**

a. Housing Supply

Of this type, there is a lack of residential area within the surrounding villages near IPs. Therefore, it is inevitable that workers commute from distant places or be offered commuting services (e.g. factory bus services). As a result, it is quite difficult for large / medium scale companies to recruit certain numbers of workers without the need for construction of dormitories.

b. Spatial Planning

IPs are located isolated areas from the existing villages and cities. For the construction of living facilities around IPs, land reclamation, landing, and construction of urban/social infrastructure are necessary.

c. Building

Construction of dormitories seems to be the only means to solve the housing demand around such IPs. However, many workers tend to neglect dormitories that are located in isolated areas without social and commercial facilities.

d. Legal System

Traditional legal systems d not compel IP operators to prepare workers' residences around IPs. It is necessary to inform IPs' investors and operators to prepare residential facilities or residential areas in or around IPs if there is potential for problems to arise.

e. Business Planning

It is quite difficult to expect alternatives to IP investors or factories except IP operators who would be interested in construction of workers' residence around IPs because of its high capital cost especially in preparation of the infrastructure. In order to resolve this situation, IP should be planned with residential areas and provide for infrastructure services.

f. Conclusion

The living condition problems in type 3-1 are caused by the lack of infrastructure systems around IPs completely. If the IP provides this infrastructure for committed residential investors for their common use, the problem would be easier to resolve. Apart from this, the problem is quite difficult to correct.

2) **Isolated IPs with Workers Dormitory for Large Scale Factory (type 3-2)**

a. Housing Supply

In this type, the large-scale factory constructs and provides dormitories and workers housing unilaterally according to its demand. In case of any problem, the company will take the necessary action with full responsibility.

b. Spatial Planning

Dormitories and workers residences are constructed in and around IP sites. Most of the dormitories are located in closed sites and a lack of spatial relations with their surroundings.

c. Building

Many workers do not like dormitories that are located in isolated spaces within the factory site and tend to leave dormitories that are too strict (e.g. restriction of cooking and curfews).

d. Legal System

There is no legal penalty if the large-scale factories continue their operations while providing residential facilities.

e. Business Planning

Construction and operation of the dormitories are funded by factory owners based on their own business schemes. Therefore, there is no significant problem to be considered by other entities.

f. Conclusion

In this type, the factory owners prepare residential facilities and takes on the necessary measures, such as commuting at their own cost. In addition, there is no significant problem envisaged by other entities after approval of their IP's plans.

3) **Isolated IPs with Workers Dormitory for Small/ Medium Scale Factory (type 3-3)**

a. Housing Supply

In this type, the IP operators construct and provide dormitories and workers housing on their own according to their demand. In case of problems, the IP operators will take necessary actions independently.

b. Spatial Planning

Dormitories and workers residences are constructed in and around IPs' site. Some of the dormitory/residences are located inside the IPs and basic social facilities, such as Medical facilities, commercial facilities, are provided. However, some kinds of social facilities, such as elementary schools, are seldom allowed for in such a setting.

c. Building

The buildings of dormitories and residential facilities are well planned and designed. For most of these facilities, the operator ensures certain levels of independency for residents. The occupancy rate of these dormitories is higher than that of type 3-1.

There are no residential buildings for sale, so workers need to seek houses or apartments outside of the area if they want to purchase their own property.

d. Legal System

There is no significant problem with the residential facilities of this type. If enacted the systems allowing for sale of residential facilities, it is going to help in impacting on sustainable regional development.

e. Business Planning

Construction and operation of the dormitories are handled by IP operators based on their own business policies. Other entities have no objection to this approach.

f. Conclusion

In this type, the factory prepares residential facilities and takes on the necessary measures, such as commuting at their own cost. In addition, there is no significant problem envisaged by other entities after approval of their IP's plans.

(4) **IZ Development Integrated with IPs and Surrounding Cities and Villages (type 4)**

a. Housing Supply

IP operators, investors or their representative companies provide several types of residential properties for sale and rent including social housing. The housing is provided with a long term view of future demand.

b. Spatial Planning

Spatial plans of IZ are formulated with consideration of their surroundings including residential, commercial development and the other land uses.

c. Building

Most of the land is for residential area sale. The investors (affiliated company of the IZs' investor) prepare several social or shared housings.

d. Legal System

Their investment and development plan are flexibly implemented according to the situation in each period of development. As a result, building construction progresses according to the housing demands.

e. Business Planning

The key advantage of this type is that the investor and developer of the IZ can manage and redistribute the profits that are earned from profitable sector into other unprofitable sectors. However, this development model needs large-scale investment, so its realization is undertaken by quite a limited number of players.

f. Conclusion

This development model is ideal for IZ development. The model anticipates role sharing and financial schemes among different sectors related to IZ development. In other words, the investor assumes a role of local government in planning, development and management.

(5) **Types of IPs Having Issues to be Improved Regarding Living Conditions**

The IPs in location Type 2 and Type 3-1 are necessary to be improved their living environment. Most of them obtained their investment approvals before 2009 when they were not obliged to be responsible on housing construction.

3.5. Situation of Residential Area Development

3.5.1. Outline of Analysis

(1) **Objectives of the Analysis**

The study aims to analyse the current situation of the IPs, the neighbouring villages and the residential development areas around industrial zones, and their effects. The study leads to better environmental conditions of workers by identifying key factors. The results are intended to be

reflected in further planning, improvement of current IPs and their surroundings and to enhance future urban planning.

(2) **Analysis and its Result**

The study provides two viewpoints for the analysis depending on the urban and the detailed planning levels. The urban planning level analysis concentrates on the spatial structures, land use situations and the relationship between the IP and the surrounding area. On the other hand, the detailed planning level analysis focuses on spatial conditions about the site of the residential development area and other related issues.

The analyses consist of two phases that are a) research on IPs for analysis, b) analyses on workers' living environment.

3.5.2. Analysis from the View of Urban Development

(1) **Research of IPs for Analysis**[7]

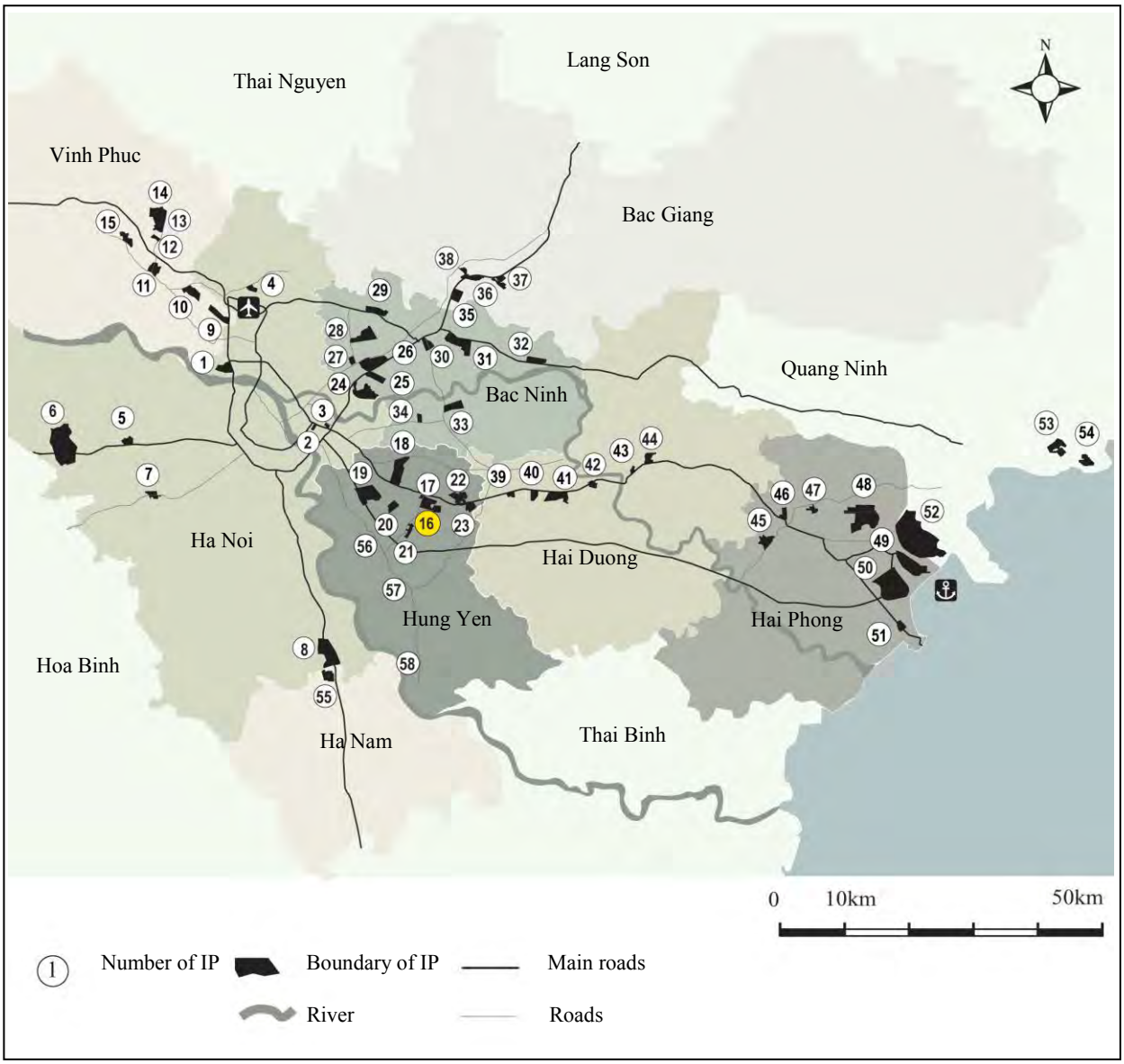
i) The Northern part of Vietnam

The survey analysed IPs in the northern part of Vietnam that comprised 9 provinces (Ha Noi, Vinh Phuc, Hung Yen, Bac Ninh, Bac Giang, Hai Duong, Hai Phong, Quang Ninh, Ha Nam) , and more than 50 IPs were identified.

These industrial zones are at three stages of development (under operation: development completed, under construction and planned).

The study team conducted site visit surveys of the IPs and their surroundings mentioned above.

[7] The analysis is based on the result of site visiting, JETRO Hanoi office report 3-2015 industrial park data of the north and middle area of Vietnam, and the web site of each industrial park which written in JETRO report



Source: JST

Figure 3-5 Location of the IPs in the Northern Area of Vietnam

Table 3-4 List of IPs in the Northern Area of Vietnam

	No	Name	Current Situation		No	Name	Current Situation
Ha Noi	1	Thang Long I	Under operation	Bac Giang	35	Quang Chau	Under operation
	2	Sai Dong B	Under operation		36	Van Trung	Under construction
	3	Dai Tu	Under construction		37	Noi Hoang	Under operation
	4	Noi Bai	Under operation		38	Dinh Tram	Under operation
	5	Tach That	Under operation	Hai Duong	39	Phuc Dien	Under operation
	6	Hoa Lac	Under construction		40	Tan Truong	Under operation
	7	Phu Nghia	Under operation		41	Dai An	Under operation
	8	Hanssip	Planned		42	Viet Hoa	Under operation
Vinh Phuc	9	Quang Minh	Under operation		43	Nam Sach	Under operation
	10	Kim Hoa	Under operation		44	Lai Vu	Under operation
	11	Binh Xuyen	Under operation	Hai Phong	45	Trang Due	Under operation
	12	Binh Xuyen II	Under construction		46	Nomura	Under operation
	13	Ba Thien	Under operation		47	Nam Chau Kien	Under construction
	14	Ba Thien	Under operation		48	VSIP	Under construction

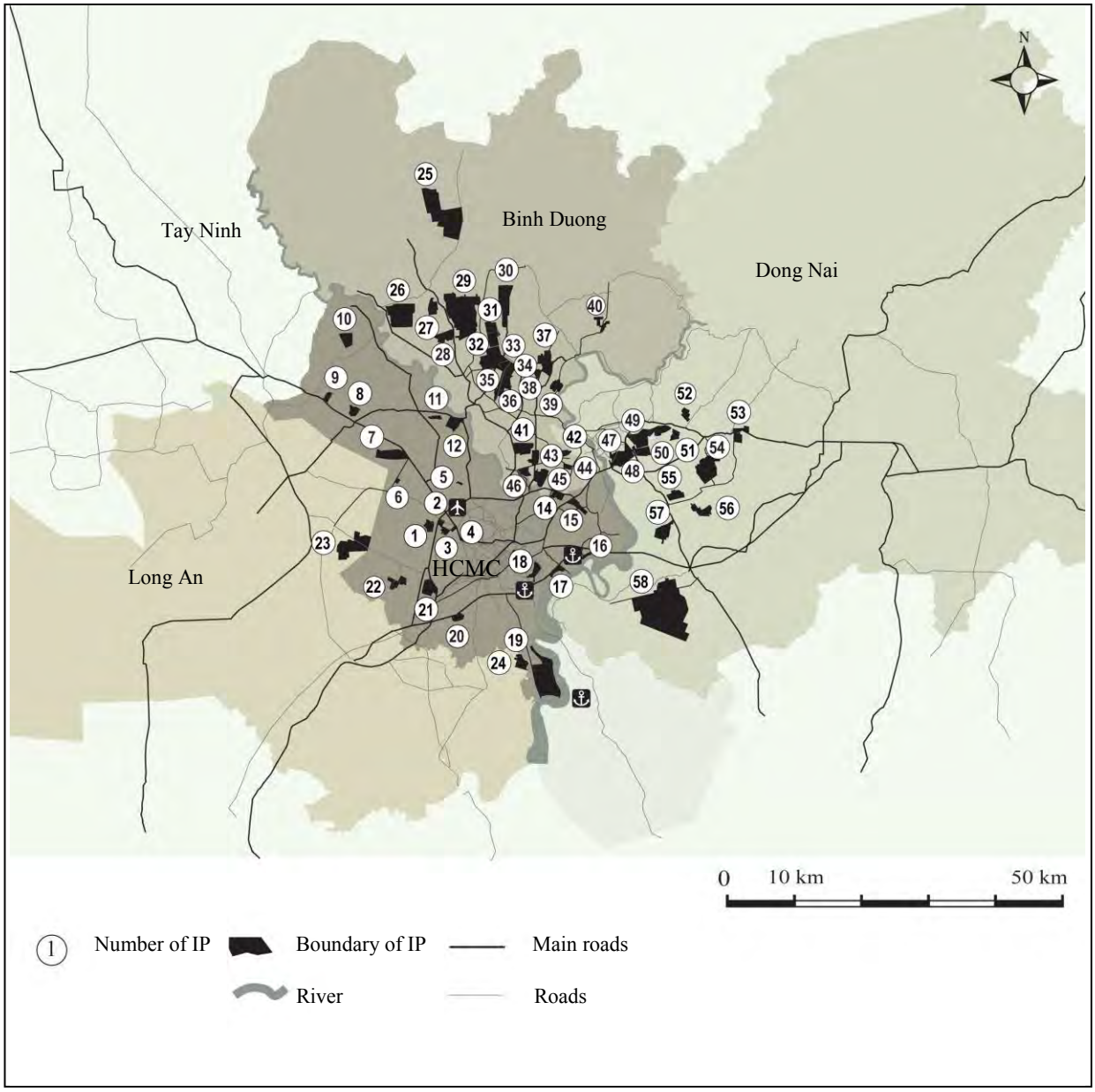
	15	Khaki Quang	Under operation		49	Dinh Vu	Under operation
Hung Yen	16	Thang Long II (Pho Noi B)	Under operation		50	Trang Cat	Planned
	17	Pho Noi Textile & Garment (Pho Noi B)	Under operation		51	Do son	Under operation
	18	Pho Noi A	Under operation	Quang Ninh	52	Dam Nha Mac	Planned
	19	Vinh Khuc	Planned		53	Viet Hung	Planned
	20	Ngoc Long	Planned		54	Cai lan	Under operation
	21	Yen My II	Under construction	Ha Nam	55	Dong VanII	Under operation
	22	Minh Quang	Planned				
	23	Minh Duc	Under construction				
	56	Tan Dan	Planned				
	57	Kim Dong	Planned				
	58	Ly Thuong Kiet	Planned				
Bac Ninh	24	VCIP Back Ninh	Under operation				
	25	Dai Dong-Hoan son	Under operation				
	26	Tien Son	Under operation				
	27	Hanaka	Under Construction				
	28	Tu Son	Planned				
	29	Yen Phong	Under operation				
	30	Nam Son-Hap Linh	Under operation				
	31	Que Vo I	Under operation				
	32	Que Vo II	Planned				
	33	Thuan ThanhIII	Planned				
	34	Thuan ThanhII	Under operation				

Source: JST

ii) The Southern part of Vietnam

Survey analysed and identified the various IPs in the southern part of Vietnam. The survey covered four provinces (HCMC, Lon An, Binh Duong, Dong Nai), and more than 50 IPs. These industrial zones include three stages of development: 1) under operation (development completed), 2) under construction and 3) planned.

The study team implemented the site visit survey in the IZs and their surrounding areas as mentioned above.



Source: JST

Figure 3-6 Location of the IPs in the Southern Area of Vietnam

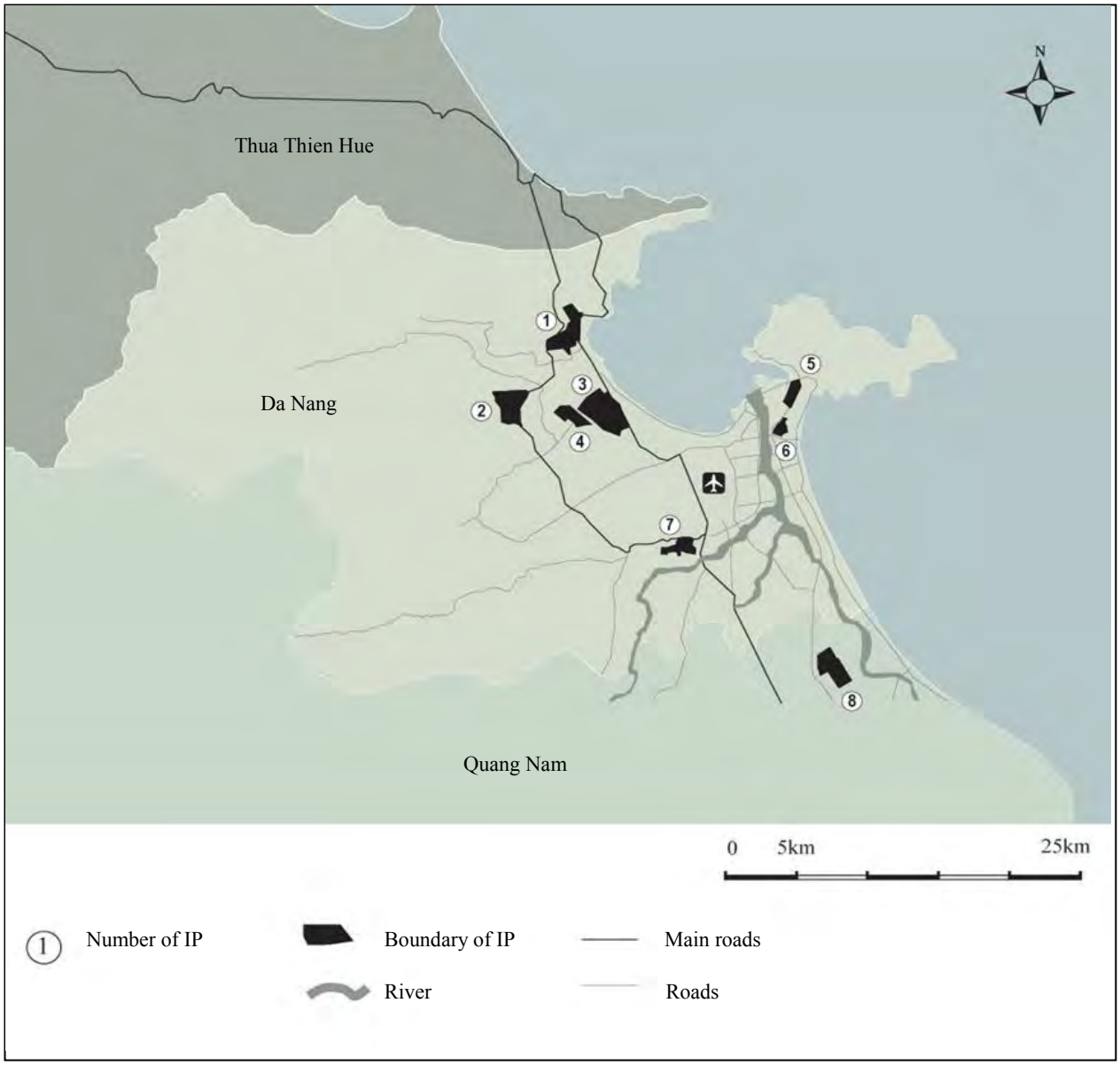
Table 3-5 List of IPs in the Southern Area of Vietnam

	No	Name	Current Situation		No	Name	Current Situation
HCMC	1	-	Under operation	Binh Duong	25	Vinh Loc	Under construction
	2	-	Under operation		26	Ascends	Under construction
	3	Phung Dong	Under operation		27	My Phuc1	Under operation
	4	Tan Binh	Under operation		28	Viet Huong 2	Planned
	5	Tan Thoi Hiep	Under operation		29	MyPhuc2345	Under construction
	6	Xuan Thoi Son	Under construction		30	VSIP2	Planned
	7	Tan Phu	Under construction		31	Dong An 2	Under construction
	8	Tay Bac cu chi	Under operation		32	VSIP1	Under operation
	9	Phuc Hiep	Planned		33	Map Tree Business city	Under construction
	10	Bau Dung	Planned		34	Kim Huy	Under construction
	11	Michanical auto	Planned		35	Song Than3	Under construction
	12	Dong Nam	Under construction		36	Dai Dang	Under construction
	13	Dong An	Under operation		37	Nam Tan Uyen	Under operation
	14	Linh Trung 1	Under operation		38	-	Under operation
	15	Saigon Hi Tech	Under operation		39	-	Under operation
	16	Phu Huu	Planned		40	Dat Cuoc	Under construction
	17	Cat Lai 2	Under operation		41	VSIP1	Under operation
	18	Tan Thuan	Under operation		42	Tan Dong Hiep B	Under construction
	19	Hiep Phuoc	Under construction		43	Song Than	Under operation
	20	Phong Phu	Planned		44	Tan Dong Hiep A	Under operation
	21	Tan Tao	Under operation		45	Song Than I	Under operation
	22	Le Minh Xuan	Under construction		46	Dong An 1	Under operation
Long An	23	Tan Duc	Under operation	Dong Nai	47	Bien Hoa 1	Under operation
	24	Long Hao	Under operation		48	Bien Hoa 2	Under operation
					49	Amata	Under operation
					50	Loteco	Under operation
					51	Ho Nai	Under operation
					52	Song May	Under operation
					53	Bau Xeo	Under operation
					54	Giang Dien	Planned
					55	-	Under operation
					56	Long Duc	Under construction
					57	Long Thanh	Under operation
					58	Nhon Trach12345	Under operation

Source: JST

iii) The central area of Vietnam

The location of the IPs in Da Nang is presented in figure 3-7. Only the Da Nang High-Tech Park is under construction out of seven industrial parks. Lien Chieu and Hoa Khanh have expanded already and commenced operation while some parts are under development.



Source: JST

Figure 3-7 Location of the IPs in the Central Area of Vietnam

Table 3-6 List of IPs in Da Nang City

No	Name	Current Situation
1	Lien Chieu	Under construction
2	Da Nang Hi Tech	Planned
3	Hoa Khanh	Under operation
4	Hoa Khanh Expanded	Under construction
5	Da Nang Sea Food	Under operation
6	Da Nang	Under operation
7	Hoa Cam	Under operation
8	Dien Nam	Under operation

Source: JST

JST has visited the above mentioned industrial zones and the sites for the survey. The characteristics are stated below.

(2) **Analysis on Workers' Living Environment**

i) General view

For the spatial analysis, the following matters were considered.

- The existing surrounding towns/villages

In many IPs, the existing towns/villages provide housing to workers in the form of rent rooms. The accessibility (distance) from the IPs and the existing facilities (commercial, social facilities) are the key factors that influence their living conditions.

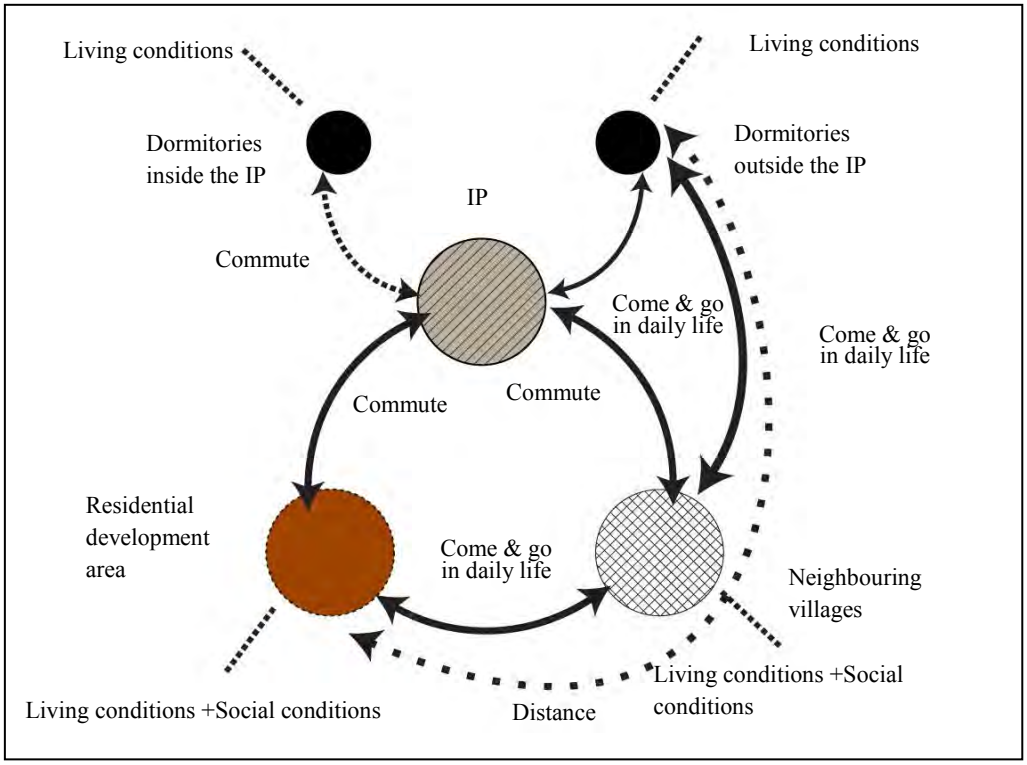
- Residential development around IPs

In order to supply housing needs, residential areas have developed around IPs. Their location (distance from IP and the existing towns/ villages) and type of residential facilities offered are examined below.

- Dormitories

Some companies prepare dormitories to provide convenience for their workers. These dormitories fill the gap between demand and supply of residential facilities.

Following figure shows spatial model and views for the analysis between the residential facilities, living environment related to worker's daily life.



Source: JST

Figure 3-8 Spatial Model and View of Analysis between the IP and the Surrounding Residential Area

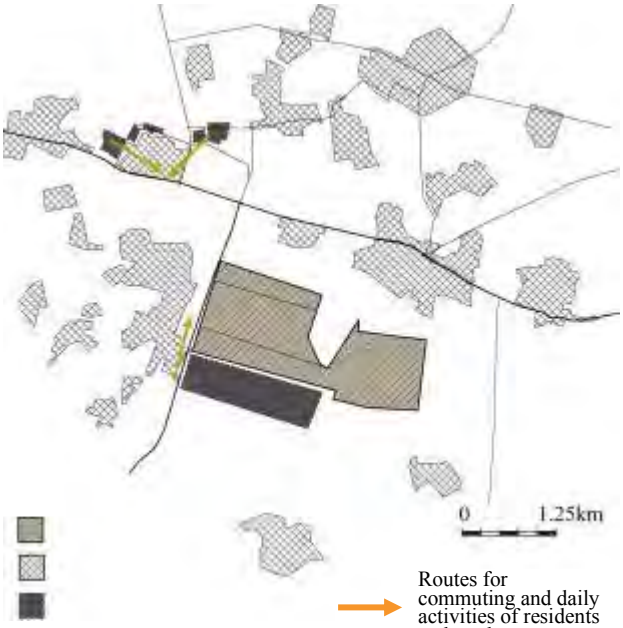
ii) Spatial prototype of the IPs

As a result of analysis on the current spatial situation of IPs and their surroundings, they are divided into 6 spatial prototypes. The followings are the characteristics and the relationships between the IPs and adjoining areas.

Type a: IPs near Autonomous or Independent Residential Area

- Characteristics

- Standalone IP or large factories, which are located independent of neighbouring towns/villages.
- Industrial areas are usually surrounded by open spaces.
- Usually located in proximity to arterial roads, highways and airports.
- Independent functioning as living environment and infrastructure and limited connection with the surrounding areas.
- There is a weak spatial connection between the IP and the near villages.



Source: JST

Figure 3-9 Thang Long IPII

- Situation of living environment

- The residential development development areas near this kind of IP tend to fail due to low occupancy rates caused by the long distances between IP and the existing developed housings and neighbouring villages/towns.
- The cost for infrastructure installation and other facilities would be expensive.

- References

Noi Bai, Pho Noi I, Minh Duc, Thuan Thanh II, Thuan Thanh III, Quang Chau, Phuc Dien, Nomura, Dinh Vu, Do son, Cai lan, Dong Van II

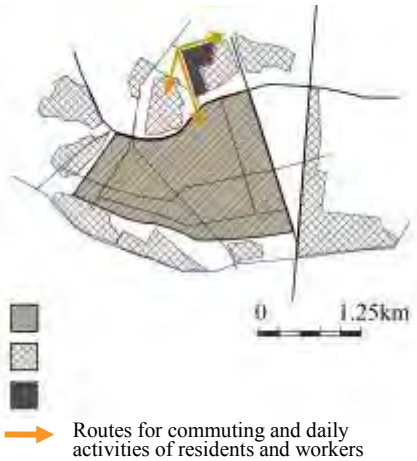
Type b: IPs with new Development Residential Area

- Characteristics

- The residential area is planned and prepared adjacent of industrial areas.
- Industrial areas are usually surrounded by the existing villages and towns.
- There is the opportunity to use the same infrastructure network for residential development.
- There is a spatial connection among the IPs, the residential development area, and the villages. This enables workers to go to work on foot or by means of motorcycles.
- The neighbouring village/town offer social services.

- Situation of living environment

- The residential area near the IP functions adequately through the contribution of short distances between the IP, residential development area and the neighbouring villages/towns.
- The construction cost of infrastructure and the other facilities would be inexpensive.



Source: JST

Figure 3-10 Thang Long IP I

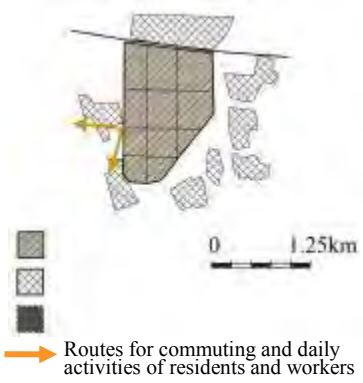
- References

Sai Dong B, Tach That, Phu Nghia, Tien Son, Yen Phong

Type c: IPs with Satellites Villages

- Characteristics

- These IPs were planned and constructed adjacent to the existing villages/towns.
- Industrial areas are usually surrounded by villages
- The short distance from the existing village provides a spatial connection with the IP, the residential development area and the villages.



Source: JST

Figure 3-11 Tan Truong IP

- Situation of living environment

- In several areas, residential developments were planned and constructed as extensions or satellites to the existing villages.
- There is an opportunity to utilise the same infrastructure for the new residential developments

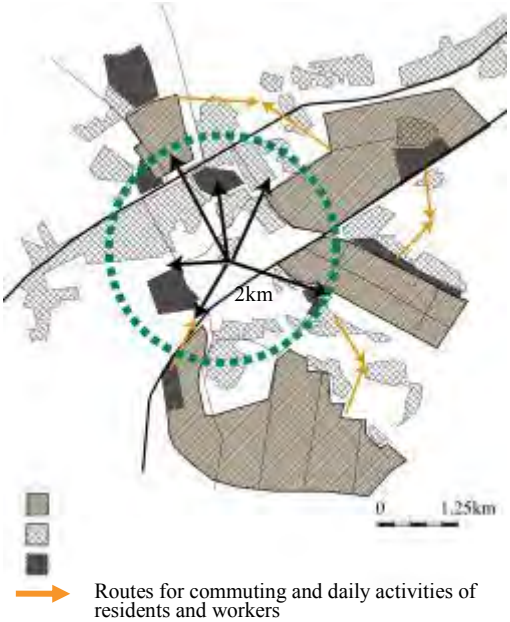
- References

VCIP Back Ninh, Dai An, VCIP Hai Phong

Type d: IZs with Organic and Integrated Spatial Relation

- Characteristics

- Integrated land use was planned for industrial and residential development within the existing villages.
- IPs are planned close to the existing villages.
- There is a spatial connection between the IZ, the residential development area and the villages. Workers can therefore go to work on foot or motorcycles.
- The residential occupancy rates are higher.



IP was established within 2 km from the village, and made accessible to commute.

Source: JST

Figure 3-12 VSIP Back Ninh, Dai Dong, Tien Son, Hanaka IPs

- Situation of living environment

- Integrated relationships between several industrial zones, the existing villages and residential areas are created.
- The same infrastructure network can be shared in different surrounding areas.

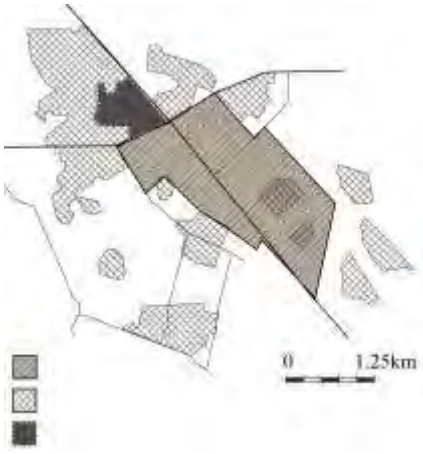
- References

Binh XuyenII, Ba Thien I, Ba Thien II

Type e: IPs with Individual Development Residential Area without Management System

- Characteristics

- This type is similar to type b, but housing development does not consider the spatial connectivity to surrounding village. (The residents can access to the IP by motorcycles or walk.)
- The infrastructure facilities and services in IP are unlikely to reach to the surrounding residential area.
- The development around this area covers only housing development. It does not provide the basic social facility and the roads connected to the arterial roads, and it is difficult to expect the future development neither.
- The development is not an overall housing area development, but the individual construction development by housing lot. The development management is not controlled over the whole area comprehensively. As the result, the development progress is slower than other development areas.



Source: JST

Figure 3-13 Kim Hoa IP

- Situation of living environment

- Residential area fails due to the low occupancy rates.
- The comprehensive development management is not applied. It causes the non-unification of spatial characters.

- References

Tach That, Que Vue

Type f: IPs with Open Access to the Surrounding Villages

- Characteristics

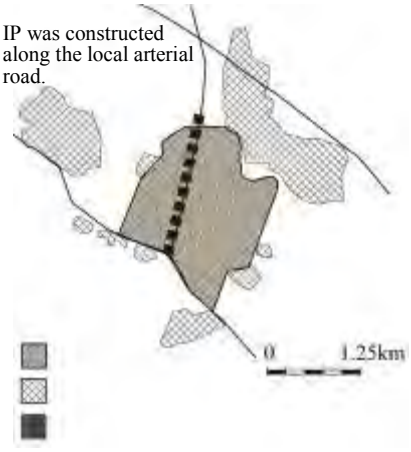
- Strong spatial relationships between the IP and the neighboring villages/towns are planned for and created.
- Free access to both inside and outside the IP generates spatial continuity of the working place, living environment and social/commercial activities.

- Situation of living environment

- Fine spatial connections between the existing villages and IPs have been created.

- References

Hoa Lac



Source: JST

Figure 3-14 Binh Xuyen IP

iii) relationship between the two levels of IP classification

The study classifies IZs into four types according to their location and background[8] from a regional planning view, while the six spatial prototypes describe the IPs characteristics according to the relationship between the IP and its community (village and residential development area).

The following table illustrates the correspondence and frequency of IPs' spatial features from two planning scales.

[8] As explained in 3.4.2 Typology of IPs and the Situation of Housing Supply

Table 3-7 Correspondence of IPs' Spatial Features from Two Planning Scales in Vietnam

IPs Prototypes (Spatial Relation with the Neighbor)		IPs Prototypes (Location and Background)					
		Type 1 (IPs in suburban areas around large cities)	Type 2 (IPs in the vicinity of areas around large cities)	Type 3 (isolated IPs in rural areas)			Type 4 (IZ development integrated with IPs and surrounding cities and villages)
				Type 3-1 (IPs without living facility)	Type 3-2 (IPs with dormitory for large factory)	Type 3-3 (IPs with dormitory for medium/small factory)	
	Type a (IP near Independent Residential Area)	Few	Many	None	None	None	None
	Type b (IP with New Development Residential Area)	Some	Some	None	Many	Many	Some
	Type c (IP with Satellites Villages)	Few	Some	None	Some	None	Some
	Type d (IZs with Organic and Integrated Relation)	None	None	None	None	Some	Many
	Type e (IP with Individual Development Residential Area without Base)	Few	Some	Many	None	Some	Few
	Type f (IP with Open Access to the Surrounding Villages)	Many	Some	None	Few	None	Many

Source: JST

From the table, it is clear that the types "b", "c", "d", and "f" have the potential to improve living conditions for workers, especially the aspect of dormitories and their related facilities.

The housing built in suburban areas around large cities has the possibility to establish IZ integrated within the living environment. In addition, an IP established in rural areas with a desire to create an adequate link with its neighbourhood would choose a type "f" case to create such an environment.

On the other hand, type "a" and type "e" have negative impacts on the living conditions of workers, such as a lack of living facilities.

(3) Situation of Workers' Housings

On the other hand, Type "a" and type "e" have negative impacts on the living conditions of workers, such as a lack of living facilities.

- IZ without dormitories:

Most of the IPs in the northern part of Vietnam does not have any dormitories, and in this case, the workers normally rent rooms in the villages that are located beside the IP. An example of such a case is Quang Minh, TLIP II

- IZ with dormitories inside IPs:

Another way of expressing this IP without any open access to the neighbouring areas. In this type of setting the workers can commute to the factories on foot, bicycles and motorcycles, e.g.: Brother Dormitory in Phuc Dien IP

- IZ with dormitories or residential development areas outside IPs:

In this type, the workers living outside the IP in special development zones can go to work walking, on motorcycles or buses, which are provided by their employers depending on the distance between the residential area and the IP. An example of this can be observed around TLIP and Yen Phong IPs.

This scenario correlates to the number of workers in a factory. Only large-scale factories (more than 1,000 employees) construct their own dormitories and offer residential facilities.

In the Long Hau IP, the dormitory is setup by the IP operator and offered to a plurality of factory owners, but this is an exceptional case.

(4) **An Evaluation Summary of Spatial Relation between IPs, Residential Facilities for Workers and Surrounding Areas**

Table 3-8 shows the result of evaluation based on observation of the current situation of housing development cases prepared by IP operators or factory owners around Hanoi. The evaluation of current development situation is summarized based on the visit surveys (the progress of housing construction and the occupancy rate) with the distances between housings, surrounding cities/villages.

1) **Evaluation Based on the Area Housing Development Situation**

The evaluations for each development case of housing area around IP are as below:

- In Case 1 and 5, in addition to newly developed housing area for workers, the constructions of housings, commercial and social facilities are enhanced in surrounding cities or villages. These cases are highly evaluated as successful examples.
- In Case 2, 4 and 8, the housing construction for workers are proceeded to the certain point as the planned housing areas around IP are developed. On the other hand, the development did not reach to the overall housing development. The positive impacts are limited on the worker housing development and the environment as a whole.
- In Case 3, the housing constructions for workers are not progressed as overall area development sufficiently. In Case 6 and 7, the housing constructions within the area are not progressed at all except where the factory owners prepared their dormitories for their workers. The housing construction plans around IPs are rarely found in these areas, and the few of constructed housings also have some problems in these cases.

In addition, from the investigations of fieldwork, a progress of each housing construction case is hypothesized as it is strongly related to the housing land layout plan and the housing location selection. The details are explained as follow.

2) **Relationship between Housing Location and Surrounding Environment**

The following are critical matters to be considered for planning living conditions for workers:

- The distance between the residential area and the IP:

It is important to consider the distance between the residential area and the IP and make it shorter. As a result of observation through the site visit survey and current progress of development, the distances between residential areas and IPs are recommended at less than 500 m for commuting on foot. Furthermore, distances more than 2 km make it difficult for commuting without motorcycles.

- The distance between the new residential development area and the surrounding villages:

The following Figure 3-15 shows the positional relationship between the existing villages and residential areas to be developed around the IPs across Vietnam. Many residential developments are planned and constructed with strong spatial relation with IPs. Despite consideration of accessibility to IPs in the planning of residential developments, little attention is paid to the relationship of a housing area location and the existing villages. Based on the results of our observation, it is necessary to consider the spatial continuity and to plan the development area within a 300 m radius from the existing villages to prevent an isolated situation. In the residential areas, which are located farther than 300 m, housing developments tend to become failures as the examples provided earlier indicate. On the other hand, the development of the entire area is accelerated when the housing development is increased in between the existing villages and IPs.

- Social facilities in the neighboring villages/towns:

The social facilities, which are offered in a neighbouring village, are imperative to support daily activities of workers, improve the living condition and to achieve sustainable development in an area. In some cases of IP housings, the dormitory alternative offers limited commercial and entertainment services to workers. However, its scale and variety of services are quite small in comparison with that of the existing villages.

3) **Planning Layout for Housing Land**

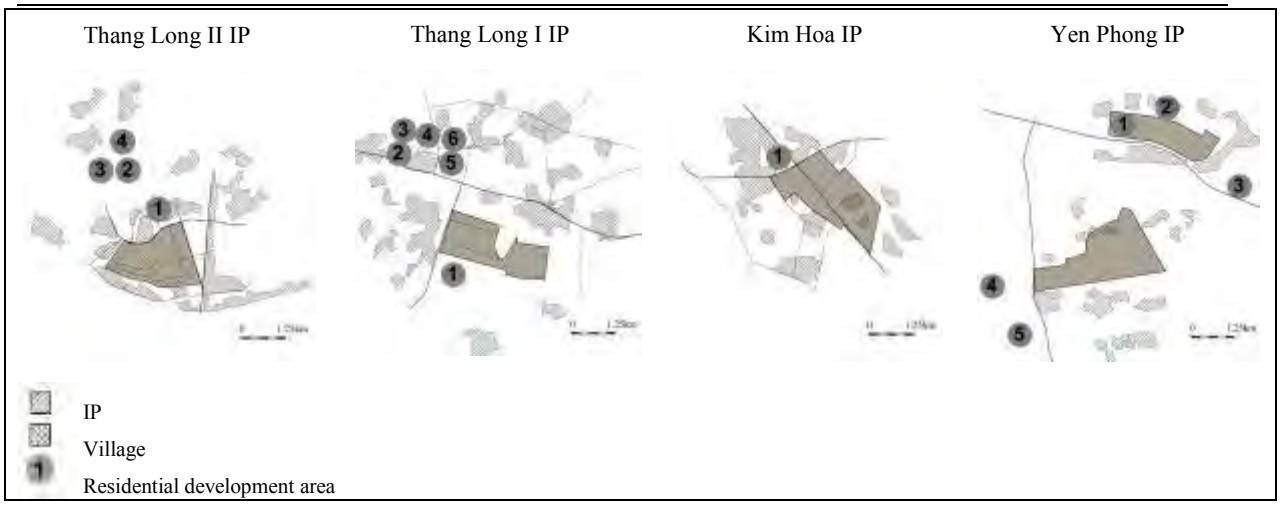
Considering housing land layout at the beginning of IP construction can strongly affect to promote later housing provision.

In Case 4, 5 and 8, the housings are constructed by lay outing housing land as the plan from the beginning of the IP construction. The lands for IP and housings for newly development are prepared as considering the spatial connectivity with neighboring city and villages. As a result, the improvement of living and daily facilities for workers are improved and promoted.

Case 1, 2, and 3 are the examples that the housings were constructed separately from the initial IP construction plan. In these examples, the spatial connectivity between IP and housings are considered as a plan when the housing was planned later. However, they are a lack of accessibility to the surrounding cities and villages, and delays of housing constructions are also found (Case 2 and 3).

Case 6 and 7 do not have a plan to construct housings around IPs.

From these results, the sustainable housing development significantly needs the related plan to develop worker housing by referring to land use or urban planning.



Source: JST

Figure 3-15 Residential Developments Around the IPs

Table 3-8 Evaluation of the Current Situation in Residential Facilities Around IPs Sampled Depending on the Distance between the Three Elements (IP, Villages, and Development Residential Area)

Development case		Development summary	Dormitory		Surrounding City & Village				Residential Development Land					Comprehensive Evaluation	
No.	Name of IP	Housing Development Planning Application & Summary of Housing Provision	Location		Distance between Residential Area and Village (m)		Situation of Public Facilities & Commerce in village/town	Evaluation of Housing Situation	Type of Residential Area	Distance between Residential Area and Village (m)		Distance between Residential Area and Village (m)		Situation of Area Housing Development	Housing Development Evaluation
			Inside IP	Outside IP	Distance	Evaluation			WD/WR/VI/MI	Distance	Evaluation of Housing Situation	Distance	Evaluation of Housing Situation		
1	Thang Long IP	Planned development housings, and private rental housing (a part of them is rent by factory)	-	✓	300-900	A	Have commerce & public facilities inside of housing land & adjacent town	B	WD (several factories)	700	A	300	A	Develop comprehensively with strong business & public service bond between housing development & adjacent town	A
									DH (low occupancy)	6000	D	500	B		
									MI (empty)	3700	D	900	C		
2	Kim Hoa	Housing land for planned development, staff dormitory & a lot of land	-	✓	200-700	A	Have commerce & public facilities in adjacent town	B	WD (Japanese Company "H")	170	A	150	A	Staff dormitory is exclusive. Housing construction in a lot of land is not progressed.	B
									MI	500	A	150	A		
3	Thang Long IP II	Housing construction is planned, but not conducted yet	-	-	700-2500-	D	Have commerce & public facilities in neighbouring village	C	DH	700-	A	600-1200-	D	Housing provision depended on surrounding village. Enamouring development is not progressed.	C
									WR	3000	D	300	A		
4	Tien Son	Integrated housing development, staff dormitory & a lot of land	✓	-	200-500	A	Have commerce facilities in neighbouring village	B	MI (Japanese Company "C")	200	A	200	A	High accessibility for commuting. Low availability of commerce facility & no progress on housing construction.	B
									DH	200	A	200	A		
5	Yen Phong	Integrated housing development, staff dormitory & a lot of land	✓	✓	300-500 2500	A A C	Have commerce facilities & public facilities in neighbouring village	A C	WD (Foreign Company "S")	300	A	500	A	Facilities are developed in the fields of commerce, daily live & social by surrounding private development.	A
									WD (Foreign Company "S")	2870	A	400	A		
6	Dinh Tram	No staff dormitory within the IP or housings around	✓	-	800-1000	B	Have commercial facility around village	B	-	-	-	-	-	Not balanced daily facilities are provided. Available only within IP residences.	C
7	Phuc Dien	No staff dormitory within the IP or housings around	✓	-	200-700	A	Have commercial facility around village	B	-	-	-	-	-	Not balanced daily facilities are provided. Available only within IP residences	C
8	Dai An	Integrated housing development, staff dormitory & a lot of land	-	✓	200-2000	A	Have commerce facilities & public facilities in neighbouring village	B	WD	800	A	200	C	High accessibility for commuting and daily lives. Low availability of commerce facility & no progress on housing construction.	B

Type of residence: WD: worker's dormitory, WR: worker's room, DH: detached houses, MI: mixed (dormitories+ villas and commercial facilities)

Evaluation: A- Very Good B-Good C- Fair D- Bad

Source: JST

3.5.3. Analysis on Residential Areas around IPs in the View of Detailed Planning

In this section, the study authenticates a spatial planning index, which is applied to the land area for the existing residential facilities, housing capacity (building floor area and height) and detailed planning index etc., in order to use it as a reference for the future spatial design.

a. Current Situation and Design Criteria for Residential Development:

The analysis includes seven case studies on residential areas and developments in and out of IPs prepared systematically by IP operators or factory owners around Hanoi area. The planning index, comprises aspects of land area, Floor Area Ratio (hereinafter referred to as "FAR"), Building Coverage Ratio (hereinafter referred to as "BCR"), etc.

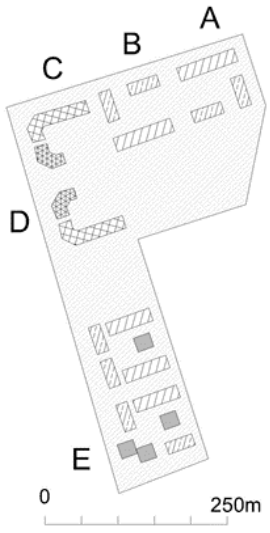
- The housing layout case developed with several buildings. (When the worker housing is only for one building, it is excluded from the case.)
- The case of housing layout and dormitory provision by factory owners or IP operators, and it is confirmed by interviewing related entities.
- The housing layout case confirmed clearly only with interviewing related entities or conducting field surveys.

The cases are investigated based on the construction basics such as land area, FAR and BCR since the basics are related to the detail planning formulation. This analysis includes only the specific cases that fill the requirements mentioned above, and the result does not indicate the average of worker housing layout in Vietnam.

Case 1) Thang Long I IP:

The residential development area is located in the north of the IP and has two types of buildings as shown below.

Table 3-9 Planning Standard and Design Criteria in Thang Long I IP



	Housing Type: Middle rise residential building				
	Building area /m²	Number of floors	Floor surface of one building /m²	Number of buildings	Total surface area/m²
A	1,580	6	9,480	5	47,400
B	703	6	4,218	8	33,744
C	1,780	6	10,680	2	21,360
D	836	6	5,016	2	10,032
Housing Type: High rise residential building					
	Building area /m²	Number of floors	Floor surface of one building /m²	Number of buildings	Total surface area/m²
E	466	16	7,456	4	29,824

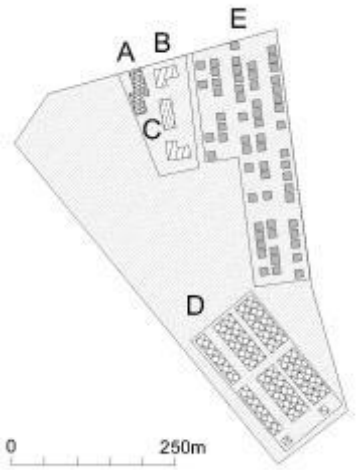
Total land area/m²	Total built area/m²	Built land/m²	Open space/m²	FAR	BCR	Access to IP/m	Access to villages/m
114,244	142,360	19,070	95,174	1.25	0.16	700	300

Source: JST

Case 2) Tien Son IP:

The residential development area is located inside the IP and has three types of housing building as shown below.

Table 3-10 Planning Standard and Design Criteria in Tien Son IP



Housing Type: Workers Dormitories (zone area=14,239 m², floor area=3,676.4 m²)

	Building area /m²	Number of floors	Floor surface of one building /m²	Number of buildings	Total surface area/m²
A	1,277.4	5	6,387	1	6,387
B	833	5	4,165	2	8,330
C	733	5	3,665	1	3,665
FAR=1.3			BCR=0.25		

Housing Type: Town houses (zone area=26,021 m² , floor area=13,260 m²)

	Building area /m²	Number of floors	Floor surface of one building /m²	Number of buildings	Total surface area/m²
D	255	3	765	52	39,780
FAR=1.5			BCR=0.5		

Housing Type: Detached houses (zone area=40,403.8 m², floor area= 8,747.4 m²

	Building area /m²	Number of floors	Floor surface of one building /m²	Number of buildings	Total surface area/m²
E	143.4	2	286.8	61	17,494.8
FAR=0.4			BCR=0.2		

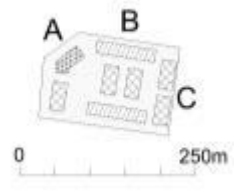
Total land area/m²	Total built area/m²	Built land/m²	Open space/m²	FAR	BCR	Access to IP/m	Access to villages/m
173,416.3	75,655.8	25,683.8	146,162.6	0.4	0.1	Inside	500

Source: JST

Case 3) Yen Phong IP:

This case has two types of residential development area located inside and outside the IP as shown below.

Table 3-11 Planning Standard and Design Criteria in Yen Phong IP

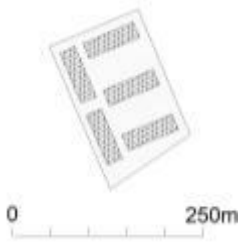
Case: Foreign Company "S" Bac Ninh		**Housing Type:** Workers Dormitories inside the IP					
			Building area /m²	Number of floors	Floor surface of one building /m²	Number of buildings	Total surface area/m²
		A	834	6	5,004	1	5,004
		B	1,433	6	8,598	2	17,196
		C	839	6	5,034	5	25,170
Total land area/m²	Total built area/m²	Built land/m²	Open space/m²	FAR	BCR	Access to IP/m	Access to villages/m
22,881.3	47,370	7,895	14,986.3	2.07	0.34	Inside	500
		**Housing Type:** Workers Dormitories outside the IP					
			Building area /m²	Number of floors	Floor surface of one building /m²	Number of buildings	Total surface area/m²
			842	6	5,052	4	20,208
Total land area/m²	Total built area/m²	Built land/m²	Open space/m²	FAR	BCR	Access to IP/m	Access to villages/m
18,946	20,208	3,368	15,578	1.06	0.17	2,870	400

Source: JST

Case 4) Dinh Tram IP:

This residential development area is located inside the IP with one type of housing building as shown below.

Table 3-12 Planning Standard and Design Criteria in Dinh Tram IP

		**Housing Type:** Workers Dormitories inside the IP					
			Building area /m²	Number of floors	Floor surface of one building /m²	Number of buildings	Total surface area/m²
			1,528	6	9,168	5	45,840
Total land area/m²	Total built area/m²	Built land/m²	Open space/m²	FAR	BCR	Access to IP/m	Access to villages/m
23,939	45,840	7,640	16,299	1.9	0.3	Inside	1,600

Source: JST

Case 5) Phuc Dien IP:

The residential area is located inside the IP and consists of four workers' dormitories as shown below.

Table 3-13 Planning Standard and Design Criteria in Phuc Dien IP

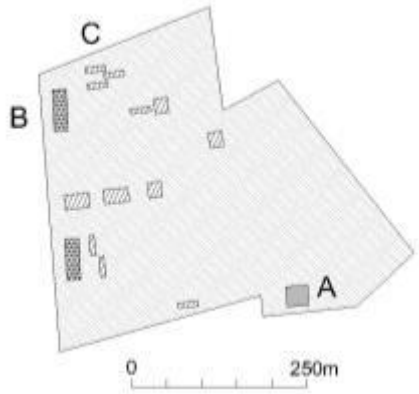
Case: Foreign Company "B" Phuc Dien		**Housing Type:** Workers Dormitories inside the IP					
			Building area /m²	Number of floors	Floor surface of one building /m²	Number of buildings	Total surface area/m²
			1068.6	5	5343	4	21372
Total land area/m²	Total built area/m²	Built land/m²	Open space/m²	FAR	BCR	Access to IP/m	Access to villages/m
13,531	21,372	4,274.4	9,256.6	1.58	0.3	Inside	400

Source: JST

Case 6) Dai An IP:

The residential area is located outside the IP and consists of three types of workers' dormitories as shown below.

Table 3-14 Planning Standard and Design Criteria in Dai An IP

		**Housing Type:** Workers Dormitories Outside the IP					
			Building area /m²	Number of floors	Floor surface of one building /m²	Number of buildings	Total surface area/m²
		A workers	886	5	4,430	1	4,430
		B foreign	1,178	4	4,712	2	9,424
		C experts	4,315.5	2	8,631	-	8,631
Total land area/m²	Total built area/m²	Built land/m²	Open space/m²	FAR	BCR	Access to IP/m	Access to villages/m
163,274	22,485	7,558	155,716	0.1	0.046	250	200

Source: JST

Case 7) Kim Hoa IP:

The residential area is located outside the IP and consists of one type of workers' dormitory as shown in below.

Table 3-15 Planning Standard and Design Criteria in Kim Hoa IP

<table>
<tr><td colspan="2" rowspan="2"> 
</td><td colspan="6">Housing Type: Workers Dormitories Outside the IP</td></tr>
<tr><td></td><td>Building area /m²</td><td>Number of floors</td><td>Floor surface of one building /m²</td><td>Number of buildings</td><td>Total surface area/m²</td></tr>
<tr><td colspan="2"></td><td>A (workers)</td><td>3,622</td><td>6</td><td>21,732</td><td>1</td><td>21,732</td></tr>
<tr><td>Total land area/m²</td><td>Total built area/m²</td><td>Built land/m²</td><td>Open space/ m²</td><td>FAR</td><td>BCR</td><td>Access to IP/m</td><td>Access to villages/ m</td></tr>
<tr><td>10,418</td><td>21,732</td><td>3,622</td><td>6,796</td><td>2</td><td>0.34</td><td>170</td><td>150</td></tr>
</table>

Source: JST

b. Summary and Conclusion

The following indices and table show the applied spatial norms and guiding design criteria that were noted in the residential development areas during the site survey.

From the previous case studies and the summary of all the considered factors, the major points are the following:

- The range of the BCR is: 0.16 to 0.4 (average for a whole residential area)
  0.3 to 0.4 (for middle rise residential areas)
- The range of the FAR is: 0.4 to 2 (average for whole residential area)
  1.5 to 2 (for middle rise residential areas)

Same cases are under the preferred standards due to some reasons such as the long distance between the IP and the surrounding villages and the development situation in these areas.

Table 3-16 Summary of the Detailed Planning Index in the Residential Areas Development

	Total land area(m²)	Total built area(m²)	Built land (m²)	Open space/m²	FAR	BCR
Thang Long IP	114,244	142,360	19,070	95,174	1.25	0.16
Tien Son	173,416.3	75,655.8	25,683.8	146,162.6	0.4	0.1
Yen Phong T1	22,881.3	47,370	7,895	14,986.3	2.07	0.34
Yen Phong T2	18,946	20,208	3,368	15,578	1.06	0.17
Dinh Tram	23,939	45,840	7,640	16,299	1.9	0.3
Phuc Dien	13,531	21,372	4,274.4	9,256.6	1.58	0.3
Dai An	163,274	22,485	7,558	155,716	0.1	0.046
Kim Hoa	10,418	21,732	3,622	6,796	2	0.34

3.6. Situation of Living Environment around IPs

3.6.1. Situation of Housing Development and Living Environment around IPs

Table 3-17 shows the results of residential development around IPs across Vietnam. As a result of our investigation, the followings are a summary of typical cases of living environment conditions.

- All except Sole Proprietors (individual businesses) are large-scale developments in the suburbs. In residential development lead by local government, town planning progresses integrally with a public facility development such as schools. Since the development of the private facility proceeds in accordance with establishing the infrastructure of public facilities, it tends to be swiftly linked to the surrounding urban area.
- Other developments are affected by the positional relationship between the nearby villages and cities because the living environment is dependent on the public and commercial functions.
- The amenity function in residential developments is insufficient and fall short of providing corresponding services than those in developments implemented by sole proprietors.
- There is a tendency for many eating/drinking outlets, and entertainment centers (karaoke, etc.) to crop up in proximity to worker housing development areas. Therefore, sprawl development (disorderly urbanization) progresses, and then planned regional urban development is affected by these negative aspects.
- There are cases where large-scale housing complexes and facilities with amenity functions were established within many companies' own factory sites, such as the development of a large-scale factory in Bac Ninh Province. In this case, the residents of these housing complexes still desire shopping, dining, and leisure activities at neighboring communities. Private developments eventually accommodate them due to such worker longings, and there are many casual shops erected in a disorderly manner. Some people move from equipped facility to apartments in such neighboring communities even if its environmental condition is deplorable.

Table 3-17 Examples of Residential Development around Industrial Zones (Northern Vietnam)

Investor, Undertaker		(1) Local Government	(2) Operator of IP		(3)Tenant of IP			(4) Privet Developer	(5) Sole Proprietor
Location/ IP name		Thang Long I	Tien Son	Dai An	Phuc Dien	Yen Phong	Yen Binh	Que Vo	
Location & IP No. (corresponding to Table 3-4)		1	26	41	39	29	N/A	31 & 32	N/A
Location		North of Hanoi, Kim Chung Area (Beside of IP)	Bac Ninh Province, (Inside of IP)	Hai Duong Province, (Beside of IP)	Hai Duong Province (Inside of Tenant Site)	Bac Ninh Province, (Beside of Tenant Site)	Tai Nguyen Province	Bac Ninh Province	(Many Places)
Operator		Hanoi Housing Company	Private developer (Viglacera)	Private developer (Dai An JSCO)	Foreign Company "B" Vietnam co.,LTD	Foreign Company "S" Vietnam co., LTD	Foreign Company "S" Vietnam co., LTD	Private developer :REDAMCO	Sole Proprietor
Starting Year of Operation		2003	2009	2006	(2004)	2013	2019	2012	
Resident's Type		Single Worker, Family of worker	Single Worker	Single Worker (Changed to Family Use)	Single Worker	Single Worker	Single Worker	Single Worker	Not Determined
Capacity of Residents		20,000 (Including high rise apartment)	About 2,000	200 (32rooms)	2,500 (500rooms)	7,000 (1,500 rooms)	30,000 (8,000 rooms)	1,000 (150rooms)	
User (Tenant of IP)		Leased by tenant company (Japanese Company P, Japanese Company C)	Leased by tenant company (Japanese Company C)	Leased by tenant company	Owned by tenant company (Foreign Company "B" Vietnam co.,LTD)	Owned by tenant company (Foreign Company "S" Vietnam co., LTD)	Owned by tenant company (Foreign Company "S" Vietnam co., LTD)	Leased by tenant company (Japanese Company C)	—
Equipment	Commercial	Mini mart	Y	—			Mini mart	Mini mart	—
	Meeting Room	Y	Y	—	Y			Y	—
	Amenity Facility			—	TV room, PC room		Library , cosmetics Service	Karaoke Room, Tea room	—
	Clinic	Y		—	Y		Y	Y	—
	Sport Facility	Gym, Ping pong room	—	—	Gym		Stadiums (the footstall 3, the soccer 1, a soccer club, other sports clubs, a dance club, etc.)	Badminton, Karate, Gym	Common light court (in some case)
Surrounding Environment	Relation with Existing Towns & Villages	The area was developed independently of the existing village. The relation between development area and village had been generated.	The area is isolated from villages and towns	The area is surrounded by IPs along National Road No.5	The facility is located in the Factory site. It is necessary to cross the National road for social facilities.	The area was isolated from villages. Development is ongoing in surrounding areas of the IP site.	The area was isolated from villages. Development is ongoing in surrounding area of IP site.	The area was developed as a closed residential Zone	The facilities are located in towns and villages nearby IPs
	Public Facility	Elementary school, junior high school and high schools are constructed in surrounding area	—	—	Use facilities in surrounding area	—	—	No public facility except sport facilities.	Use facilities in surrounding area
	Commercial Facility	New shopping zone was constructed.	—	—	Use facilities in surrounding area	Small scale facilities are developed	Small scale facilities are developed	Restaurants are developed in its commercial zone	Use facilities in surrounding area
	Trend of Development in surrounding area	—	—	15 residential buildings are under development		Rent room buildings are under construction in the surrounding area	Rent room buildings are under construction in the surrounding area	—	

Source: JST

3.6.2. Issues for Living Environment

1) Practical Examples of Development Viewed Over the Period of IPs in Vietnam

IPs in Vietnam were initially located near large cities, and there was no specific necessity to establish houses, commercial, public and utility facilities, etc. to support the residents. When IPs started to spread to rural areas near large cities and farther local areas, housing construction become essential and consequently the development of infrastructure, commercial and dining facilities, public facilities and utilities, etc. become necessary.

To accommodate such needs, housing facilities were established within many IPs or neighbouring areas. However, commercial and dining facilities were not established sufficiently and workers often came to rely on those in the existing communities nearby. Notably, there are a few cases where public facilities and utilities, such as schools have been established.

Based on similar social service needs, a certain level of housing facilities have been established at IPs. However, there still remains a sizeable number of cases where workers prefer to live in the existing neighbouring communities that provide convenience for living. The worker housings built in existing communities is cheap yet have a poor habitation environment (e.g. poor ventilation, poor lighting) and hygiene, that is to say, unpleasant wet areas.

Reflecting on the above situation comprehensive development-type establishments have started with a view of creating all-inclusive towns in terms of the industrial, commercial and housing. The living environment of factory workers has improved drastically in there. However, the comprehensive development mentioned above is still in its infancy and many developments around IPs are without planning. This situation portrays a negative image to surrounding villages and environment. Additionally, since it is difficult to establish such housing under IP's operators and their affiliates, thus the supply of workers' housing by landlords in neighbouring communities remains essential. In light of this, there is need to build a system to facilitate small-scale investors such as landlords to build workers' housing to attain a good living environment.

2) Challenges of Establishment from a Living Function Perspective

The housing for IP workers are approximately divided into "housing complex for workers" and "privately owned apartments". In establishing a living environment for workers, the existence and content of living functions have a major bearing on the living environment. The tasks to carry out in establishing the living environment are summarized below.

Table 3-18 Tasks on Establishing the Living Environment of IPs Workers

Category	Problems and Issues
Surrounding Site Conditions, Living Environment	■ Housing complex Many living environments for workers are isolated from local communities and societies and most surrounding buildings are undeveloped in suburban areas. In many cases, the housing complex is located next to or near industrial parks and the locational situation is not desirable in terms of habitation. It is important to start planning for integrating a worker's life with the city and villages at the early development stage, and it is necessary to consider the proximity between cities and workers' living area when planning the locations for new development projects. A worker's life can only be well-established when there is sufficient social connection to the surrounding cities and villages.
	■ Privately owned apartments Privately owned apartments are often located inside villages or communities, and the locations establish high connectivity to the society and enhance worker's convenience in accessing their daily needs. However, the apartments are built in a dense city or village

	where they have risks of poor ventilation, low day lighting, low security and weak disaster prevention. Therefore, for privately owned apartments, it is essential to establish regulations or guidance policies toward private apartments for improving their living environment and amenities.
Buildings	■ Housing complex Many housing complexes for workers are high-rise buildings and workers from other regions or provinces often feel uncomfortable with them.（from another perspective, the high-rise buildings can destruct the landscape and give negative impressions to the surrounding communities.） Not many housing complexes consider the locational arrangement with other buildings, the spatial arrangement which people feel comfortable with and relaxing greenery. Therefore, even though when the housing complex for workers is not able to provide the comfortable living environment due to the lack of enough space and high dense area, it is important to provide the comfortable living environment by trying to establish the sufficient building arrangement of mixing mid and low height level buildings and their spaces with green provision and relaxing space.
	■ Privately owned apartment Privately owned apartments are confined and have problems with water related facilities, and are deteriorating. Therefore, there needs deliberation on establishing regulations or guidance policies towards privately owned apartments to improve their building quality.
Amenity Functions and Facilities	■ Housing complex While some industrial parks provide the functional amenities within the area, most industrial parks tend to depend on the amenities from the surrounding cities or villages. Even if amenity functions are established in the housing complex, the options are limited from the worker's side and the low rate of applicability will be an issue. At a majority of housing complexes for workers, shared kitchens are built outside the living room, and yet to enjoy simple meals and tea, it is best for functions and equipment to be positioned within the living room. Amenity functions are essential for ensuring workers living satisfaction and contrivances in management and operation of making it more attractive will be required. The amenities should be allowed or open to more than the residents who live in industrial parks. This can enhance the sense of community by sharing them with people in surrounding areas. Considerations should be made for basic equipment and services such as cooking functions inside the living room.
	■ Privately owned apartments Although privately owned apartments do not have amenity functions, it is often the case that these are supplied inside the village or built-up area to a certain degree. The water related facilities such as shared kitchens and washrooms face low-hygiene issues. Improvement to basic matters such as the provisional fixtures, environment issues (e.g., ventilation, low day lighting), resolving unhygienic equipment, and measures against aging deterioration need to be addressed before establishing amenity functions.
Housing Conditions, Living Rules	■ Housing complex Most housing complexes for workers in industrial parks are built for single residents and not many of them are designed for family-use. Moreover, they are big-shared rooms with a large number of occupants. Therefore, many workers choose to live in privately owned apartments where it is cheaper and less bureaucratic to move in with their families or friends and higher privacy levels. The dormitories owned by the companies who run the industrial parks business have low satisfaction appeal due to strict rules for residents, such as the implementation of curfews. For operating companies, their first priority is on hiring young, productive and cheap labour and it results in the provision of large numbers of single type dormitories.

	Therefore, the operators should consider how to fill the variety of needs that workers have for stable labour provision from local communities and the overall aging population in Vietnam. If dormitories which are managed by a company and prevailing rules similar to those in Japan are introduced at the current stage, people from rural areas may become uncomfortable. The benchmark for living standards shall always be that of their hometown. As a result, they move out of private apartments, because recreations and facilities are meagre. Living environments that induce a sense of isolation should be avoided.
	■ Privately owned apartments No curfew for any residents is useful for residents. However, considerations to crime prevention and safety are necessary.

3) **Challenge from a Management Aspects**

When employee companies manage the dormitory types of accommodation and management services are improved leading to growth in occupancy rates and higher satisfaction than in other management cases. For example, they hire the matrons, setup accommodation rooms for families who visit the residents and provide programs for sports facilities. From the companies' viewpoint, the presence of these facilities contribute to a more secure employment situation.

3.7. Situation of Building for IP Workers

3.7.1. Cases of Housing for IP Workers

During the field survey visit near Hanoi in the north, most IP room layouts follow the same pattern in the dormitories and privately owned apartments. They are designed in the following way: one shared toilet and shower outside and a room without windows but with one vent. The JST observed a limited variety of dwelling unit types that took into account personal requests for better living in the dormitory/apartment. The number of rooms with air conditioning are relatively few, floor to height are generally designed between 3 m ~ 3.6 m relatively higher, so that hot air keeps converging on top of a room, partially. There are single-story privately owned apartments whose floor height is 2.8 m. In the interview with industrial workers, there are two ways to find a room for living; industrial workers themselves may ask about vacancies and rental fees for a room by making phones calls to contacts advertised on walls or through fellow industrial workers. They could also contact dormitories operated by industrial companies they are working for.

(1) **Private Owned Apartment near Thang Long IP II (Hung Yen Province)**

Most private apartments are built within the owners' homes in the existing city, which is located on the east side of National Route 39 highway along Thang Long IP II. Single-story apartments comprise mostly of a brick structure, floor height of 2.7 m - 3.6 m, metal corrugated sheets for roofing, and occasionally designed as concrete tiled roofs for apartments. Most apartments are planned with 100 mm×100 mm ventilation fans instead of windows. Since the level of the building floor is about + 0.1 m above ground level, the outer moisture keeps drifting into the rooms. The size of rooms in apartments have a width of around 2 m - 2.5 m, a height of more than 3.2 m and floor area of more than 8m² space. Although industrial workers would share a single room in an apartment, the size of the shared room became quite small for two people. Most industrial workers who follow a shift system might find this case better for their life style. The structures that are more than 2-stories utilize a framing plan that consists of a reinforced concrete (hereinafter referred to as "RC") structure and brick walls as the façade (skin). If the building were to be one-story, it would be unnecessary to use a RC structure but rather a brick one. In some cases, industrial workers prefer to stay in a boarding house that is cheaper than privately owned apartments. While rent of a private apartment is more than 1 million VND per a month, the rent of a boarding house is 0.52 million

VND per a month cheaper, despite the fact that industrial workers share a room in privately owned apartments. In many cases, industrial workers rent boarding houses where a TV, kitchen, shower and toilet shared. New private apartments are also being built near the IPs, rather than building apartments in premises of private houses as it has been until recent. New private sites have been observed constructing 2-3 apartments to cater for 18 households.

There were many privately run apartments in Thang Long IP I. Since they were built in areas of high population density, most of the houses have limited ventilation and daylight. The buildings along the main street have established shops facing the streets with workers houses lined at the back.

Source: JST

Figure 3-16 Apartment in Private House Premises

Source: JST

Figure 3-17 New Apartments nearby Thang Long IP II

(2) **Corporation Dormitory in Phuc Dien IP (Hai Duong Province)**

The Japanese B Corporation factory plans to construct four 5-story buildings consisting of a RC structure on their factory premises. The second and third floors are designed as common facilities. Only one building is designed for dining and meeting rooms for industrial workers. The style of roof is flat. The floor to ceiling height on the first floor is about 4.3 m as relatively higher than normal. It is designed as a motorcycle and bicycle parking space, designed not only for dormitory residents but also for industrial workers anticipated to use motorcycles and bicycles. The floor height of 2nd -5th floor would be about 3.6 m. The size of a room would be about 2.5 m by 4 m. A balcony of about 1 m will result in a 10 m² floor area. The blind steel louvers for concealing laundry are to be located on the balcony. This may be considered from both a design aesthetic and thermal barrier shield perspective. The windows of dormitory rooms have a sliding mechanism. The window is partly a single casement. The dormitory will have rooms on both east and west sides allowing for a middle corridor. The staircase will be located on the gable side of the building. Since the dormitories are to be located in the factory, a number of CCTVs as security cameras will be installed.

(3) **Corporation Dormitory in Yen Phong IP (Bac Ninh Province)**

The Korean S Corporation factory plans to construct eight 6-story buildings consisting of a RC structure on their factory premises. The first floor shall accommodate common facilities in all buildings consisting of dining rooms and meeting rooms for industrial workers and will be an air-conditioned space. A flat roof will be used. The floor to ceiling height on the first floor is about 3.4 m, and the floor to ceiling height on the second floor-6th floor as typically about 3.0 m. The size of a room would be about 2.5 m by 4 m. A balcony of about 1m will result in a 10 m² floor area. The blind steel louvers for concealing laundry will be placed on the side of a balcony, leaving a clearance between the steel lovers of about 250 mm. This is insufficient room to act as an evacuation route. The windows of dormitory rooms are the sliding type. Although the room area in

each building will be similar, there will be changes in the position of staircases, toilet-bath room and exterior colours. Each building's façade will appear different. Instead of relying on a reliable security system, one security guard for each side on the site has also been deployed in addition to CCTV monitoring. The motorcycle and bicycle parking located on the first floor is covered by shelters under the balcony's slab. Far from predicting the numbers of motorcycle and bicycles to accommodate, the parking is primarily for dormitory residents.

(4) **Hanoi Social Housing near Thang Long I IP (Ha Noi City)**

The Hanoi housing development public corporation manages social housing near Thang Long I IP applies two kinds of leasing systems. One of the leasing systems shall be leasing rooms to public corporations, and the other shall be leasing rooms to private corporations as sub-leasers who will lease the whole building/parts of a building for the establishment of dormitories for a certain period. Hanoi social housing is designed as seventeen 5-story buildings, in which stores/restaurants and common spaces occupy the 1st floor. Japanese C Corporation has been leasing common space as meeting rooms and multi-purpose halls from Hanoi housing development public corporation. As construction for four 15-story high-rise buildings was completed for low-income families 2 years ago, industrial workers with families can live in high-rise apartments. 5-story social housing is designed as a four people shared room type, six people shared room and sixteen people shared room as well. About 30 m² to about 100 m² for room floor area is provided. 30 m² room of a dwelling unit area would have a width of about 3.5 m, the length of about 8.0m. The depth of balcony is about 1 m. A pair of casement windows is positioned between the room and balcony. The window is large enough for one to access the balcony. Part of the windows slide. The capacity of building fully leased from Hanoi housing development public corporation accommodates 350 people in 50 rooms. The size of columns are 400×400 mm, the grid span for the structural frame is 3.5 m×8 m, partially 3.5 m×4.5 m about 3.7 m for floor to ceiling height on the 1st floor. About 3.3 m is the typical floor to ceiling height. The effective corridor width is 2.1 m. The depth of girders/beams is ranges from 500 mm to 900 mm. The balcony cantilevers for 1m, and supports the outdoor air-conditioning units. In some cases, the outdoor AC unit is mounted against the exterior by brackets. The manner of installing outdoor AC unit would depend on individual rooms in social housing. Since the sleeves for air conditioning were not allowed for, the AC conduit could not be installed after construction. In the women's dormitory, there are six washing basins. There are 8 flush toilet units and 10 shower booths are yet to be fitted. The corporation dormitory will contain a multi-room of 150 m² that is to be leased from Hanoi housing development public corporation. The multi-room could potentially be used for club-activities and a meeting room for dormitory residents. Karaoke-room whose area is about 20 m² will be incorporated on a typical floor.

(5) **Corporation Dormitory near Kim Hoa IP (Vinh Phuc Province)**

The corporation dormitory of Japanese H Company is located near Kim Hoa IP. If there is no elevator in a building, the rental fee for dormitories on the upper floors would be much cheaper. The dormitory that was built in 2011, is stained with dirt on the exterior wall, the paint is peeling off and pipes are clogging, yet it does not seem like 4 years have passed. One of four 6-story buildings is for the women's dormitory. The dormitory was planned to contain 300 rooms for 6 people sharing a room and has a design capacity of 1800 people. It is currently occupied by 800-900 people. There are barbershops, shops, cafeteria, computer room, a library corner, dining room, a volleyball court (outdoor), conference room, Karaoke Dance hall (approximately 200 m²) on the 1st floor. The dormitory is arrayed with a set of awning and fixed windows. The windows for staircases, common spaces, toilets, and bathrooms are fitted with fixed windows. Each room area of the dormitory is about 34 m² for 6 people to share a room. All rooms, which have a width of about 5 m and length of about 6.8 m, are furnished with 3 bunk beds with individual closets. The floor to ceiling height of the 1st floor is about 5.3 m, and the floor level of the 1st floor is +500 mm above the ground. The

room height of a typical floor is about 3.5 m, and the depth of beams is 500 mm. The effective width of the corridor in the centre is about 3 m. The south facing building among the dormitory buildings is designed for the outer corridor facing on the outside. The common facilities/toilets/bathrooms are located in the central portion of the building while facing the courtyard (to inside). There are single units containing 3 washing basins, 2 flush toilets, 2 urinals, 2 washing machines, and 2 shower booths as bathrooms. Two toilet/bathroom units for any given building are planned for. The building structure of the dormitory is RC and is based on a combination of about 5.0 m × 5.0 m span grids. Each room, which is fitted with two fluorescent lights, one ceiling fan and one TV unit. No air conditioning is available for residents. The dining room is fitted with air conditioning.

Source: JST

Figure 3-18 The Dormitory Room

Source: JST

Figure 3-19 Canteen in the Dormitory

(6) **Social Housing Sales for Low-Income Earners by Private Developers near Kim Hoa IP (Vinh Phuc Province)**

The social housing by a private development company called "TRANG DAT TOWER" is for low-income people and is in the development process close to Kim Hoa IP. The project consists of one 14-story building and low-rise row-housings. The 14-story building has a planned basement for motorcycle and bicycle parking lots. The high-rise apartment currently has a 60 % occupancy ratio, the low-rise row housing are yet to be construction. The occupancy rate for 2 Living-Dining-Kitchen (hereinafter referred to as "LDK") is better than 1LDK. Probably, the total number of units is about 80. The floor area for 2LDK (2 room+ living room+ dining room+ kitchen) + 2WC is about 70 m² from 2nd to 11th floor, and the floor area of 1LDK is about 36.5 m² from the 12th floor to 13th floor. The sales price to households of social housing ranges from about 270 million VND to 580 million VND. The floor to ceiling height for the first floor is 4.5 m. The first floor level is +1000 mm above the ground level. The floor to floor height of a typical building is more than 3.2 m, the depth of beams is 500 mm, and the ceiling height is 2.7 m. The effective width of common corridor is about 2.1 m and the thickness of the wall is more than 220 mm. The first floor will house conference rooms for residents and shops.

Source: JST

Figure 3-20 Apartments for Low-Income People

Source: JST

Figure 3-21 Housing Layout Design in Apartment

(7) **Housings and Dormitory near Dai An IP (Hai Duong Province)**

The residential zone is to be located on the east side of Dai An IP in the original master plan. There are three types of Villas as housing for expatriates, 4-story row buildings for manager-class workers and dormitory for industrial workers. Although one dormitory built by the IP development company would not function well as a dormitory, the room was converted to a family type and renovated by waterproofing and exterior wall painting. Even if industrial workers were not going to live in the dormitory, the IP development company would sell the dormitory to other housing operator.

The three-story Villas for expatriates is a RC structure with brick walls and has a floor area of about 300 or more than 450 m². It comprises 3LDK with 2 bathrooms, concrete roof tiles and furnished basically with air-conditioning. The floor to floor height for the basement is about 2.8 m, 3.3 m for the 1st floor, and 3 m for 2nd /3rd floor.

Housing for manager-class workers, which are planned four-story row housing with a RC structure, probably targets foreigners. The managers would be sharing rooms and the floor area of row housing is about 130 m². The row housing will have provision for car garages on the 1st floor. The 1st floor height is about 4.0 m and about 2.0 m for the basement. The second and fourth floors are about 3.6 m .Concrete roof tiles cover the building and rooms contain furniture and air-conditioning.

For low-income staff dormitories is consisting of 20 rooms with areas of 88-122 m² for 4-6 people sharing. Although the master plan was designed for nine buildings expected to function as a dormitory for low-income earners, it stalled at one building only because it was discovered that it would not be popular with low-income industrial workers. Safe parking lots are available and a 24-hours security service in the dormitory is active. The dormitory is a RC structure, which has approximately a 4.0 m height between the ground and first floors, about 3.0 m for the second to fifth floors and a flat roof to which asphalt waterproofing is applied.

Source: JST

Figure 3-22 Apartment for Foreign Manager Class

Source: JST

Figure 3-23 Dormitory as Converted Family Types

(8) **The Privately-Run Apartment around Dong Van II IP (Ha Nam Province)**

There are many private apartment houses around Dong Van II IP. Interviews were conducted with two families who live in there.

1) **A Residential Area Located on the South of IP**

This area was prepared as a housing site and land plotting was done. Some buildings are complete and some others are still under construction. There were not only apartments but also detached houses with shops. The interview was conducted with a family of five who live in a 1-storey housing complex (total: 5 units).

This house was built recently and is still new and clean. The shed roof was made of steel corrugated panels. The area was small, approximately 9 m² (3.5 m x 2.5 m) but the floor height was 3.8 m rather high, and it had loft space which was being utilized effectively. The unit is fitted with a kitchen, toilet, and shower. The floor was tiled, and the ceiling had thermal insulation indicating good living conditions compared to other workers' housing in the region. There is no glass on the window, only shutters and iron burglar proofs. Although the interview was conducted around 12 pm, most shutters were closed. Based on the interviews, the air considered polluted outside and thus, they do not consider obtaining ventilation.

The resident of this house is a short-term worker on the construction site who receives a higher salary compared to a factory worker. The standard of this house seems to be higher than that of an ordinary factory worker.

Source: JST

Figure 3-24 Social Housing (Outside)

Source: JST

Figure 3-25 Social Housing (Inside)

2) **The Town Adjacent to the Southeastern Part of the IP**

There is a residential area surrounded by IPs. Another interview was conducted at one of the housings for workers.

It was a single-story housing complex for workers, with a total of 3 units, which recently constructed by the landlord within the same site as his residence. The shed roof was made of steel corrugated panels. The housing area was around 8 m² (3 m x 2.5 m) and the floor to ceiling height was 2.6 m. Each unit has a toilet and shower.

Although there was no window, the entrance was quite big and should be able to provide enough sunlight when opened.

(9) **The Privately-Run Apartment around Noi Bai IP (Ha Noi City)**

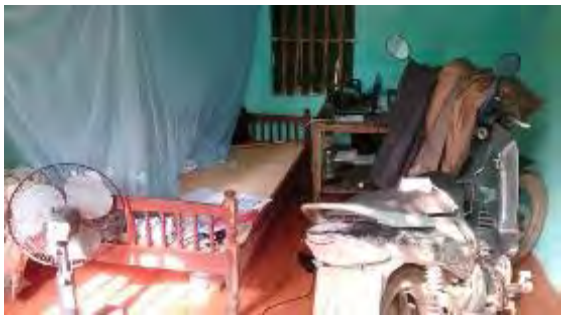
An area called Xuan Bach Commune located 200 m northwest from Noi Bai IP was likewise surveyed. There are a number of private apartments scattered across the village over a relatively large site area. The interview was conducted with occupants of one of the houses.

The layout consists of groups of 3-single-story houses surrounding a central-courtyard, with 15 houses. The shed roof was made of steel corrugated panels, and the floor to ceiling height was about 2.5 m. The room was small, only about 6 m^2 (2.5 m x 2.5 m) with one resident. In addition to the entrance, there were also 2 windows, each of which had ventilation passages. The toilets and shower room were being shared.

Because the building density is low, and there were many courtyards, 2-sided day lighting and ventilation can be expected for attaining a comfortable living environment.

Source: JST

Figure 3-26 Inner Court



Source: JST

Figure 3-27 Social Housing (Inside)

(10) **High-Rise Social Housings near Thang Long IP I (Ha Noi City)**

There are four buildings of 15-stories housing in the social housing complex in the vicinity of the Thang Long IP I. High-rise social housing are comprised of two buildings for families of industrial workers and two other buildings for single industrial workers. In 2013, the buildings had been completed except for the interior and later spent two years finishing interior works including MEP works. Targeting 8 households (dwelling units) on each floor in 4 buildings, it was set up in such a way that the common-use facilities are on the 1st floor in each building and households from 2nd floor to 15th floor. Motorcycle parking lots are located on the first basement floor. There are two housing types 59 m² and 53 m² for family housing while housings for singles are 53 m² for 8 people sharing a room and 49 m² for 6 people sharing. It contains two elevators and two evacuation staircases. The floor to floor height of each typical floor is 3.1 m and the ceiling height is 2.5 m. Since there is a demand for social housings, it has become popular to live independently because rent is cheaper. A notification is issued of the rentals available to the factory within the Thang Long IP II then residents who wish to occupy would submit the required documentation, such as employment contracts from their factories and present income certificates. Therefore, it would be likened to a lottery when prospective residents apply to many social housing options. It is expected that the development plan, envisages incorporation of a public park and kindergartens in the vicinity of housing complexes under the Hanoi private and public collaboration.

There is a plan to renovate housings for single to family housings in low-rise buildings that currently vacant. The rent for low-rise housings is 120,000 VND per month for one resident. The rents for high-rise apartments are yet to be decided.

(11) **Row Housing for Industrial Worker near Tan Huong IP (Tien Giang Province)**

In the periphery of Tan Huong IP in Tien Giang province, since there is no large employee-dormitory near the IP, individual local landowners have already built row housing for industrial workers. Most row housing for industrial workers are single-story buildings, so it is unusual to find 2-story row-housing in the region. Since low-housing is categorized as single-story buildings, the building is mostly composed of a brick wall structure and metallic roofs to fulfil the specification. Some local landowners built single-story apartments on land lots of about 2000 m², therefore, landowners rent out rooms to industrial workers. After investigating another land lot along the alley in town around the IP, other local landowners had already built and had been constructed the same as single-story row housings in from three to four different land lots. The building is planned to contain16 rooms, that is to say, 8 rooms on the northern side and 8 rooms on the southern side. The roof, on the other hand, is clad with metal roofing. The building height is more than 3.6 m, the width of each room is about 3.0 m, the length of each room is about 4.5 m, there is a loft occupying about 4 m², and the size of each room is about 17.5 m².

(12) **Industrial Worker's Dormitory near Long Hau IP (Long An Province)**

Long Hau IP is located 30 minutes south of HCMC. IPC (Tan Thuan Promotion Company) belongs to the HCMC People's Committee. The land occupying 80 ha targets IPs of medium-size, there are four buildings for employee housing/dormitory that are 5-story. In the IP complex, a hospital, fire station, convenience store, supermarket, kindergarten, bank, sports facilities, post office and security office are available.

The buildings were designed with a family housing zone on the western side, housing for singles on the eastern side and the size of rooms is about 35-40 m². The building consists of 70 % rooms for single people, 25 % rooms for families and 5 % rooms for foreign staff which are to be air-conditioned. The typical room is designed with perforated blocks on the exterior wall of the kitchen which allow for natural ventilation. The residential land lots will have trees which will keep the rooms cool.

The size /layout of households/rooms for family and single people are almost similar to each other. A toilet and shower booth are included in 1K rooms while there are closets in only the family type housing The single type is designed with two toilets and two shower booths. The floor height is about 3.6 m, the level of 1st floor was planned at 1.2 m from GL. On the semi-basement floor, there is the motorcycle shelter, where one is charged 50,000 VND/month per a motorcycle.

(13) **Industrial Worker's Dormitory in Ascendas Protrade Singapore Tech Park (Binh Duong Province)**

At a distance of 80 km from HCMC lies the Ascendas Protrade Singapore Tech Park in Binh Duong province. The IP's dormitory lies in the central zone of the park. One dormitory has been completed so far on a 1 ha plot and other projects for dormitories remain undecided. There is a biometric authentication system at the gate, which offers 24-hour security management to entrance/exist of residents. Ascends has overseas experience and this security measure may have been successful elsewhere. There is a canteen serving residents and other industrial workers as well. A Singapore management-company known as Habit Management Company manages the dormitory. The building has eight rooms on the northern side and 8 rooms on the south. The building height is about 6.2 m. It is this high because there are PS spaces for each dwelling unit in the corridor, and natural lighting to the hallway flows from a skylight that is able to act as a window. The area of each room is about 35 m², and each room is 4.5 m in width and 7 m in length. The ceiling height is about 2.6 m. The area of terrace is about 3 m², where a set up for a washing machine yard and drying clothes would be located. The roof will consist of cement panels on a gable roof. According to a dormitory manager/caretaker, the construction cost for this dormitory is approximately 4.5 million VND/m², which is the same unit cost for low-rise housing with a RC structure and RC roof. The MOC investment unit cost falls within the same range.

(14) **Industrial Worker's Housings near My Phuc Industrial I, II & III (Binh Duong Province)**

My Phuc IP is located in the central zone of Binh Doung province, and would be an extension of phase I to IV IP.

Low-rise and medium-rise housing, that are located near My Phuc IP, were planned along the national road 13. After many industrial workers finish to work in the factory, workers walk along the road to go back home, that is designed as a 2-story row housing located close to the IP in town. There is also a shuttle bus which picks-up/drops-off industrial workers to their towns/communes. Around the My Phuc IP I, many buildings have been planned such ad shops and restaurants on the first floor, and industrial workers housing on the second floor. There are entranceways about 2 m in width between each shop there are plans to increase to 5 m width.

(15) **Industrial Workers Housing near Vinh Loc IP (HCMC)**

There is a social housing complex that HEPZA supports/supervises in HCMC. They are planned as apartments for both family housing (10-story building) and two buildings of 9-story for housing singles. A super market is located on the first floor of the family housing apartment with the ceiling height of 2.6 m, the second floor space is occupied by tenant recruitment while the super market rents.

The first floor area occupied by the super market is about 480 m², the 2nd floor area is facing a void that is about 200 m². All main entrances of the apartment are located on the south side, and two entrances have been planned for. Each household has been provided with 66 m² that includes 2DK + 2 shower booths. Each household's layout is typically designed around 8.8 m width by about 7.5 m length. The occupancy for housings is relatively higher at 90 %.The floor height for a typical floor is about 2.8 m. Family housing is designed for 88 households in the building. All buildings are designed to have two elevators. Water reservoir and firefighting water tanks are planned to lie underneath the volleyball court in the central square of housing complex. The manager rooms and motorcycle parking lots shall occupy the first floor in housings for singles. The area of each room for single people is about 37 m² and smaller than that for family housing that could be shared by six singles. Since the housing for singles are designed for 128 factory owners, two buildings whose total is 256 occupants are planned for. A unit is equipped with 1K + toilet/shower booth, 6.0 m width, 6.3 m length, and the floor height of a typical floor is 3.1 m.

The housing complex is located 500m away from a hospital location and 3,500 m away from an elementary school.

Source: JST

Figure 3-28 Volleyball Court in Courtyard

Source: JST

Figure 3-29 Motorcycle Parking

(16) **Industrial Worker's Dormitory near Long Thanh IP (Dong Nai Province)**

The workers' dormitory belonging to Japanese O's company is located in Long Thanh IP, Dong Nai province. Japanese O's company has rented one building plus one additional floor of other building from an IP developer in Long Thanh IP. Japanese O's company is renting at 1.3 million VND/person × 5 people resulting in 6.5 million VND a month for one room. Currently, 450 female industrial workers are living in the dormitory. The company has been renting a dormitory since 2010 and has provided the accommodation to its employees for free. There are 16 rooms on each floor indicating that five industrial workers could share one room that is 36 m^2. Cooking in the rooms is prohibited, although boiling water using an electric kettle is allowed for a meal of Ramen noodles. There are mini-shops, a multi-purpose room, and an event space on the 1st floor. The multi-purpose room used to be a canteen that was unpopular in the past.

(17) **Industrial Worker's Dormitory near Phuoc Dong IP (Tay Ninh Province)**

There is a dormitory which is under the supervision of TANIZA (Tay Ninh Province Economic Zone Authority within Phuoc Dong IP in Tay Ninh Province. Each factory may be able to bear the rent for dormitories. There are worker dormitories of different types that are managed by each factory in the IP. Eight buildings will function as dormitories and canteen/multipurpose halls. All rooms in dormitories are equipped with air conditioning. One basketball and one volleyball court will lie near the dormitories. Since the dormitories are located in the IP, there are no commercial facilities and restaurants close by. These facilities, are more than 3 ~ 4 km away from the city.

Source: JST

Figure 3-30 Worker's Dormitory

Source: JST

Figure 3-31 Canteen

Conclusion of the Case Study

At the dormitories, the occupancy rates are generally low because there is increasing rental fees, imposing curfew restriction, minimal visits from workers' relatives and cooking prohibitions.

During the investigation, an increasing demand for family housings was noted. The JST also suggest provision of family housing settings as much as possible. On the other hand the, standard design plan by VIAr in Annex 3 is similar to a dormitory layout in the Long Thanh Industrial Park. Some standard model plans are referred to as the benchmark for social housing in the Industrial Park.

Table 3-19 Summary of Building Analysis

IP Name	Type of Building	Building Stories	Room Area	Number of Room	Capacity of People per One Room	Ceiling Height	Common Use Facilities
1)Thang Long II	Privately owned apartment	1FL-3FL	> 8 m²	5-30 rooms	2<	2.7-3.6 m	Shower and toilet
2)Phuc Dien	Dormitory	5FL	10 m²	-	-	3.4 m	Canteen, shower and toilet
3) Yen Phong	Dormitory	6FL	-	-	-	3.0 m	-
4)Thang Long I	Low rise Dormitory	5FL	30-100 m²	50rooms per a building	6-8	3.1 m	Multi-purpose room, Karaoke room, shower, toilet, washing machine, and kindergarten
Thang Long I	High rise family Dormitory	15FL	-	-	-	-	-
5)Kim Hoa	Dormitory	6FL	34 m²	300 rooms	6	3.5 m	Canteen, Multi-purpose room, TV lounge barbershop, shower, toilet and washing machine
6)Kim Hoa	Social housing for low-income	13FL	36-70 m²	112 households	2-4	3.2 m	Multi-purpose room, manager room and motorcycle parking lots
7)Dai An	Housing for experts	3FL	300-450 m²	-	> 4	3.3 m	2 Bathrooms, toilet and washing machine
Dai An	Housing for manager-class	4FL	130 m²	7 households	> 4	3.6 m	Shower, toilet and washing machine
Dai An	Dormitory	5FL	88-122 m²	20 rooms	4-6	3.0 m	-
10) Thang Long I	High-rise Social housing	15 FL	59/53 m²	112households	4-8	2.5 m	Manager rooms, toilet, shower, multipurpose rooms, shop
11)Tan Huong	Private row housing	1-2 FL	17 m² ~	64rooms	2	3.6 m	Kitchen, toilet, shower, shop
12)Long Hau	Private	5FL	35-40 m²	128households	4	3.6 m	Kitchen, toilet, shower, nursery rooms
13)Ascendas Protrade Singapore Tech Park	Private Dormitory	1 FL	35 m²	16 rooms	4	2.6 m	Toilet, shower, Landry space, communal canteen, ATM
14) My Phuc	Private Apartments	2FL	-	-	-	-	-
15)Vinh Loc	Medium-rise social housing	9-10 FL	66 m²	88households	4	3.1 m	Toilet, shower, kitchen, washing machine space, supermarket, manager rooms
16) Long Thanh	Private Dormitory	5FL	36 m²	76rooms	5	-	Meeting rooms, TV rooms, mini shop, communal toilet, communal shower
17) Phuoc Dong	Private Dormitory	5FL	-	-	-	-	Communal canteen, sports facilities

3.7.2. Housing Issues for IP Workers

Social housing for industrial workers is divided into two types based on a building scale. One is small-scale housing in which tens of staff live in at most and are managed by a sole proprietor. Another is large-scale housing in which hundreds to few a thousand people live and are managed by an IP operator, factory owner, or local government. A living environment problem is common in small-scale housing. Poor architectural designs are frequent in large-scale housing although their living environment condition is good. Challenges in each housing type are shown in the table below.

Table 3-20 Confirmed Problems in Social Housing for Industrial Workers

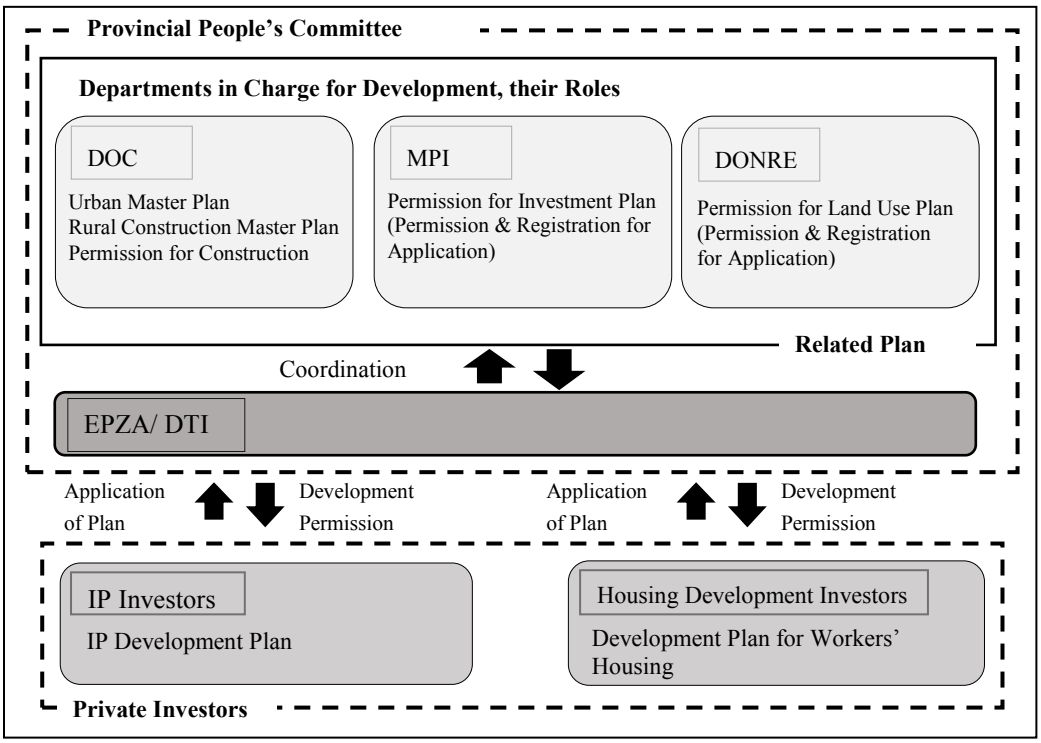
Housing Scale	Problems
Housing Managed by Sole Proprietor /Small Scale Housing	Humidity levels can be high since the height of 1st floor levels are not so high to allow for proper ventilation.
	Air ventilation is low due to an insufficient number of ventilation openings.
	The number of inhabitants is too many compared to the room areas in cases of shared rooms.
	Wet areas such as kitchens, bathrooms and toilets are adequate for a dwelling unit.
	Since the housing is located in an existing housing estate, housing spacing is too close and the daylight and ventilation condition are poor.
	Due to insufficient storage space, inhabitants are unable to store their belongings in a shared room.
	There is an absence of a security system in most housings
Housing Managed by IP Operator, Factory Owner or Local Government /Large Scale Housing	There is a lack of choice for singles that share rooms, especially six to eight people.
	The number of family units is inadequate.
	In circumstances where an IP is located far from town, housing next to IPs lack common conveniences and are worse than other set ups.
	The brick partition wall makes it is difficult to remodel housing layouts in future.
	Curfews and restrictive rules are an inconvenience.

3.8. Business Model of Housing Development for IP Workers

3.8.1. Stakeholders and their Roles in Housing Development

(1) Department of License Related to the Industrial Worker Housing and IP Development

Relating departments for licensing the construction of SH for industrial workers and establishment of IPs, and its roles are shown in the figure below.



Source: JST

Figure 3-32 Relating Departments of Licensing IP Workers' Housing and Establishment of IP

Under the administration of the PPC, DPI is responsible for IP and IP Workers'SH investments while the land use permit is under the DONRE jurisdiction in coordination with the respective Urban or Rural Construction Master Plans and development permits which are under the DOC jurisdiction. For the business implementaiton, construction permits are governed by DOC. Furthermore, development offers by IP investments including their factory owners FDI are mostly handled by EPZA/DTI or equivalent local authority in close coordination with PPC executives. IP master plans which cover both IP and IP Workers' SH is mainly handled by EPZA/DTI. while the Urban Plan or the Rural Construction Master Plan administers a framework of the IP within the wider spatial context including SH outside the IP boundary.

The level of coordination among the PPC and the responsible authorities under the PPC differs significantly from province to province. As the integration of IP Workers' SH plan into IP development becomes popular among provinces, owing to the efforts of the Government by promulgations on an integrating system, coordinations among the above mentioned authorities seem to be improving.

(2) Three Classifications of Private Sector Owners Providing SH for Workers

The following figure indicates that there are three types of stakeholders investing the IP Workers' SH projects. First, one is ordinary housing development owners such as real estate developer, small-scale housing owners and so on. Second, one is the IP owner/management entities and third one is factory owners (IP factory owners).

Table 3-21 Classification of Owners of Social Housing for Workers

Operator	Distinction
1. Real Estate Developers	- Bridge the gap of income issues in the housing business for workers and obtain profit.
2. IP Owners	- They supply housing services from the viewpoint of whole business development balance even if it is a loss-making business. The aim nevertheless, is to get some margins. -There is a possibility of supporting urban infrastructure development.
3. Factory Owners	- As a facility for its own workers, it may not achieve profitability. - There are some cases in which support is contributed to facility construction and operating costs.

The first and the second stakehoders basically consider the IP Workers' SH as an economic productivity tool. The third category are able to function as operators beyond their obligation to financially support the SH projects, which they take as an opportunity for their employees' welfare satisfaction and thus non-profit making in nature.

While social and urban infrastructure development is actually through constructuion support from IP investors, this development is the responsibility of the PPC/Public sector. Therefore, infrastructure development costs are conceptually offset by the incorporation of land use fees in IPs. In addition, with some pre-conditions, the tenant companies are obliged to financially support to housing development by the Decree No. 100.

3.8.2. Housing Development Business Models in Vietnam

In Vietnam IP development investment, one is duty bound to provide the necessary social housing IP workers. The current development patterns for social housing are categorized in following three ways.

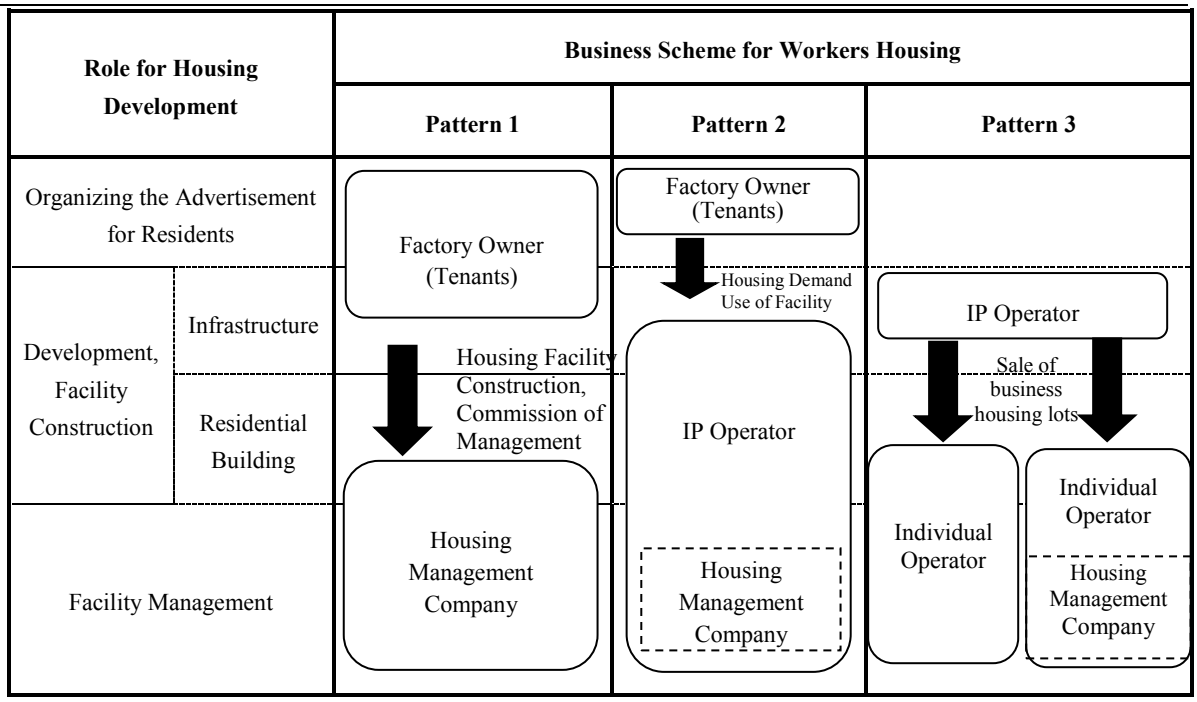
(1) Workers' housing development by production companies for own workers.

(2) Workers' housing development by IP operators.

(3) Workers' housing development by the third parties except IP operators/companies in the vicinity area.

The above mentioned patterns possess both advantages and disadvantages. In reality, development patterns are not exclusive. Since the selection of the workers' housing development patterns are dependent on the existing condition and intervening measures, it is difficult to assess the preferable patterns for the particular settings.

Characteristics of the above three patterns are shown in the proceeding figure.



Source: JST

Figure 3-33 Business Model of Workers' Housing Development

(1) **Workers' Housing Development by Production Companies for Their Own Workers**

This pattern's housing developments are mostly conducted in spaces within the IP and near the production bases. In cases where that the locations are outside the IP sites, they are managed by an enclosure setting from the surroundings. This pattern of the workers' housing development is the most common except for the rent rooms.

Such housing development is indispensable for IP development in locations where they are far from the existing residential build-ups. The facilities are in good condition and decently equipped with a low burden to the dwellers due to ample expenses being met by the firms as part of their welfare expenditures to the employees. These dwelling facilities are quite advantageous for new comers to the areas.

The dwelling facilities tend to be primarily for IP workers, with mainly single status, from distant places looking for employment. The facility and controls are based on the business management, however, are too stringent for the workers and portray a working environment.

Consequently, occupancy levels of these facilities are destined to become low as the surrounding areas develop housing facilities. Furthermore, it could also lead to a high tendency of job-hopping.

Recently this style is common among large-scale IP developments in rather remote areas. On the other hand, there are noticeable unused the housing sites prepared in IPs[9]. If it is the prior case, some IPs prepare the housing in neighboring site by spatial coordination.

(2) **Workers' Housing Development by IP Operators**

This style of workers' housing development is located within or adjacent to the IP sites. There are several housing developments with this style in HCMC. They were developed exclusively for the

[9] There is unused dormitory with 1,000 people capacity in Thuan Dao Industrial Park in Long An Province.

respective IPs at the beginning. They are now open to all kinds of industrial workers such that they obtain more dwellers and become focal places for the surrounding residential areas by accommodating common commercial and public facilities like supermarket and kindergarten.

This style of workers' housing development is unique. It seems the sustainability of the housing facilities as a part of the IP operation are burdensome for the IP operators while producing firms are able to meet the housing as a cost center. For the IP operators, the housing has to be a commercially viable business, which is usually difficult for an IP workers' housing scheme. It might be feasible in case the surrounding precinct has a sufficient number of dwellers where the housing schemes can be open to the public.

(3) **Workers' Housing Development by Third Parties except IP Operators/Companies in IP Vicinities**

This style of housing developments can be observed in the HCMC metropolitan area. The areas for housing development sites are prepared adjacent to the IP. The sites are provided to the private entities for constructing rental room housings that are low-rise buildings to spur residential accumulation.

Adjacent areas to the My Phuoc No. 1 and No. 2 IPs have been developed as residential areas mainly consisting of low-rise buildings with front shops and the rear rental rooms. These types of planned developments are quite successful in formulating vivid residential oriented towns. A combination of this type of development and the factory owner type stated in (1), is becoming popular in the Hanoi metropolitan area.

It has to be noted that this type of housing site must be located outside the IP which has to be treated as a residential district formulation. It, however, requires, a certain time span as can be typically observed in the case of Kim Chun district in Hanoi in association with Thang Long IP I. Consideration and appropriate measures for short/ medium/ long terms to minimize negative aspects must be made.

Additionally, quality assurance measures for the low-rise buildings which are the majority of structures of the district formulation are essential.

There are several cases where allocated residential sites adjacent to the IPs are untouched and/ or construction has come to a halt. It seems that the IP workers' additional residential needs are being met by satisfactory accommodation supply in the surrounding areas. The slow increase in number of factories in IPs may be due to the aforementioned.

They include the housings planned and constructed without proper preparations such advertisements for residents or managements because some IP operators after 2009 just followed to fill the housing provision requirement. This case develops housing lands without having a responsible operator who works on "advertisements for residents or managements".

3.8.3. Case of Coordinating Implementation of SH Project

Although there might have been plenty cases of coordinated implementation by government-IP owner/ tenant for industrial workers' housing supply projects with new IP development, there seems to be significant differences in degree of coordination and project materialization. Followings are the examples of coordinated development for industrial workers' housing supply projects by IP owner/tenant with new IP development, and district spatial planning by local government.

- Examples of urban planning and Integration such as Bac Ninh Province and Vietnam - Singapore IP: Coordination with surrounding IP developments close to the highways and residential areas along national roads as proceeding developments parallel to new highways and national roads.
- Thai Nguyen Industrial Park (coordinating with local community housing land and new town areas): Within the IP in Thai Ngyuten Province, IP in Thai Ngyuten province, a large scale company is to provide large-scale worker housing for singles and the new town layout preparation is ongoing by local community. Moreover, the commercial and housing developments have been processed. (Some are already occupied).
- An example of new provincial capital development and surrounding industrial parks in Binh Duong Province: There is a vast city development ongoing that includes worker housing within the existing industrial park and IP development in a surrounding green field area for a new provincial capital.

3.9. Affordable Housing Costs for Residence for Industrial Park Workers

3.9.1. Results of the Interview Survey of the Living Condition

The outline of the questionnaire survey (conducted in May to June in 2015) is summarized in the following section. Detailed survey results are shown on the Annex 4 while the summary is shown in the following.

(1) **Outline of the Survey**

The survey is supplementary and was implemented based on the results of a questionnaire survey conducted in 2010 under the Study on living environment around IP in Vietnam, by JICA. The survey is aimed at grasping the latest working and changes in living conditions. Results will be utilized for preparing housing facility supply plans.

Question items are intended to obtain the perception of current circumstances, the rationale in the selection of houses. Architectural and project plans will be informed through the results and effective approaches to improvement.

1) **Question Items and Contents**

The interview survey included categories like those shown beneath.

Table 3-22 Question Items and Contents

Survey Items	Question Items	Outputs to be utilized
Personal Information	Sex, Age, Marital Status, Education background, Distance from hometown (time basis)	
Working Conditions	Working period in the IP, Experience in job change and reasons for working in factories.	Workers Consciousness, Setting target workers
Living Environment	Living period in the current commune, Current housing style, Public utilities, current housing style, Most insufficient housing condition, **Most satisfactory living condition for the area, Public Space and facilities to be accessed frequently, Most insufficient living condition in the area**, Commuting measures (Transportation), Commuting time, **Experience on change of house and room area (reason)**	Housing Improvement Proposing urban environment development Preparing conducive spatial plans Proposing operation systems of housing
Economic Condition	Average monthly income, monthly rental fee, assistance for housing from the company(if any, price), free time, Way to spend leisure time	Project Plan (Monthly payment) required for public facilities and urban functions
Future Life Plan	Desirable career path, willingness to work as an industrial worker, willingness to stay in the area and reason why,	Setting targets for workers housing Housing improvement and development
Additional Information	**(Workers living in the same house) Reason for staying in the same residential facility, Major changes in the circumstances,** **(Workers with job changing career) Reason for changing job** **(long distance commuter) Reasons to select current housing**	Fostering attractive urban environment Forming pleasant housing facilities

* Additional items for the survey conducted in 2010 are underlined and bold

Source: JST

2) **Survey Method**

a. Sampling and Implementation of the Survey

Initially, the resident companies in Thang Long IP II were selected, thereafter an assessment of workers status which included number, gender, and address was made.

A total number of 60 was aimed at, a half of the respondents were selected from Nghia Hiep and Lieu Xa Commune which is located around the Thang Long IP II for comparing with the questionnaire survey results conducted in 2010. The rest of the half was selected randomly. Numbers by area are shown in the following table.

Table 3-23 Survey Sampling

Sampling Area	Male	Female	Total	Ratio (%)
Lieu Xa and Nghia Hiep	24	39	63	53.9
Outside of the Area	23	31	54	46.1
Total	47	70	117	100.0

Source: JST

b. Metrology

Questionnaire surveys were conducted at the premises of each tenant company. Workers are sampled by calls from the study team. A survey questionnaire is prepared prior to the exercise.

Questionnaire sheets were directly provided to the workers with instructions at the target factories and collected by the survey team.

3) **Summary of Survey Results**

a. Personal Information

i) Gender

There are more females (59.8 %) than males (40.2 %) among respondents. This proportion reflects the common trend of gender in Vietnam's Industrial Parks that females are more than males.

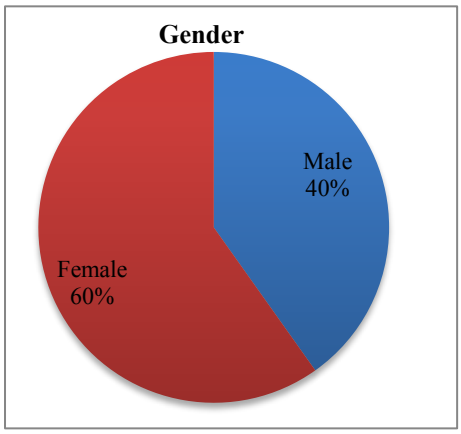


Figure 3-34 Percentage of Gender

Table 3-24 Distribution of Gender

Gender		
	Frequency	Ratio
Male	47	40.17
Female	70	59.83
Total	117	100.00

ii) Age

The common age bracket ranges from 21 – 25 years old (41.9 %), followed by 26 – 30 years old (36.8 %). Only two respondents were between 31 – 35 years old; only one respondent was over 41 years old.

Table 3-25 Distribution of Age

Age	≤ 20	21 - 25	26 - 30	31 - 35	36 - 40	≥ 41	Total
Number	3	49	43	19	2	1	117
Percentage	2.56	41.88	36.75	16.24	1.71	0.85	100

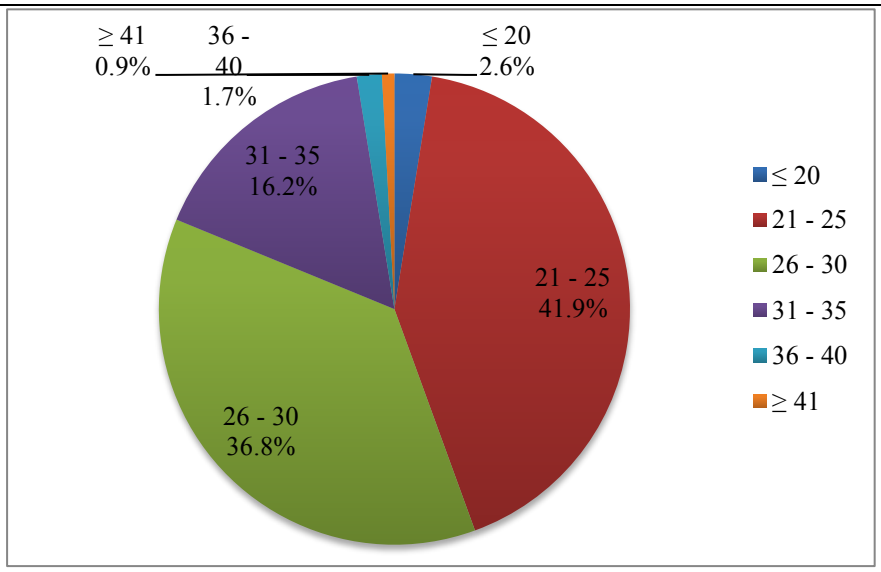


Figure 3-35 Distribution of Age

iii) Marital Status

Marital status of the respondents is shown in Table 3-26, in which, married respondents are more than singles (39.32 % and 60.68 %).

Among married respondents, married with child/children respondents are a higher proportion (46.15 %) than married and without child respondents (14.53 %)

There was no single parent respondent.

Table 3-26 Distribution of Marital Status

Items	Single		Married		Total
	Single	Single with child/children	Married without child/children	Married with children	
Number	46	0	17	54	117
Percentage	39.3%	0%	14.5%	46.2%	100.0%
	39.3%		60.7%		

b. Working Status

i) Years of Working

The subsequent figure presents the distribution of working experience of the respondents at their current company. It ranges from less than one year up to more than 5-years of experience.

The group of respondents that had less than one year's experience is the largest (23.9 %), while the group with more than 5 years of experience (>5 years) is the least (15.4 %). 21.4% of respondents have 3 – 4 years' experience and 16.2% of respondents 2 - 3 years' experience.

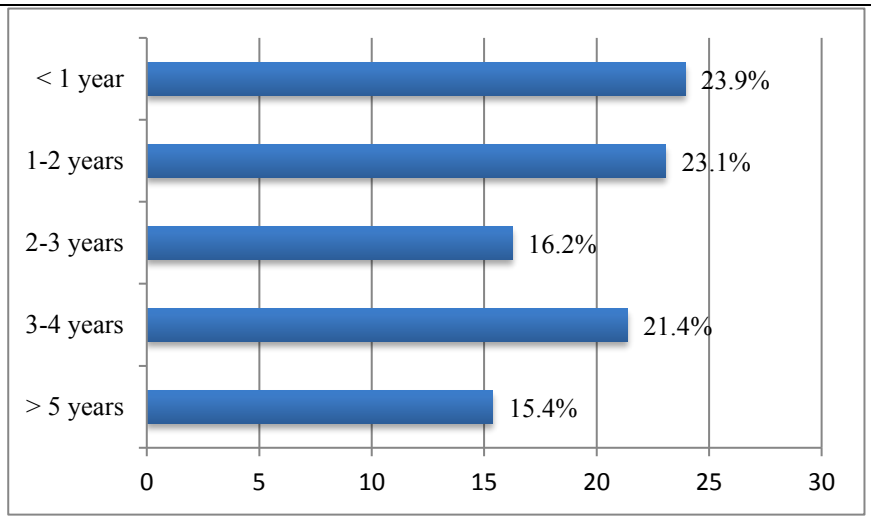


Figure 3-36 Distribution of Working Experience

ii) Reasons for choosing the current job

Only 21.4 % of the respondents considered the job "Suitable/compatible with their qualifications" as a reason for their job selection.

Good salaries were not the reason given by most respondents, which took only 17.1 %. It means that surveyed workers are primarily concerned with the work condition including working time and type of work, then the stability of the work and finally distance to their working place, instead of the salary they are offered.

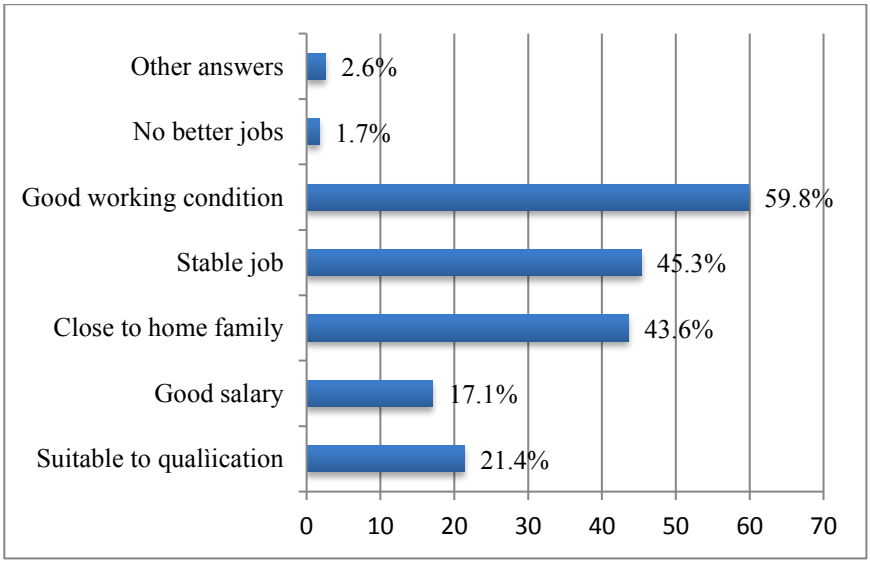


Figure 3-37 Reasons for Choosing Job at the Industry Park

c. Living Conditions

i) Length of time at current accommodation

As the following figure shows, the longest time that one interviewed has stayed at their current accommodation is > 36 months at 51.3 %. 18.0 % and 12.8 % have lived in their respective places for 6 – 12 months and 13 – 24 months; new comers who have been lived for less than 6 months occupy 10.3 %. This trend reveals that the surveyed workers tend to be stable residents or reluctant to switch accommodation.

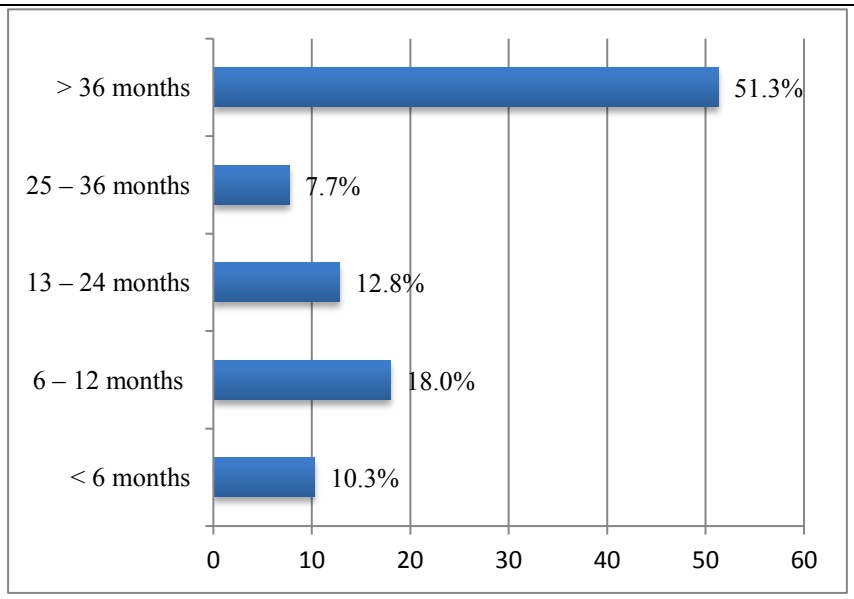


Figure 3-38 Length of Time Living in Current Accommodation

ii) Type of accommodations

According to data in the following figure, almost half of surveyed workers live with their home family (45 %). This result confirms the prevailing recruitment strategy of many companies in the industry park that endeavour to employ the local people.

For those surveyed that do not live in their parents' homes, renting a room is a popular choice with them (28.1 %) than sharing room with others (11.1 %); some of them live with their relatives (2.6 %) or buy their own houses (3.4 %). A small percentage of the workers live in rental rooms with their families (9.4 %).

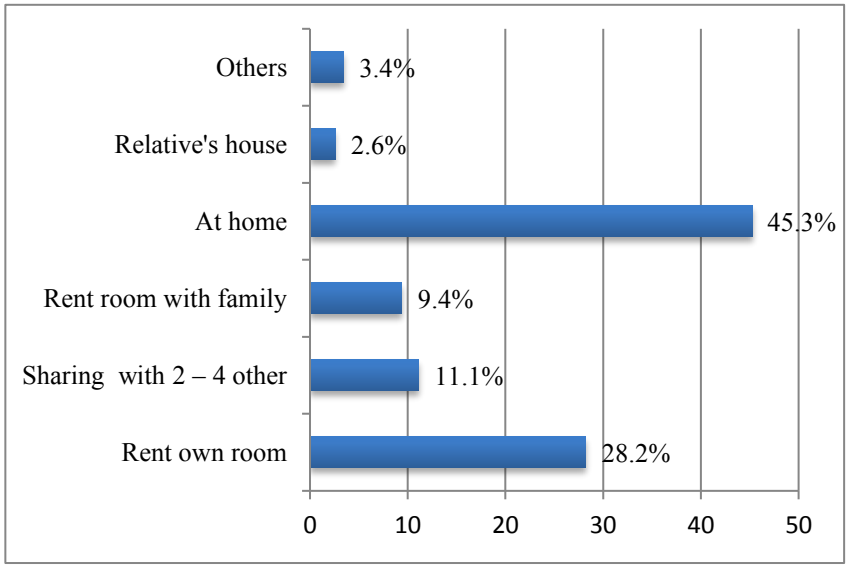


Figure 3-39 Type of Accommodation

iii) Living space

According to the survey, an area > than 20 m² is the average space preferred for accommodation (41.9 %), then 10 – 15 m² (23.9 %). Rooms with space less than 10 m² and 16-20 m² have the same selection of the respondents (17.1 %).

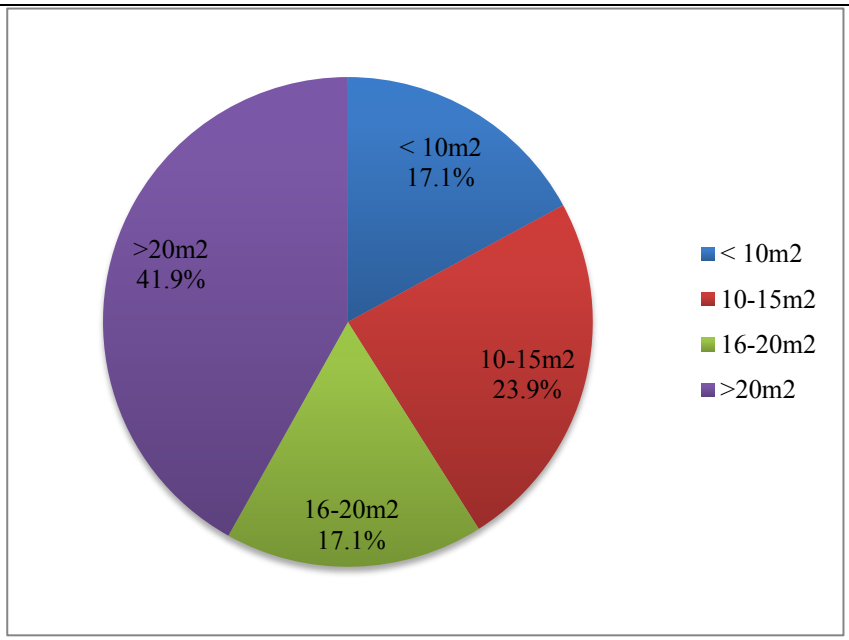


Figure 3-40 Living Space Distribution

iv) Facilities

The current condition of the facilities equipped for living space is summarized in the figure below. Kitchens, bathrooms and toilets and fridges are the popular places and equipment outfitted in living spaces for personal use, while air conditioners and water heaters are uncommon appliances added to living space.

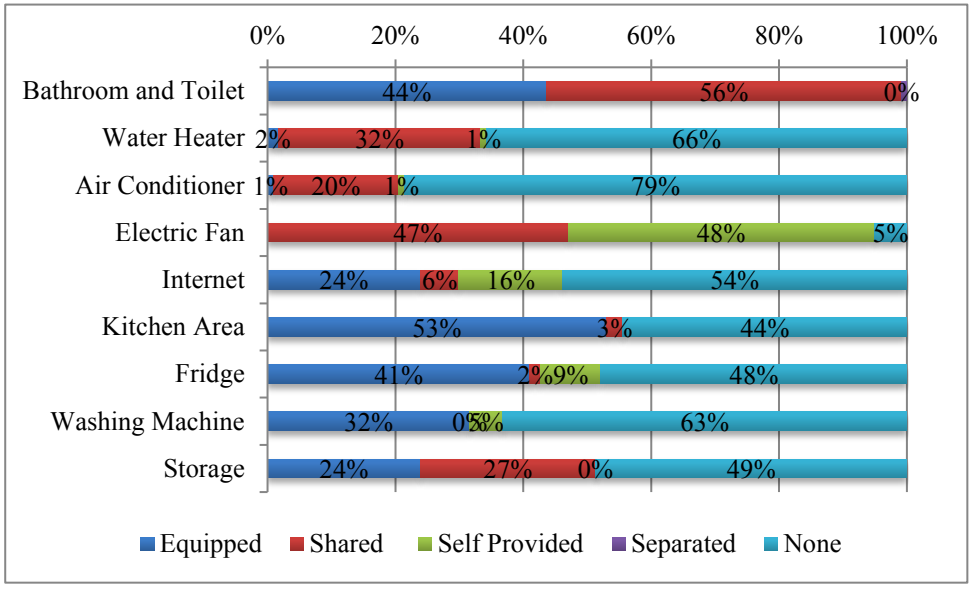


Figure 3-41 Facilities Status

v) Reasons for remaining

As shown in the following Figure, “living in parents’ house” and “distance to work” are the most common reasons for the respondents remaining at their current accommodation (41.9 % and 41.0 %). The “rental” is also considered by 22.2 % of the respondents when they decided to remain at the current accommodation.

Good facilities are also a priority for 18.0 % of the respondents.

Sharing with friends is uncommon to respondents as 8.6 % of them replied.

Quality is of low priority to many, since only 6.0 % of them highlight it.

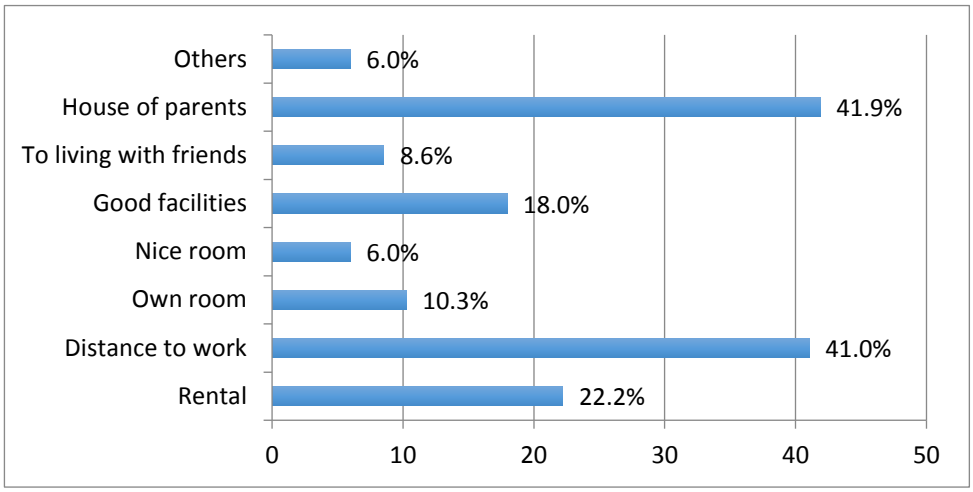


Figure 3-42 Reasons for Remaining at Current Accommodation

vi) Facilities need to be improved

According to the respondents, 41.9 % say that room space needs to be improved upon, followed by kitchen (38.5 %) and housing stuffs (goods) (37.6 %). Toilet and bathroom, and room quality are proposed to be improved by 34.2 % and 33.3 %, respectively.

Only 9.4% of the respondents mentioned other facilities, such as the quality of fresh water.

Figure 3-43 Percentage of Facilities to be Improved

Respondents in Lieu Xa & Nghia Hiep pay more attention to “room space”, then “room quality” as shown by the polls at 20.5 % and 15.4 % respectively.

Respondents in other communes tend to focus on improving the “Kitchen”, than “Housing stuffs.” This proportion is 24.79 % for both categories.

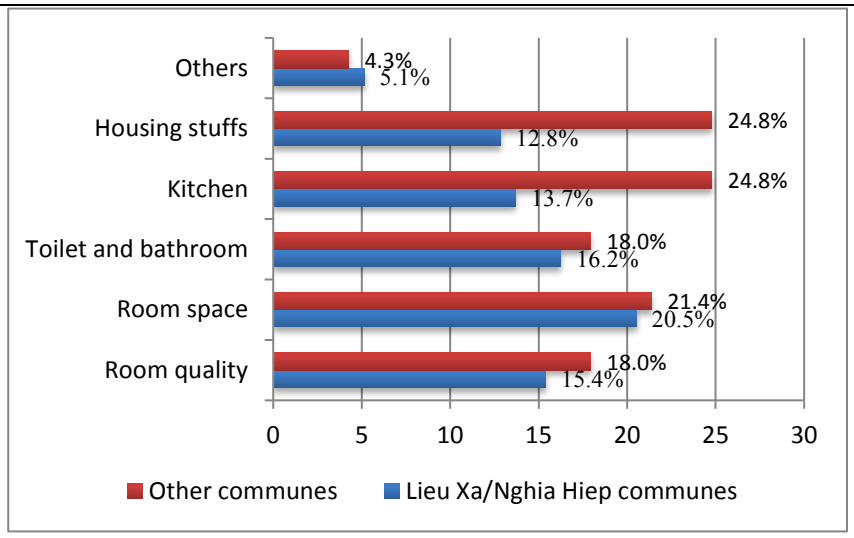


Figure 3-44 Differences in Facilities to be Improved

vii) Urban Environment to be improved

Shown in Figure 3-45, 53 % of the respondents believe a "fresh environment" needs to be developed.

Sports facilities require improvement; 28.2 % of those polled. There is a need to improve the public markets as stated by 26.5 % of respondents. Convenient coffee shops/restaurants are inadequate in terms of quality, say 19.7 % of respondents. Recreation facility and supermarket improvement share the same proportion of 16.24 %. Religious facility improvement is not a key factor that many paid attention to as reflected by the smallest poll (5.13 %).

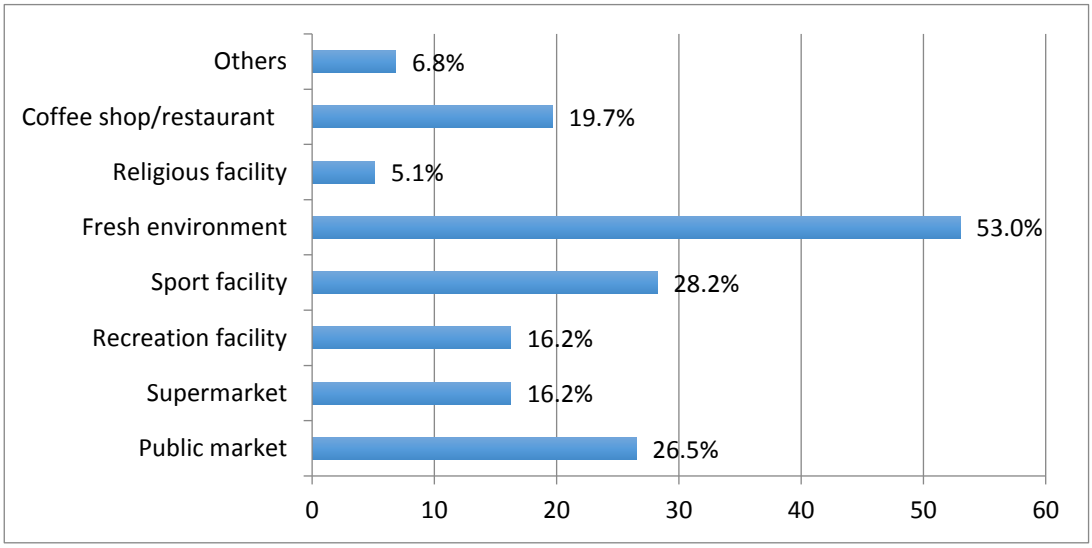


Figure 3-45 Urban Environment Factors to be Improved

Respondents in Lieu Xa & Nghia Hiep rate "Fresh environment", "Public market", "Sports facility" and "Supermarket" as four factors that need to be improved the most by order of highest percentage afforded to them.

However, respondents in other communes' rate "Fresh environment", "Sport facility", "Convenient coffee shop/restaurant" and "Public market" as the four factors that needs to be improved.

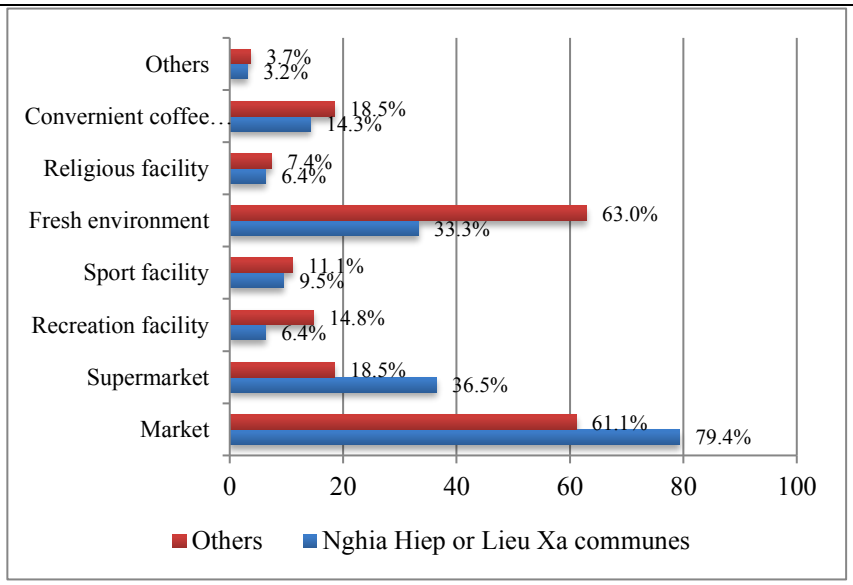


Figure 3-46 Differences in Environment Factors to be Improved

viii) Reason for changing accommodation

The following figure shows that, 78.6 % of respondents have never changed their accommodation.

However, for the respondents who have moved, rental fee is more commonly the underlying reason than others are, as it takes 7.7 % of respondents; better housing condition is also another reason for the respondents shift at 4.3 %. The respondents, furthermore, also change their accommodation because of their families. Only one respondent reported that he/she changed accommodation because of a roommate. Finally, one respondent moved because of the landlord.

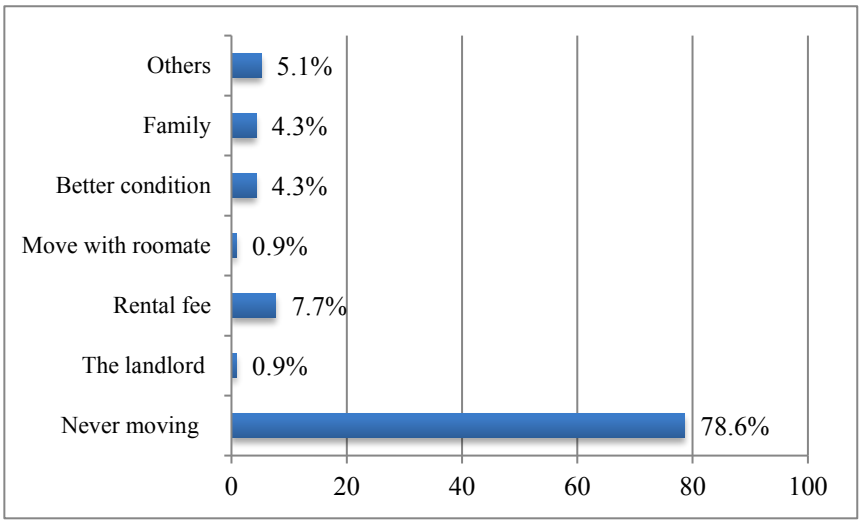


Figure 3-47 Reason for Changing Accommodation

d. Economic Conditions

i) Monthly Income

Almost half of the workers have an income between 4 to 5 million VND. 2 million to 4 million VND salary group accounts for about 21.4 %. The minimum monthly wage in Hung Yen is 2.75 million VND. Therefore, these groups got income slightly higher than the minimum wage. The result includes allowances from employer.

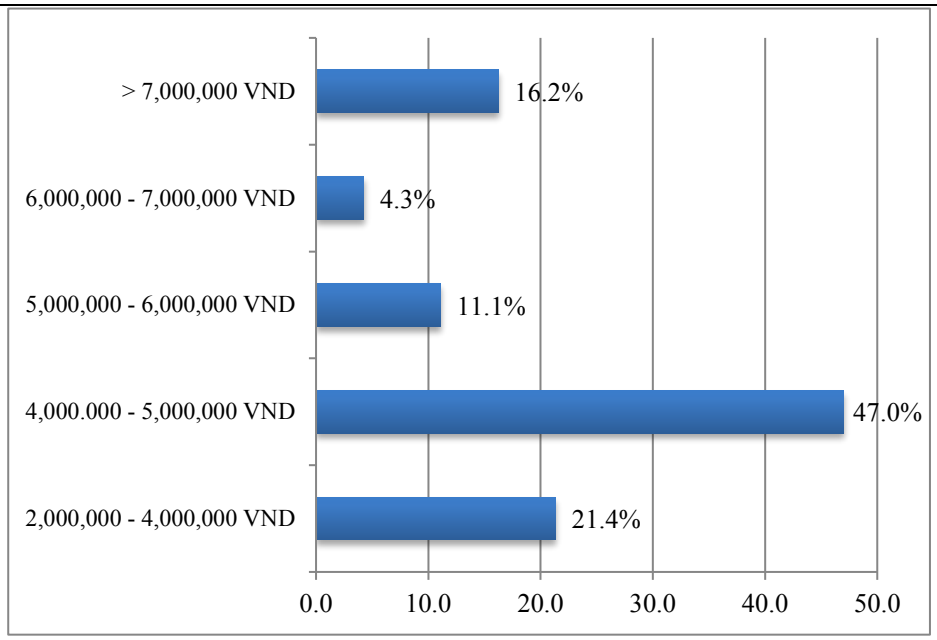


Figure 3-48 Distribution of Percentage of Monthly Income

ii) Monthly Housing Cost

Almost half of the workers spend between 500 to 750 thousand VND per month on housing. It might be said that low-income workers spend about 10 % to 15 % of their monthly income on housing fees. In addition, 19 % of labourers answered that they paid less than 500 thousand. About 68 % of the labours answered that they have subsided living cost as an allowance from their companies in the other questionnaire. Therefore, they could not spend on rental housing from their salary and paid the least limited amount.

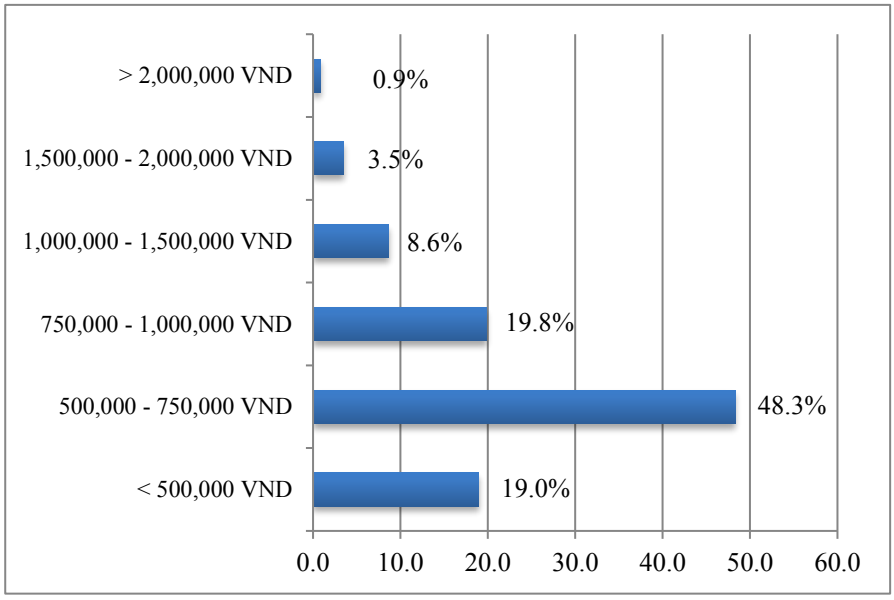


Figure 3-49 Monthly Housing Cost

3.9.2. Employment Condition and Economic Situation of Workers

(1) Employment Period

The Labour Law No. 10/2012/QH13 provided minimum conditions for labour. Labour contracts are categorized into the following three groups. Those are 1) Indefinite term employment contract 2)

Definite terms of employment contract, and 3) An employment contract for seasonal work or a specific task that has a term of less than 12 months.

According to the factory owners, employers selected "Definite term employment contract" for usual workers except managers and specific skilled labours. An employment period of this definite term employment contract is 12 months to 36 months. Only one additional definite term employment was approved for both parties. It will be an indefinite contract if both parties agreed to have a second extension. Therefore, the normal industrial worker can continue to work in one factory for six years normally. The employment period might be taken into account at the analysis of affordability of housing loan of workers.

(2) Affordability of Housing Costs to Workers

1) Questionnaire Survey

According to the questionnaire survey, the dominant group was the 4-5 million-salary group which accounted for about half in the model sites. About 20 % accounted for the 2-4 million-salary group including the minimum labor wage[10] in this region which was 2.75 million VND[11]. Therefore, it might be said that most of the laborers in the Thang Long IP have gained income slightly higher than the minimum wage. Meanwhile, the first group spent between 0.5-0.75 million VND per month on housing. This group accounted for 48 %. It might be assumed that 10-20 % of salary was set aside for the housing cost. A group that paid less than 0.5 million accounted for 19 %. This group might share rooms with roommates or live in a rented room with minimal space. In addition, almost 70 % of workers actually receive a housing allowance. This suggests that it is difficult to obtain housing without these financial supports.

2) Labors Income Analysis

Affordability analysis was conducted in the "Vietnam Housing Sector Profile[12] (UN Habitat, 2013)" and "Affordable Housing[13] (World Bank, 2015)".

These analyses were conducted based on the "Vietnam Household Living Standard Survey (General Statistics Office)", although the survey year and conditions are different from today. This study is aiming to conduct analysis utilizing the latest data sets with correction and reflecting the industrial workers condition in the aforementioned questionnaire survey. The following table is a summary from the Vietnam Household Living Standard Survey.

[10] Minimum wage is designated annually by the decree based on the Labour law.

[11] The minimum wage in this area was 2.75 million VND when the survey was conducted. It varies every year since the decree of prime minister regulates the annual minimum wage based on the labor law. Due to the selection range of the survey, the salary group was mentioned as “2-4 million VND”, but they actually receive more than 2.75 million VND as their wages.

12 http://unhabitat.org/vietnam-housing-sector-profile/ Retrieved Nov 24, 2015

[13] http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2015/11/05/090224b08319820b/1_0/Rendered/PDF/Vietnam000Affo0sing000a0way0forward.pdf Retrieved Nov 24, 2015

Table 3-27 Comparison of Household Income in 2010 & 2012

	Year	Quintile 1[14]	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Average
Per Capita per Month (VND million)	2010	0.633	1.153	1.611	2.268	4.985	2.130
	2012	0.952	1.672	2.333	3.198	6.794	2.989
Household Size (Person/HH)	2010	4.14	4.10	3.92	3.71	3.34	3.82
	2012	4.05	4.13	3.97	3.74	3.36	3.83
Household Income (VND million)	2010	2.621	4.727	6.315	8.414	16.650	8.137
	2012	3.856	6.905	9.262	11.961	22.828	11.448

Source: Vietnam Household Living Standard Survey results, General Statistic office

The results show that labourers are categorized into Quintile 1 or Quintile 2. According to the questionnaire survey, 40 % of Labourers are single while the rest are married and have jobs. These conditions shall be taken into account when calculating household income. A record of the minimum wage stipulated by the government is shown in the following table. This wage can be applied when a single income supports a family. The minimum wage is set in 4 different regions, those regions are categorized by economic volume and distance from the larger cities.

Table 3-28 Minimum Wage Record

Unit: Million VND

Year	Region I	Region II	Region III	Region IV[15]
2012	2.00	1.78	1.55	1.40
2013	2.35	2.10	1.80	1.65
2014	2.70	2.40	2.10	1.90
2015	3.10	2.75	2.40	2.15
2016 (Reference)	3.50	3.10	2.70	2.40

Source: Decree 122/2015/NĐ-CP, 14/11/2015 [16], Decree 103/2014/ND-CP, Decree 182/2013/ND-CP, Decree 103/2012/ND-CP, Decree 70/2011/ND-CP

Hung Yen is categorized in Region II on the table. Results of the questionnaire surveys show that the 20 % of the respondents obtain a salary less than 400 million VND. In addition, 47 % of the workers answered that they received between 4 and 5 million VND per month. It is general taken that the workers received slightly higher than the minimum wage. They claim to belong to the first

[14] (Income of Household, estimated) = (Statistical data in 2012) * (Increase rate of minimum wage 2012/2015)

[14] The Vietnam Household Living Standard Survey categorized into five groups for estimating income and household size from their statistical survey.

[15] Details are shown in the Decree. Following is the principle of designation.

Region I : Urban area of Hanoi, HCMC and Hai Phong

Region II: Suburban of Hanoi, HCMC and Major capital of province around Hanoi and HCMC

Region III: Capital of Province and Major Town

Region IV: Others, undeveloped area

[16] http://staffing.vn/en/r674/DECREE-1222015NDCP-dated-Nov-14-2015-on-Regulating-RegionBased-Minimum-Wages.html

or second quintile. Average household income obtained from the General Statistic Office indicate that minimum wages have the following listed aspects for consideration.

- Average Household income is available from the 2012 surveys, therefore, an estimation shall be made using the raise of the minimum wage from the table above.[1]
- Number of persons in a family of the household survey is more than four. This number is different from that of our questionnaire survey.
- The slightly higher salary group shall also be included in the target for the housing project.

3) **Analysis on the Economics of Affordable Housing Price**

The following conditions have been applied to the analysis of mortgages for economic affordability.

Table 3-29 Conditions for Housing Mortgage

Item	Value	Remarks (Standard Setting and Reason for Selection)
Rate of Down Payment	0 %	0 % is applied for the low-income group (1st and 2nd quintile and minimum wage group) because it is difficult for low-income people to deposit a down payment, and others are 20%.
Interest Rate	5 %	5-10 % An interest rate in banks is around 7 %. 5 % is set to be a bit lower than that.
Repayment Period	20 years	10-25 Years Maximum working period for one company is 6 years as an industrial worker. However, 20 years are allowed for workers to settle in the same place.
Affordable Rate for Housing Payment	Quintile 1:15% Quintile 2:20%	Maximum 25 % (2 cases are calculated) Around 15 % is the standard for low-income people while the upper middle is 25 %. 10 % is estimated from the questionnaire survey. According to their consumption, the affordable ratio is set slightly higher than this rate. Two cases are calculated both 15 % in Quintile 1 and 20 % in Quintile 2. The income used for the calculation base includes a housing allowance from a company.

Source: JST

The table below indicates results of the affordable housing price analysis. The process of preparing the table is shown in the Annex 5. Columns of Quintile 1 and minimum wage region II are the lowest labors range.

Rent/Sales fees can be applied to the column of the monthly maximum payment. 413-550 thousand VND (19-25 USD) is the maximum rent fee for a month for single workers. 61-82 million VND (2,853-3,804 USD) is the sales price. For a 1st quintile family, the minimum rent fee is 41-55 USD, while sales price range from 133-178 million VND (6,179-8,238 USD). Those results are similar to the study of UN Habitat and World Bank.

Table 3-30 Affordable Housing Price Setting (Affordable Rate: 15%)

Item	Unit	Minimum Wage	Average Income for Household					
		Region II	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Average
Expected Monthly Income	million VND	2.750	5.956	10.667	14.308	18.476	35.264	17.684
Monthly Maximum payment	million VND	0.413	0.893	1.600	2.146	2.771	5.290	2.653
Annual Maximum Payment	million VND	4.950	10.721	19.201	25.754	33.257	63.474	31.832
Total Payment	million VND	99.000	214.415	384.017	515.073	665.141	1,269.488	636.632
Maximum size of Housing Loan (20 years)	million VND	61.688	135.372	242.451	325.194	419.941	801.498	384.891
Down Payment	million VND	0.000	0.000	0.000	65.039	83.955	160.300	61.865
Affordable Price for Housing	million VND	61.688	135.372	242.451	390.233	503.929	961.798	258.732
Monthly Maximum payment	USD	19	41.3	74.0	99.3	128.2	244.6	122.7
Maximum size of Housing Loan	USD	2,853	6,261	11,213	15,039	19,421	37,067	17,800
Down Payment	USD	0	0	0	3,008	3,884	7,413	2,861
Affordable Price for Housing	USD	2,853	6,261	11,213	18,047	23,305	44,480	20,661

Source: JST

Table 3-31 Affordable Housing Price Setting (Affordable Rate: 20%)

Item	Unit	Minimum Wage	Average Income for Household					
		Region II	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Average
Expected Monthly Income	million VND	2.750	5.956	10.667	14.308	18.476	35.264	17.684
Monthly Maximum payment	million VND	0.550	1.191	2.133	2.862	3.695	7.053	3.537
Annual Maximum Payment	million VND	6.600	14.294	25.601	34.338	44.343	84.633	42.442
Total Payment (20 years)	million VND	132.000	285.887	512.022	686.765	886.855	1,692.651	848.843
Maximum size of Housing Loan (20 years)	million VND	82.251	180.496	322.268	433.593	559.921	1,068.665	513.188
Down Payment	million VND	0.000	0.000	0.000	65.039	83.955	513.188	61.865
Affordable Price for Housing	million VND	82.251	180.496	322.268	520.311	671.905	61.865	595.676
Monthly Maximum payment	USD	25	55.1	98.7	132.3	70.9	595.676	156.6
Maximum size of Housing Loan	USD	3,804	8,347	14,950	20,052	25,895	49,423	23,733
Down Payment	USD	0	0	0	4,010	5,179	9,885	3,815
Affordable Price for Housing	USD	3,804	8,347	14,950	24,063	31,074	59,307	27,548

Source: JST

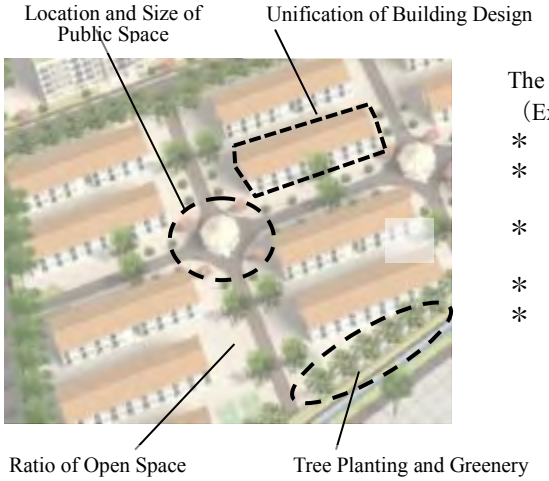
3.10. Examples of the Improvements of Housing Development in Vietnam

3.10.1. Introduction of Low Rise Housing in the Development

In the previous housing development around the IPs, many housing operators tend to plan medium-rise housing for workers. Instead, some cases of the recent housing development include layout spaces for low-rise housings. These plans focus the functions and roles of low-rise rental housing

from the beginning of the plan and establish the spatial planning by considering the worker commuting and daily activity. They consider the guideline for small sized rental housing blocks, individual architectural designs, housing block layouts and building locations with public space planning. In there, the worker/individual housings and individual shop/complex construction are managed or constructed in many cases. They are positively impacted by the advantages of individual or small sized operators for cost-cut and complex housing business management. As a result, the development with small-sized buildings enables to restrain what would otherwise be a high initial investment cost and to afford productive public space.

Referring these cases, the design guidelines and the construction requirements are proposed to promote that medium and small developers to participate more in the business. Then, they can secure the quality of living environment.



The design guideline regulates the following contents
（Examples）
- ＊ Location and size of public space
- ＊ Unification of building design (Height, wall position and color)
- ＊ Landscape approach to tree planting and greenery
- ＊ Ratio of open space
- ＊ Location of approach to each building

Figure 3-50 Spatial Planning with Low Rise Rental Housing and Example of Design Guideline

Figure 3-51 Rent Room Housing by Individual Investors with Service Facilities and Open Space

3.10.2. Improvement of Housing Management

Some worker housings in Vietnam, an automatic security system to control entrance and exit of the residents and visitors in the dormitories has been installed.

It is expected that the introduction of this system will enable relaxation of the operational rules, which are based on management's reliance on human resources such as imposing curfews.


Figure 3-52 Case of Relaxing the Operational Rules by Automatic Security System (Ascendas IP)

3.11. Summary of Issues

The issues for the improvement of living condition for industrial workers are shown below by the results contained in 3 chapters -"Current Legal Framework for Improvement of Living Condition of Workers around Industrial Parks" in Chapter 2, "Current Living Situation of Industrial Park Workers" in Chapter 3, "Plan of the Model Site" in Chapters 6-9.

The issues are assorted under the following 3 points. 1) issues of spatial planning and housing building (The issues of the quality of living environment), 2) issues of organization regarding housing construction, improvement and enhancement of social housing business (The participation of business operators and the issues of promotion), 3) issues related to business profitability (issues of the management). These issues stated above are particular in the IPs established before 2009 when the construction of worker housings were started to be legally required.

Table 3-32 Issues on Living Environments for Workers

	Issues	Detailed Contents	Referred Sections
1) Issues of Spatial Planning and Building Design (Issues of Quality of Living Environment)	Selection of inappropriate housing locations	Low occupancy rate is caused due to the long distances between housing location and IPs, villages and cities. This issue is found especially in the IPs (Type 2 & 3-1) mentioned in Chapter 3.4.	3.4, 3.5
	Competition with low-quality housing for workers	Price competition with the poor quality rental rooms from surrounding villages hinders the promotion of decent quality housings. This issue is found in IPs over Vietnam.	3.7
	Lack of developers	After 2009 when housing construction for workers was legally passed, the housing developments progressed through IP operators and factory owners and the living conditions are improving. The number of operators who only work on housing construction is limited for the IPs that were established in the local areas before 2009. This issue is found especially in the IPs (Type 2 & 3-1) mentioned in Chapter 3.4.	3.4
	Inadequate housing tailored to worker's affordability	The dwelling unit for social housing is set at 25～70 ㎡. The price is beyond the affordability of workers.	2.4, 3.7
	Strict housing management operation	The strict management rules in workers' housing are leading to its low occupancy rate.	3.6
2) Issues of Organization Regarding Housing Construction, Improvement and Enhancement of Social Housing Business (Issues of Developers and Operators' Participations and Business Promotion)	Lack of developers	Similar to the above.	3.4
	Imbalance of public business support	Differences in each provincial support for housing business and public-private partnership. This issue leads a living environment gap between wealth provinces and provinces with financial difficulty.	3.8
	Coordination of residents	Many housing facilities for IP workers in Vietnam are organized by IP operators or large-sized factory owners. From the beginning of this business, they have aimed at housing their workers as residents. Many development cases have been implemented by large-sized operators, and a low implementation is caused without them. This issue is found especially in the IPs (Type 2 & 3-1) mentioned in Chapter 3.4.	3.8
3) Issues of Business Profitability (Issues on Business Implementation and Operations)	Business profitability	Lack of balance between affordable housing cost of workers and housing construction cost. Especially, in the IPs located in local areas face the difficulty for making profits by real-estate business, and it causes the slow housing construction.	3.9, 9.1
	Profit regulation	The same profit regulation is applied evenly on social housing businesses without consideration of the differences in business schemes and viability. Differentiating a regulation is important for various situations like high profitable social housing cases in urban area and low profitable cases in outer area.	2.3
	Business support	The applications of business support measures differ among provinces. This issue leads a living environment gap between wealth provinces and provinces in financial difficulty.	2.2, 3.8
	Contribution of housing costs by factory owners	It is statutory under the Decree No. 100 and considered to be applicable for the implementation of the housing projects.	2.2

4. Housing Development Measures in Surrounding Countries

4.1. Summary of Housing and Financial Policies

Affordable housing is an issue in South Asian countries, particularly for low and middle-income households. The major causes of the issues include the limited formal housing finance, the inadequately flexible housing finance, the high interest rates, the short loan periods and the expensive housing prices against worker's income levels. South Asia will continue with the fast and sustained growth in the coming decades, so their urban population is expected to expand from about 600 million to 1.4 billion by 2050[17]. This growth of urban population will add further strain on households' ability to obtain adequate housing.

4.1.1. Challenges and Supports to Low-Income Housings

The ratio of housing price to income is high in many of these countries, but it varies from one country to another. The ratios are high in the countries which face a high demand for housing such as Thailand. Therefore, the low-income urban households have no other housing options other than renting rooms built by the informal sector located in the informal settlements. In India, other households build dwellings on illegally occupied lands. The people who cannot afford the rooms in there become pavement dwellers.

However, many countries have set policies to match low-income people to adequate housing through public interventions. Over the last sixty years, many housing programs and policies have been established. Some countries like Malaysia and Thailand adopted these social housing policies. The government of Cambodia supports the provision of urban land for private-sector-led development.

Realization of the housing policy depends on the strong political will and the improved institutional capacity with participation from the Non-Governmental Organizations (hereinafter referred to as "NGO") and public communities. Hence, affordable housing could be provided sufficiently. These actions are observed in Bangladesh, India and Malaysia.

4.1.2. Historical Transition of Housing Policy in South Asian Countries

General trends of housing policy in South Asian countries are as follows:

- 1950s: Some governments started to focus on public housing for rent or sale with high density and multi storied apartments (e.g. Singapore).
- 1960s: Self-build development that a government side provides infrastructures and lands and a private side build housings became popular in the world. However, such large-scale development has not been implemented in Asia.
- 1970s: Many countries established governmental housing development agencies.
- 1980s: Governments changed their role from direct providers of houses to enabling market actors so as to encourage private investment (e.g. The Philippines).
- 1990s: Socio-economic structural changes resulted in the continuous exclusion of lower-income groups from housing markets. The low-income housing sector is not an attractive proposition for private housing developers (e.g. Bangladesh).

[17] UN-HABITAT 2011

- At the turn of the millennium: slum upgrading

4.1.3. Current Housing Programs

Although many governments have withdrawn from direct housing delivery, public organizations ensure provide adequate and affordable housings for low-income households and disadvantaged groups in many countries:

Singapore: Subsides and mortgages have made it affordable to the majority of households.

Malaysia: Various housing development programs have contributed to an increase in housing construction.

India: The housing and urban development corporation (HUDCO) improves housing conditions of lower income groups and the homeless.

Bangladesh: Government launched programs for the rural landless and homeless people through the provision of loans to NGOs to build shelters for urban low-income groups.

Philippines: Government encourages the private sector to produce social housing under the decentralization of government through a participation approach.

The housing policy characteristics in last sixty years are summarized in the following table, covering the cases from nine countries in Asia.

Table 4-1 Experiences of Housing Policies for Low-Income Groups in Southeast Asia and Asia

Singapore	**Characteristics of Housing Policies**
	Significant control over land and housing supply Use non-used public land for housing development Strong public administration: Clear administrative procedures and quick implementation Sustainable housing supply regimes: Providing timely real estate market information Private organization involved in providing low-income housing
	Typical Cases of Business Scheme, Organization and Measure
	Housing and Development Board (HDB) in 1960: To provide housing for those who needed them but it still has challenges in meeting comprehensive social and qualitative aspects of public housing Home Ownership Scheme (HOS) in 1964: To enable the lower income group to own their own homes Land Acquisition Act (LAA) in 1966: To facilitate land acquisition by the state Anti-Speculation Measures in 1996: To curb speculative and rapid rise in housing price
Taiwan	**Characteristics of Housing Policies**
	Civil Participation & social organization since 1989 Relationship between state-real estate developers -social movements Two forces of democratization and deregulation since 1980s: Have driven the government to gradually change their approach of housing intervention from direct construction to mortgage program Varity in social policies 2000s: Social housing, decent housing, modern housing, social welfare housing,

	youth housing, national housing were serving to increase social facilities however, faced inadequate responsible authorities mechanism
	Typical Cases of Business Scheme, Organization and Measure
	Creation of large-scale six-year public housing project in 1976: The government began to take direct charge of public housing construction
	Established new social rental housing policy in 2010s: Faced the issue of discrimination against the poor
	Social Housing Promotion Alliance (a non-profit organization) in 2010: Its primary goal was to pressure the government into supplying sufficient public rented housing for the disadvantaged
Thailand	**Characteristics of Housing Policies**
	Major role of public welfare housing division and public housing office (ministry of interior) 1950s- 1970s: Building urban social housing
	Various projects (social, walk up, turnkey, detached) since the 1960s, Due to limited budget, the concept of walk up apartment did not expand
	Typical Cases of Business Scheme, Organization and Measure
	Policies to attract the housing's investment 1960s-1990s: Decree 49, land code, decree 289 on land sub-division), Due to some shocks (such as first oil shock in 1973, second oil shock in 1980, Gulf war in 1990), some projects did not expand
	Sites and services schemes from the 1960s-1970s
	Establishment of National Housing Authority (NHA) in 1973:
	First national housing policy in 1983: Provide frameworks for the roles of government agencies and private developers
	Community Organization Development Institute (CODI) in 1990: CODI or (UCDO urban development office before 2000) participates in implementing a national urban poverty alleviation program, establishing community participation and providing subsidy for infrastructure
India	**Characteristics of Housing Policies**
	Introduction of various housing programs since the 1940s
	Introduction of labor welfare schemes for workers since the 2000s: Needed more coordinated activities
	Important housing sector reforms: It has been executed but its timing was not adequate
	Basic Services for Urban Poor scheme (BSUP) by ministry of urban development: To provide services and housing to low-income group
	Introduction of foreign direct investment guidelines
	Typical Cases of Business Scheme, Organization and Measure
	First national housing policy in 1988: It was followed by a series of public sector interventions for human settlement sector
	National Housing and Habitat Policy (NHHP) in 1998: Focused on transition of public sector role as facilitator, increased role of private sector
	National Urban Housing and Habitat Policy (NUHHP) in 2007: Seeks to promote partnerships between public, private, and the institutional sectors
	Jawaharlal Nehru National Urban Renewal Mission (JNNURM) in 2005-2012: Aims to construct 1.5 million houses for urban poor
Malaysia	**Characteristics of Housing Policies**
	Government has assumed a leading role through public low cost housing in 1957

	Government sought direct private participation through involvement of private developers to build low-cost housing in the 1980s
	Low-cost houses were added as a new housing type to the commonly medium and high cost after 1980
	Typical Cases of Business Scheme, Organization and Measure
	Mixed development and mixed income housing has been introduced (projects by private developer are required minimum 30% to low-cost housing)
	Setting-up the Human Settlement Research Institute in the early 2000s
Bangladesh	**Characteristics of Housing Policies**
	The government has shared the work with the NGOs since 1986
	Private housing sector assumed the major role from the 1990s: There was necessity to improve the standards of shelter
	Encouraged private-public cooperation
	Many programs for low-income housing since the 1990s
	Typical Cases of Business Scheme, Organization and Measure
	Third Five-Year Plan 1986-90: The government adopted a strategy of seed funds to develop smaller-sized service plots for the low-income group through house building finance corporation (HBFC)
	Fourth Five-Year Plan 1990-95: Separate guidelines were prepared for collaboration between the public and private housing sector
	Fifth Five-Year Plan 1997-2002: Site-and- service schemes need more access to loans and increased land supply
Myanmar	**Characteristics of Housing Policies**
	Government takes the responsibility to establish new satellite towns in planned industrial zones 2000s:
	Need to improve laws and policies
Cambodia	**Characteristics of Housing Policies**
	Settlements upgrading and relocation policies
	Introduce Land sharing concept
Indonesia	**Typical Cases of Business Scheme, Organization and Measure**
	Kasiba (ready to build area) _Lisiba (ready to build environment) scheme: Large-scale housing and urban development to facilitate the mass housing provision which is implemented by public or private sector
	1-3-6 and 1-2-3 Rule 1992: Setting the requirements for mix settlement to have a ratio of 6 small houses and 3 medium houses for every large house built by a private developer
	Rural Growth Centre (RGC): For improving shelters for the poor in rural area
	Cooperative Housing Association (ASPEK) in the 1980s: A voluntary housing movement in the form of housing association to provide houses for low income groups

Source: JST

4.1.4. Public Housing Entities

The profitability of housing business to low-income groups is also low in Southeast Asian countries, and the problem that participation of private operators with housing development projects and financial supports are not promoted is common issue in these countries. Therefore, many governments establish public housing entities and supply housings in regards with housing

development to low-incomes. The following shows public housing entities and their roles of each typical country.

Table 4-2 Public Housing Entities in South Asian Countries

Country	Entity Name	Main Roles	Establishment
Indonesia	Perum Perumnas (Housing and Urban Development Corporation)	・Supply half of the low-cost housings to the demand ・Provide rent housings in urban redevelopment project	Central government has established the entity in 1974
Thailand	NHA: National Housing Authority	・Housing supply to low-incomes ・Slum improvement	Central government has established the entity in 1973
Philippine	NHA: National Housing Authority	・Urban redevelopment project (sale of building lots) ・Implementation of low-cost housing project	Executive Office of the President
Malaysia	State Economic Development Corporation	・State Economic Development Corporation develop housings as a part of local development ・Low-cost housing development for land illegal occupant	Each local government has established until 1968

Source: Add based on the Southeast housing sector issues (Development Finance Research Institute Report 2001)

4.1.5. Financing Mechanisms

There are the various systems for housing finance in Southern Asian and neighboring countries:

Singapore: Central Provident Fund (hereinafter referred to as "CPF") provides incentives for long time.

Thailand: The Government Housing Bank (hereinafter referred to as "GHB") establishes appropriate loan conditions.

Indonesia: State Saving Bank (hereinafter referred to as "BTN") provides loans that are both subsidized and non-subsidized.

Bangladesh: Grameen Bank has a partnership with NGOs and Islamic Bank of Bangladesh (hereinafter referred to as "IBBL") and implements microfinance.

Philippines: Community Mortgage Program (hereinafter referred to as "CMP")

India, Philippines, Indonesia, Bangladesh, and Myanmar: Those governments implement microfinance through many funding strategies such as mandatory savings; use of donor funds, foundation funds, public funds, and bank funding; partnerships deposits credit: and enhancement of international investors and international finance.

Table 4-3 summarizes the characteristics of the financial system of nine countries in Southeast Asia and neighboring during sixty years.

Table 4-3 Experiences of Financial System for Low-Income Housing in Southeast Asia and Neighboring

	Characteristics of Financial System
Singapore	Using the wasted public land to provide housing funds to exempt land use fees and taxes Carefully regulated housing market and introduction of measures to reduce speculative demand by the government Sufficient housing financial system (mortgage and loans) since 1968

	Typical Cases of Scheme, Organization and Measure
	Central Government Savings Funds (CPF) has been providing financial systems since 1955: Directing the organization growth in long-term
Taiwan	**Typical Cases of Scheme, Organization and Measure**
	Public housing loan regulation in 1957
	Luxury tax policy implementation and credit control in 2010
	Low income housing subsidies regulations in 2011
	Welfare policy for the young families in 2010
Thailand	**Typical Cases of Scheme, Organization and Measure**
	Major roles taken by Government Housing –Saving Bank from the 1950-1970s
	Introduction of long-term loan with low interest rates since the 1970s
	Introduction of set-up payback system in 2006
	Application of the hire-purchasing payment and low-interest rate loan payment in the 2000s
	Introduction of rent control-direct subsidies 2000s
India	**Characteristics of Financial System**
	Loans granted by banks to housing financing companies in the 2000s
	Grant to a family below the poverty line in the early 2000s: It needed to set up revolving housing fund
	Appropriate experience in microfinance business 2000s
	Typical Cases of Scheme, Organization and Measure
	Introduction of Fiscal concessions for housing project (part of highway project), owner -occupied property, long term capital assist, small sized housing units, 2000s: It needed to provide interest subsidy on housing loan, incentives for rental housing
	Pooled finance development for small municipalities: Introduction of revolving housing fund
	Rule No 10 (Ashray Nidhi) shelter fund
Malaysia	**Characteristics of Financial System**
	Loan from federal government to state government in 2000s
	Direct welfare assists and income-generation projects in 2000s
	Typical Cases of Scheme, Organization and Measure
	Employee Provident Fund in 1990s
	Selling housings at low fixed prices in 2000s
Bangladesh	**Characteristics of Financial System**
	Several types of loans and operational mechanism offered by Grameen bank since 1980s
	Implementation of public-private partnership projects: Introduction of long-term payment for business cost
	National commercial banks disburse loans: There remains issues to require beneficiary of the financial system to hold their own land properties

Myanmar	Some private banks have financing agreements with the government to provide loans to home buyers. This began in the early 2000s: However, the issue of low levels of development still remain.
Cambodia	**Characteristics of Financial System**
	Housing loans by the government and the NGOs: There remains issues of lack of effective banking system and accessibility of the poor
	Typical Cases of Scheme, Organization and Measure
	Established Urban Poor Development Fund (UPDF) in 2003
Indonesia	**Typical Cases of Scheme, Organization and Measure**
	Established the bank for low income people (BTN) in 1970s Established the housing loan for low income (KPR) in 1976

Source: JST

4.2. Industrial Park Development and Housing Development for Workers

4.2.1. The Current Situation of Labors, Residence and Dormitories in Southern Asian Countries

As a result of economic growth, the factories grew and expanded. Industrial estates have several advantages, such as creating growth poles outside the cities, reducing the problems of urban congestion and create more job opportunities for the people. On the other hand, industrial estates create a concentration of workers in one area. This results into high demand of housing in limited areas.

Although, housing for workers has become one of the top concerns for many countries, there are no clear regulations which define who will take the responsibility for provision of workers housing.

In Thailand and Malaysia, some companies have provided houses for their workers. However, in other countries, workers have to find places on their own.

In many Asian countries, there are laws that industrial operators are obliged to abide by to provide housing to their workers. Nevertheless, amongst those countries these laws are not implemented. On the other hand, the process of building dormitories has lots of difficulties for the following reasons:

- From the view point of IPs' operators
  - There are high costs involved in purchasing land for housing.
  - Limited period of governmental supports such as credits
  - Inadequate ideas to provide housing for their workers, except night shift workers
- From the view point of housing developers
  - Capital shortages and slow returns on investment
  - High risk low return business
  - Need of more incentives like tax exemptions and soft or preferential loans
- From the view point of Workers
  - Unaffordable high rents.
  - Need to reduce prices of houses.

- Low quality rooms

However, many IPs and governments in several countries have penetrated access to workers' housing through introducing good systems for rent, provident fund, savings scheme, wide range of building styles of dormitory and facilities.

4.2.2. The Type of Factory Workers' Housing

The JST reviewed factory workers' residential facilities in Southern Asian and neighbouring countries.

Factory workers' housing type can be categorized into six ways; based on owner of facilities, operator and mode of rent 1) Industrialist housing, 2) Rental public housing, 3) Rental Public industrialist housing, 4) Rental private housing, 5) rental NGOs housing 6) Rental spontaneous Housing.

Following table explains the type of factory workers' housing based on the type of payment and providers:

Table 4-4 Type of Factory Workers' Housing Based on the Type of Payment and Providers

No	Name	Location	Owner	Type of Rent	Style of Building	Operator	Style of Development
1	Industrialists' Housing	inside the IP site	Factories	free	Multi -story building	Factories	
		outside the IP site	Rented by Factories	free	Multi -story building		
		inside the IP site	Rented by Factories	rental	Walk-up flats	Factories	Land from factory and government builds the houses
		outside the IP site		rental	Walk-up flats		Private developers build the houses
	Example: FTZ Bayan Lepas in Malaysia, Navanakon in Thailand						
2	Rental Public housing	outside the IP site	Government	rental	Single-family, row-houses, apartment houses, flat(room standard, room improved)	-	-
	Example: South Korea, Singapore						
3	Rental public –industrialists housing	outside the IP site	Government	rental	Walk-up flats, building from one or two floor, some rooms	Factories	government builds the houses and factories rent it
	Example: Navanakorn Thailand						
4	Rental private Housing	outside the IP site	Private sector	rental, "Chonse"[18]	Housing units	factory owners pay a large cash deposit,1/3-1/2 housing price to the landlord to take interest on the deposit as rent and refunded at the end of the lease period, tenant share a housing unit with other tenant-household	
	Example: South Korea						
5	Rental Non-Governmental Organization (NGO)'s Housing	outside the IP site	NGOs	rental	Long house with some facilities		
	Example: Malaysia						
6	Rental spontaneous Housing	outside the IP site	Private sector	rental	Housing units or long house	1-sharing housing with the land lord 2- Separate housing with the landlord	
	Example: FTZ Bayan Lepas in Malaysia, SIER in Indonesia						

Source: JST

[18] "Chonse" is a type of rented tenure where the factory owners pay a large cash deposit to the landlord at beginning of the tenancy, the amount is usually a third or half of housing' price, the deposit refunded at the end of the leas period. The landlord takes the interest but the factory owners will share a housing unit with others as a monthly renter.

4.3. Support Measures for Residential Development in Oversea Countries to be Introduced in Vietnam

After studying the housing policies and the financial system in the Southeast Asian countries especially in Singapore, Thailand, Indonesia, Malaysia and India, several points could be adopted by Vietnam in many sectors such as the financial mechanism, administrative structure and spatial control systems.

These points are divided into three categories according to the appropriate conditions and possibility of achievement it in the future,

1) Primary Level Policy (Basic: Primitive measures to be introduced)

2) Secondary Level Policy (Progress: Measures to be introduced after basic system is established)

3) Advanced Level Policy (Advance: Measures to be considered in the future)

The table illustrates these cases and its classification.

Table 4-5 Policies and Mechanism from Southeast Asia and Neighboring to be Reflected on Vietnam Situation

Classification	Financial System and Mechanism	Spatial Control System	Administrative System
Primary Level Policies (Basic)	Rule No 10 (Ashray Nidhi (shelter Fund) in India	1-3-6 and 1-2-3 rule for mix settlement (Indonesia) Housing land supply by Kasiba / Lisiba (Indonesia)	Role of CODI (the Community Organizations Development Institute, Thailand)
Secondary Level Policies (Progress)	Government Saving Bank (Thailand) State Saving Bank (Indonesia)	LCH (Low Cost Housing System) (Malaysia) Self -Help Housing (Thailand) Planning Criteria of Dormitories (Thailand)	Cooperative Housing association to provide houses for low income groups (Indonesia) NHA (Thailand)
Advanced Level Policies (Advance)	Central Provider Fund CPF (Singapore) Housing Saving Fund (Singapore)	Cooperation between the countries (Indonesia-Singapore)	Housing Development Board (Singapore)

Source: JST

The policies categorized as basic are introduced in this section. The policies from the secondary and advanced levels are discussed in Annex 7.

4.3.1. Financial System Measures of Primary Level

With the implementation of the Decree No. 100, the social housing construction system whereby business operators meet the cost was established. The following measures are introduced for the period when the funds for support are insufficient from the government budgets or the pension funds.

(1) **Rule no. 10 (Ashray Nidhi (Shelter Fund)) in India (In 1988- Amended in 2000)**

The development companies must observe one of the following three auxiliary rules in order to ensure attainment of housing for the economically weaker sections (hereinafter referred to as "EWS ").

a) 15 % of the total developed area shall be reserved for persons belonging to EWS and be equal to 32 to 40 m² in the colony.

b) The developer constructs houses of 20 – 24 m², which size is 25 % of the developed area for persons belonging to EWS, instead of developed plots 1.

c) The developers who do not want to opt either for the above two options have to deposit fees in the shelter fund for providing basic services to persons belonging to EWS.

4.3.2. Spatial Control System Measure of Primary Level

In Vietnam, SH development is required regarding large-scale urban development project and IP development. As a measure that should be introduced in the next stage, followings are considered as reference in regard with detail regulations about spatial development and promoting method of spatial control by public private collaboration.

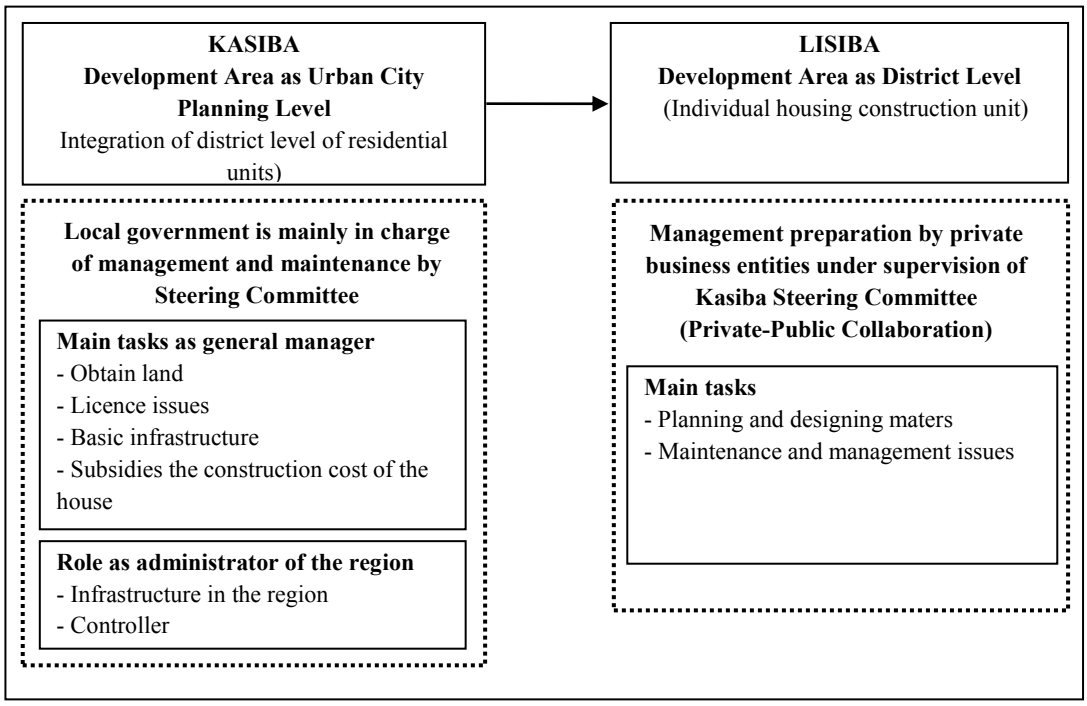
(1) **1:3:6 Ratio and its Amendment 1:2:3 Rule for Mix Settlement (Indonesia)**

By setting the requirements to have a ratio of 6 small houses and 3 medium houses for every large house built by a private developer (1:3:6 ratio), the Indonesian government set an indirect policy to ensure the provision of low-income housing. This Decree stipulates that private developers who carry out land development on 200 ha or more have to build houses in 1:3:6 ratio in their allotment. By introducing such a tool, the Government of Vietnam can also establish such indirect tools as a decree to ensure the establishment of low-income housing. This approach sets up a mixed system of housing supply that is to say, three income groups (high, middle and low).
Simple houses can be prepared with housing credit facilities at subsidized interest for house sizes of 21 m² and 36 m², and the interest rates are 8.5 %, 11 % and 14 %.

(2) **Housing Land Supply by KASIBA /LISIBA (Indonesia)**

In Indonesia, housing development is promoted by broad-based district development of local government using the KASIBA and LISIBA system and by mixing the development small- scale district development implementing mainly by private sector. The KASIBA and LISIBA scheme is an overall management system of housing development, including the management of local government and the private sector. Therefore, introduce this kind of development system would be considered in Vietnam.

KASIBA is the system to determine the development area for housing development with the well-organized environment. The construction of basic infrastructure and its management are operated by the public sector. The LISIBA scheme is applied in small-scale development areas in the KASIBA region where the housing construction is undertaken by private business entities. The KASIBA Steering Committee manages the scheme locally. This mixing of programs promotes housing construction for those with low-income by private development companies.



Source: JST

Figure 4-1 Housing Land Supply by Kasiba / Lisiba

4.3.3. Administrative System Measure of Primary Level

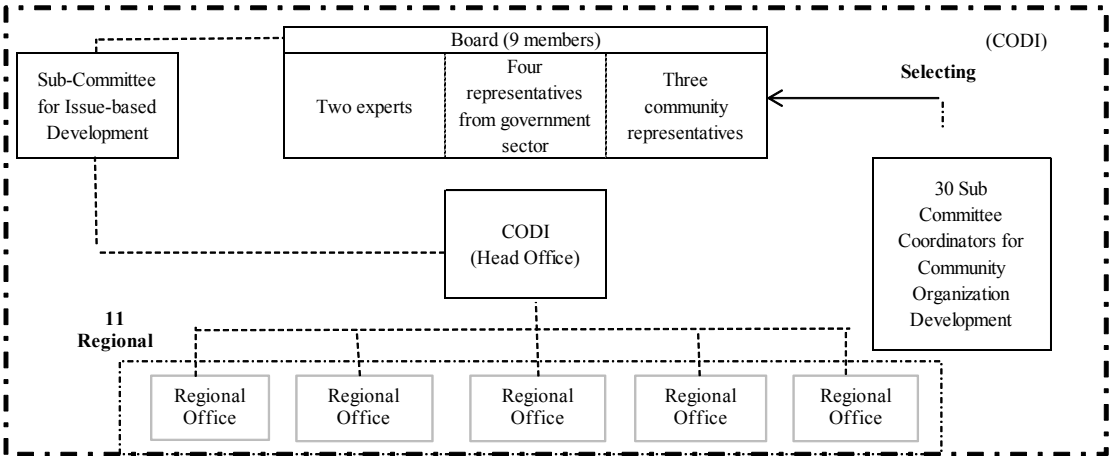
It is necessary to define the detail about role sharing of each organization or promotion system of organization for the future, while it is described stakeholders and organizations regarding SH development in current decree in Vietnam. The following cases are the organizing entities for low-incomes.

(1) **Role of the Community Organizations Development Institute in Thailand**

In early 2000s, the Community Organizations Development Institute (hereinafter referred to as "CODI"), which was Urban Community Development Office in 1990s) was formed to implement a national urban poverty alleviation program and using the credit as a mechanism to strengthen the capacity of the community to deal collectively with its own development issues.
Special efforts have been made between the following governmental and financial institutions in Thailand. The summary for the housing construction business institutions related to CODI or UCDO is shown below:

- Urban Community Development Organization (UCDO): UCDO is the institution established for reducing the urban poor in Thailand. It uses financial loans for enhancing the ability of the community independency and development issue.
- In 1990s, UCDO (former organization of CODI before 2000s) established a community participation system for development by including community representatives at the highest levels and including decision-making.
- CODI assists the communities to develop and strengthen their organizations in order to have their capacity boosted to access finance and other development opportunities.
- In the 2000s after the emergence of the Rural Development Fund, CODI established savings and credit schemes within individual communities, in order to allow the community control the development process, plans for land acquisition and microfinance.

- Housing Cooperatives, Credit Unions and NGOs: They are people's organizations that have been formed to address the housing issues of low-income groups.
- NGO participation to urban development is a positive factor to support housing for low-income people community participation.
- CODI Committee is consisted by nine members including four representatives from the central government sectors (Ministry of Social Development and Human Security, Ministry of Industry, Ministry of Finance and National Economic and Social Development Board), two experts and three community representatives. CODI has 11 regional community offices, and it manages and supports the community development regional committees with 30 coordinators for community development.



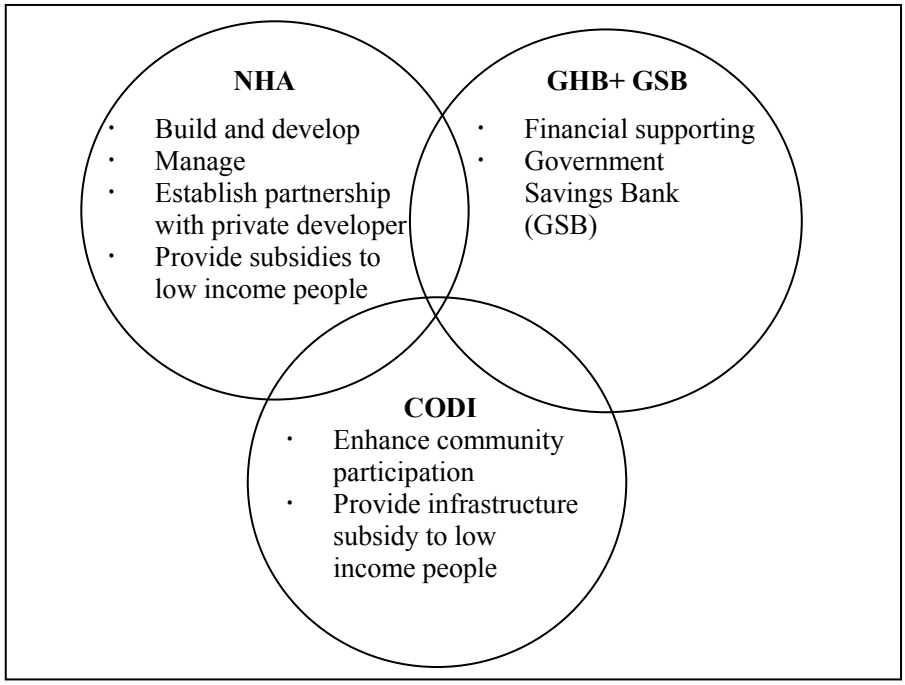
Source: "Housing Sector Research and Confirmation Survey for Coordination with Thai Citizens" by JICA

Figure 4-2 CODI Structure

(2) **Role of Government in Rental Housing Development Process (Thailand):**

The following figure illustrates the role of NHA, GHB, GSB and CODI in providing rental housing for low-income people in Thailand. Integrated development frameworks with financial and administrative organizations enables to achieve effective approach to rental housing for low-income people.

- National Housing Authority (NHA): It provides affordable housing for the low and middle income brackets, financial support and community management. They build houses for rent or sell them.
- GHB: It is a governmental financial institution formulated to stimulate house ownership and boarded access to housing finance to a wider segment of the population.
- Government Savings Bank (GSB): It attempted to devise a new system specifically targeting the low-income people.



Source: JST

Figure 4-3 Rental Housing Management Scheme in Thailand

5. RECOMMENDATIONS FOR IMPROVEMENT OF THE LIVING ENVIRONMENT OF INDUSTRIAL PARK WORKERS

From the results of Chapter 2 to 4, this chapter will assess and organize the measures that should be implemented in regard to improvement of the living environment of the workers in IPs in Vietnam.

Table 5-1 Relationship between Nation Wide Recommendations and Current Legal System

	Recommendations and the Current Related Legal System		
	(1) Enforcing the Implementation of the Current Legal System	(2) Introduction of New Measures	(3) Recommendations for Improvement of the Current Legal System
5.1 Recommendations for Spatial Planning and Building Design	1(1)1) Enhancing the Implementation of Architectural Regulation (Application of Construction Basics)	1(2)1) Formation of a Compact Living Environment Formation, Sharing of Public Facilities and Infrastructure (Advise on Planning) 1(2)2) Facilitation of Spatial Design to Medium / Small Scale Investors for Housing Development (Advise on Planning) 1(2)3) Building design for long-term (Provision of planning construction information)	1(3)1) Recommendations for Housing Facility Design (Construction Standards) 1(3)2) Reconsideration of Housing Provision (Housing Law No.54)
5.2 Recommendations for Institutional and Legal System	2(1)1) Articulated Coordination of Public-Private Partnership (Decree No.100 Article 28-31, Housing Law Article 57) 2(1)2) Enhancing the Role of Public Housing Entities (Housing Law Article 57) 2(1)3) Considering Long-Term Developments by Several Operators Participations (Decree No. 37/2010/ND-CP)	2(2)1) Housing Provision Enhancement by Medium / Small Size Investors 2(2)2) Support on Housing Business Management & Operation 2(2)3) Establishment Support of Rental Housing Dealing/ Information Centre	
5.3 Recommendations for Business and Financial Planning	3(1)1) Government Born Land Preparation and Social Infrastructure (Housing Law Article 58) 3(1)2) Introduction of Contribution to Business Cost by Factory Owners (Decree No.100 Article 31)	3(2)1) Rent Coupon Implementation 3(2)2) Whole Building Rent by Government and Public Housing Entities 3(2)3) Comprehensive Subsidy System Implementation Including Construction Cost	3(3)1) Relaxation of Business Profit Regulation (Decree No.100 Article 21) 3(3)2) Introduction of Low-Interest Loans (Housing Laws Article 58、30 Trillion VND Incentive Investment Program, Circular No. 11/2013/TT-NHNN) 3(3)3) Improvement of the Incentive System on Commercial Use of Social Housing Sites (Decree No.100 Article 9)

5.1. Recommendations for Spatial Planning and Building Design

(1) Facilitation and Tightening Enforcement of the Current Legal System

1) Enhancing the Implementation of Architectural Regulation

Actual housing supply for IP workers is catered for by private low-rise rental rooms and residential units whose quality is below the required standard.

Low-rise residential units were not considered as the major housing supply source till the recent even if the law of social housing provision expected. However, since it is expected to reduce the high construction cost of SH development, it should be considered and incorporated as an option for housing supply[19].

Currently, an implementation of decent low-rise housings is expected to be promoted by applying the legal system sufficiently. However, rental room business in areas surrounding IPs is continually facing serious competition from low-price options. Poor-quality buildings are constructed in order to decrease costs. As a result, this situation caused hesitation and difficulty for development operators intending to rent single rooms in this area. In order to attract them, quality control of building construction is essential and is required not only within the industrial parks, but also outside planned areas.
The following articles need to be followed in implementation of the current construction standards ('Constructions Standards", "Building Code').

- Preparation of guidelines for the construction standard: to clearly show contents of the relevant criteria in the current construction standards.
- Formulation of construction regulations: to supplement and introduce contents lacking in the current construction standards (see "improvement recommendations in regard to residential facilities design").
- Establishment of a regulatory organization: to strengthen construction license review of general housings.
- Application and strict control of regulations.

(2) **Introduction of New Measures**

1) **Creation of a Compact Living Environment Formation, Sharing of Public Facilities and Infrastructure**

In some built industrial zones recently, spatial planning is formulated based on consideration of the relationship between spatial housing integration with current villages and new living space for workers in some industrial parks. Based on those considerations, social infrastructure (educational facilities, parks and commercial facilities) and urban infrastructure (water supply and electricity facilities etc.) are shared efficiently with local villages and newly developed areas. Furthermore, creating an integrated compact living environment enhances and assures the quality of living of workers.

In order to realize better living conditions around IPs, it is desirable to put major emphasis on selection criteria of existing housing location (refer to 3.5.2) during formation of IP master plan or authorization guidance of the proposal.

From rational recommendations, the following articles are suggested.

- Facilitation of IP operators and factory owners

[19]The cost for residential facilities for 1,000 workers is calculated as follows in this model.
(including land acquisition cost, land preparation cost, construction of infrastructure and building)
Low rise building: 114,817 mil VND, medium rise building: 147,102 mil VND. (Referred to the section 8.6 in Chapter 8)

Adequate housing construction will be enhanced by giving proper advice during the spatial planning and business application process of IP operators.

- Reflection on the IP master plan

Creation of an IP master plan by public and governmental organizations will organize priority of land use within the housing site.

- Consideration for areas surrounding the IP.

It is recommended to determination land use by analyzing construction plans (Zoning plan etc.) and discussing proper sites. For example, for land with good accessibility, public facilities like educational and medical facilities are recommended.

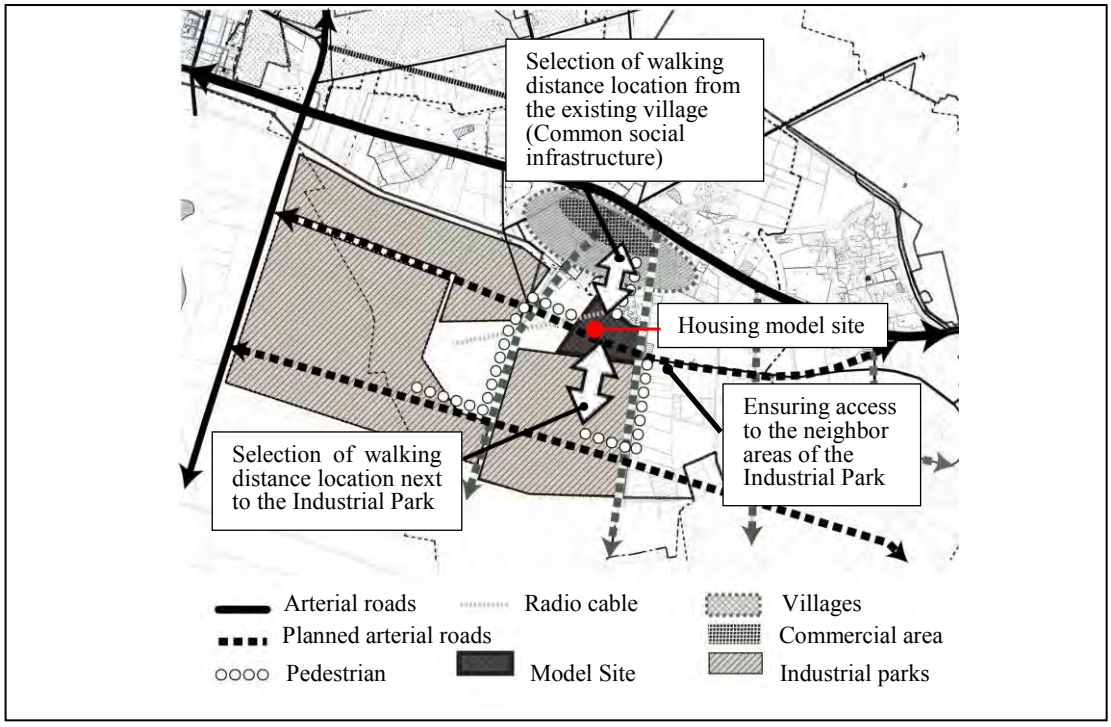


Figure 5-1 Considerations for Location Selection in View of Spatial Planning View (Case: Model Site)

2) **Facilitation of Spatial Designs to Medium / Small Scale Developers for Housing Development**

The housing supply by medium and small-scale developers has advantages such as decent price settings and local operator participations, and large-scale operators do not have such merits. It also increases the business stability for large-scale operators by sharing the roles on development. For promoting housing supply policy for medium and small-scale operators, the following considerations are recommended for the design guidelines by master developers and other developers who mainly work on housing block layouts (refer to 9.1.3).

It is desirable to formulate the principle of the spatial design and to provide these contents to business operators as design guideline.

- The various land lot dimensions should be designed matching flexible land selling options corresponding to local investment amounts.
- Considering subdivision of the lots; design guidelines need to be formulated and applied in order to plan and secure the community space at the center of each land lot. These spaces are designed for public facilities such as kiosks and food carts.
- The sport courts could be planned for common use among low and medium-rise housing lots.

An example of design recommendations on common residential and districts space by several operators can be seen below.

The following shows the example of design recommendations about common image of residential space and common residential districts by several operators.

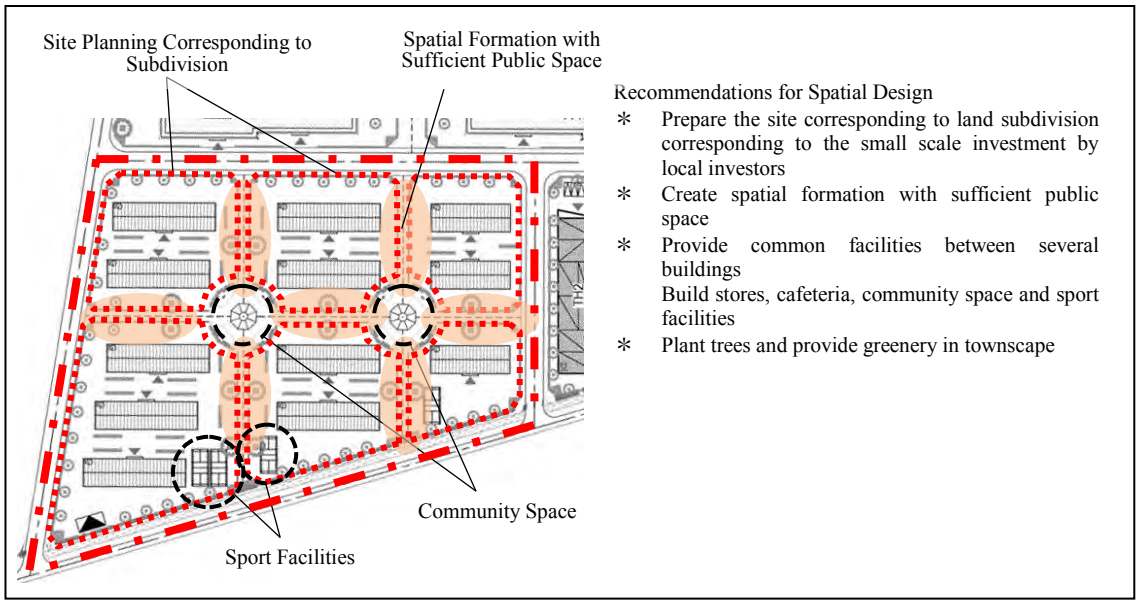


Figure 5-2 Image Showing Common Space

3) Corresponding Long-Term Construction Design

The housing market for rental rooms (demand) is very unstable due to dependence on operation policies of factories (industrial parks) and business situation. When investing in housing, future unforeseen market changes need to be seriously considered. For example, designing housing as units that can be renovated is one of the solutions to market changes.

Figure 5-3 Considerations in Architectural Building: for Renovation

(3) **Recommendations for Improvement of the Current Legal System**

1) **Recommendations for Improvement of Housing Facility Design**

The current construction standard in Vietnam does not determine strict application rules for maintaining a good environment in rooms. As a result, application of strict rules is limited.

It is proposed to define the following contents as the building regulations and design guidelines for social housing and strictly apply them. They are also to plan, review and authorize construction proposals in order to ensure good health of workers and use of residential facilities in the long-term. Below are the contents;

- Ensuring natural lighting in the room (i.e.: setting up windows covering over 10 % of the floor dimensions of general as well as social housing.)
- Ensuring natural ventilation in the room (i.e.: setting up windows covering over 15 % of the floor dimensions of general as well social housing.)
- The minimum dimension of housing units: Leading to 8~10 m²/person, is applied to high-rise residential units in Hung Yen Province.
- Installing washrooms and showers in individual housing units. (Corresponding to future and long-term use of the facilities.)

2) **Improvement of Social Housing Supply**

The current legal system in Vietnam determines residential dimension for one room of a social housing unit as 25~70 m². These housing dimensions for IP workers are larger than those of foreign

countries (Indonesia 21~36 m²[20], India 20~24 m²[21]). Also, the requirements of social housing supply is less restricted by comparing with other countries (In Vietnam, social housing supply requires 20 % of general housing development projects, but 60 % needs to be small size housings in all Indonesian housings). For purposes of enhancing social housing supply in the long-term, it is desired to readjust housing dimension rules and social housing supply requirements in housing development business corresponding to workers' affordability.

It is desirable to review items of the Decree No.100 regarding current Housing Law and Social housing corresponding to the review of these requirements.

5.2. Recommendations for the Institutional and Legal System

(1) Facilitation and Tighten Enforcement of Current Legal System

1) Articulated Coordination of Public - Private Collaboration

Support from IP business operators, investors, tenant companies and local governments for social housing development is indispensable. It is also crucial for urban infrastructure facilities and related social infrastructure developments for industrial workers.

It is therefore proposed to clarify measures of joint operations based on the roles of government and private operators in SH development. Implement of the rule in the Decree No. 100 and Housing Law Article 57 should also be encouraged.

For this purpose, it is recommended that the central government promulgate guidelines for local government and IP collaboration for supply of workers' housing at new IP establishments. The following typical procedures are proposed as contents of guidelines:

- Procedures for selection of IP location, including preliminary consultation and coordination with authorities relating to spatial and socio-economic developments of infrastructure and facility developments covering social housing site(s) and other related/neighboring areas,
- Consensus building necessity in local governments and investment operators for industrial workers' housing not only to secure the labor force but also for development of locals around the IP,
- Consensus building management and spatial formation of SH land for factory workers, that is open to neighboring communities,
- Ensuring business procedures for technical infrastructure development beyond the IP boundary covering at least the social housing site(s) with support from IP operators/ investors, and
- Integrating procedures for involvement of various operators into social housing supply including appropriate packaging of housing sub-schemes with government commitment throughout total project implementation, making participation of mid and small size investors.

It is necessary for local governments to make efforts in managing voluntary event promotion and collaboration with master developers. See proposed content in model sites in (Chapter 9 and 10).

[20] The standards for small sized housing applied the low interest rate investment based on 1-3-6 rule (refer to the section of (Chap 4 4.3)

[21] The standards for small sized housing based on Rule No 10 (refer to the section (Chap 4 4.3)

2) **Enhancing the Role of Public Housing Entities**

Currently, there are many IPs facing issues in improving living environments within Vietnam but factory owners do not face difficulties in recruiting workers even if they do not improve workers' housing. Under these circumstances, provision of social housing for workers does not continue and improve the environment. Therefore it is essential to establish a public housing organization with support from government and to conduct the business social housing. This will enhance improvement of the living environment of locals.

The following articles are the ideal functions of a public housing organization.

- Planning Formulation: designing the spatial layout including infrastructure planning, balancing with district scale infrastructure and supporting business establishment.
- Business Coordination: business management planning, subsidies for mid/ small size investors, and provision of service infrastructure.
- Implementation of Development: development implementation based on government funding and business execution by consigning to private operators.
- Housing Finance: coordination of long-term financial support (low interest loans, incentive loans and guarantees for operators and residents).

The Community Organizations Development Institute (CODI, Thailand), and the Delhi State Industrial and Infrastructure (DSIIDC, India) are examples of public housing entities (ref. Chapter 4).

3) **Long-Term Development Response by Participation of Several Operators**

In the practice of implementing SH business continuously in Vietnam, it is necessary to establish the mechanism for development business in order to response easily to long-term changes of investment situations of factory expansion and housing needs. Under the master developer that manages whole business, it becomes possible to develop housings for workers with the appropriate scales and the business contents corresponding to development moment by assuming business mechanism that several operators implement the development, housing construction, and management in some parts of area.

It is necessary to consider the following contents in response to these measures.

- To make possible to review smoothly and efficient change SH planning items as necessary in the future (urban planning, the introduce of the review system of business authorization)
- To introduce promotion measures to the operators who will participate only a part of housing development, such as housing construction or housing management (expanding the incentive system and support for organization related to social housing construction in current system, and considering to apply them to housing developers and operators who participate the business partially or from the mid-term).

(2) **Introduction of New Measures**

1) **Housing Supply Promotion by Mid and Small Scale Investors**

About construction of housings for IP developed in rural areas, it is difficult to expect the developers who can operate and provide the whole housings and its area. Therefore, the participations from the different scale of investors are necessary.

For encouraging the decent business participation and increasing the number of investors, it is recommended to first provide a decent business environment, and then encourage individual/small-scale investors to participate in housing projects.

Therefore, it needs the origination that formulates the overall business plan and coordinates the investments by individual investors and construction. For comprehensive dealings, it is suitable that the public housing organization becomes in charge of these functions.

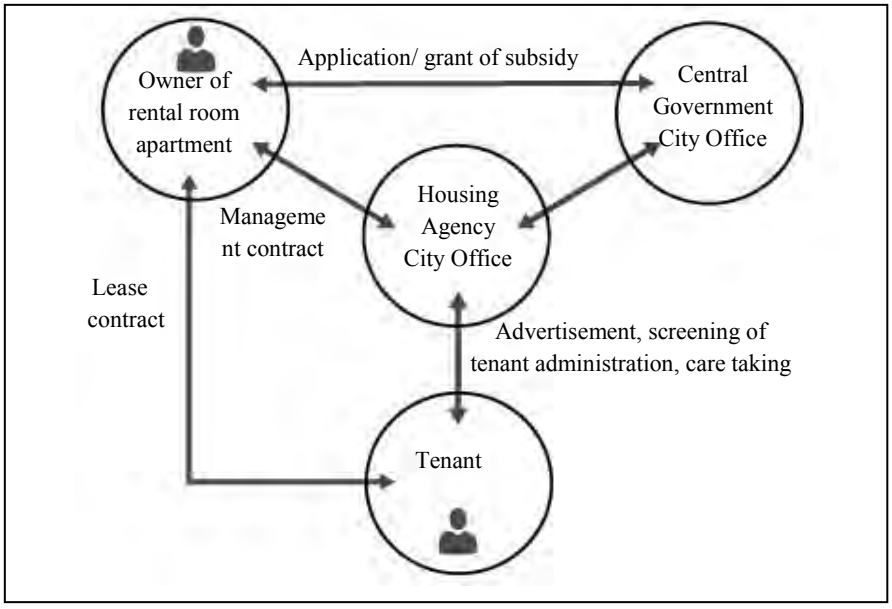
2) **Support on Housing Business Management and Operation**

Support on housing business management and subsidy provision, is proposed to facilitate rental housing construction by mid and small size investors. A corresponding system, "the subsidized rental apartment with high quality" was introduced in Japan. The following contents show the major points of the system.

System of the Business Model：

In this business scheme, owners of rental housing achieve construction requirements and are supported by the central and local/district level governments. Below are the characteristics of the program and its contents:

- Building owners (business manager) are supported by local district offices and governments through public organizations like the public housing organization. This support is in building operations, management of rent and contracts, selection of residents and advertising.
- Rent is set according to the factory owners' income. The central government and local offices provide the subsidies to fill the gap between the set rent and original rent landlords.
- Implementation of the system introducing factory owners to subsidized high quality rental apartments by the public housing agency shall be discussed. This system introduces landlords, IP operators in need of housing, factory owners and matches them.



Source: Web of Kawasaki city, Japan (http://www.kawasaki-jk.or.jp/chintai/list2.php) (edited by JST)

Figure 5-4 Program for Rental Residential Buildings with Certified Conditions

3) **Establishment Support of Rental Housing Dealing/ Information Center**

In order to facilitate workers' access to rental housing supply, establishment of a dealing/ information center is recommended to provide information regarding rent subsidies. It will also introduce decent housing. These should be established by public organizations or real-estate agencies and will promote and enhance quality of the living environment. Improvement of workers' access to rental housing will result into early realization of a community in the model site as well as increase revenue of landlords. They are also expected to organize the medium and small sized

operators who participating in housing business for workers and promote support policies like rent coupons[22].

The activities are conducted by private operators. At the beginning, the public entity will support on its organization as a part of social housing business participation support for medium and small real-estate operators, IP operators and factory owners.

5.3. Recommendations for Business and Financial Planning

Compared to IPs in areas that were not obliged to provide housing for workers, introduction of substantial subsidies or subsidy measures is indispensable. This is to support non-governmental capacity in the supply of housing for industrial workers.

Subsidy measures are categorized according to target population. Some target the dwellers while others help suppliers. Subsidies for suppliers like investment capital support including preferential development loans require profit-limiting measures. The current preferential loan package may not provide sufficient subsidy to fulfil housing supply for the lower income level groups of Q1 and Q2 groups that are the lower 40 % of total income level.

Dweller oriented subsidy measures include enhancing/supplementing dwellers affordability directly or through preferential loans. Credit and risk management are the challenges associated with loans. They are costly and require credibility.

(1) Facilitation and Tightening Enforcement of the Current Legal System

1) Land Preparation and Construction of Social Infrastructure by Government

- **Burden of land and social infrastructure by the government**

Construction of urban infrastructure facilities as well as land acquisitions is a heavy burden to small and individual investors. As the Housing Law and other related legal documents assume, social infrastructure, service provision such as medical, educational facilities, services and technical infrastructure is a government or public operator role. More still, provision of road and utility facilities is in addition to land allocations/provision of social housing schemes is also a government role as stipulated in the Housing Law. In some districts that currently face shortage of workers housing supply, it is necessary to enact a legal system to increase priority of infrastructure development and promote housing.

The cost burden of urban infrastructure development and land preparation to local governments closely depends on the financial condition of each province[23]. Some provinces have successfully managed these costs. On the other hand, for provinces facing financial shortages, the living environment has not improved due to lack of business support for private entities. The financial situation of these provinces impacts on the local workers' living environment. In view of balanced regional development, it is desirable to introduce central government support for social infrastructure development

2) Introduction of Contribution to Business Cost of Factory Owners

The Decree No. 100 defines the proper housing occupation and cost preparations necessary when launching factories. As a part of this measure, factory owners in need of housings for workers, rent

[22] Referred to the section 5.3 (2) 1).

[23] Referred to the section 3.8 in Chapter 3.

entire building(s) ensuring revenue for the owners. This decreases investment risk for private real-estate operators. It is therefore expected for private real-estate agencies to be able to reduce risk and balance business costs and profit as well as REIT when factory owners are renting a whole building. Implementation of this measure should be considered especially during new construction and expansion of plants that hire many employees.

(2) **Introduction of New Measures**

1) **Introduction of Rental Coupon System**

A "Rental Coupon" can be used for part payment of rent for housing that meets construction requirements. The owners, who received coupons, attain the reimbursement in exchange of the coupon form the public entity. The direct approach for improving worker's living environment is assumed by limiting the support usage instead of providing housing support by cash. In regard to workers' housing, it is prospective that factory owners introduce the system of "Rental Coupon" to encourage workers to move into favourable housing. This will support housing cost of workers. It will be possible to introduce this system through housing operators with regions, IP operators and factory owners and associated housing businesses in the province. In addition, local governments could contribute to improvement of the housing environment by introducing this system.

For the rent model of housing units in medium-rise buildings for four single persons, affordability by the target is only approx. 25 % (25 USD per month per house = 6 USD per month per person) is short of the non-profiting case's project expenditure.

2) **Whole Building Rent by Government, and Public Housing Entities**

When operators except those of IP operators and large scale factories construct housing for workers, they face challenges in securing stable residents. It is necessary for the government to manage housing demands when appropriate private operators are not expected to participate the housing development business, although housing development is necessary around IP.

It is proposed the government to rent a room with affordable price by renting the whole private rental building as the lease income assurance. For the management and the maintenance, it is entrusted to the private organizations.

For the provision of such service for housings, the establishment of the public housing organization is considered.

3) **Comprehensive Subsidy System Implementation and Business Establishment by the Government**

A subsidy system is necessary to increase participation of private entities or factory owners. Possibility of profiting from social housing business for workers is low because the rent and sales price for SH business is low. The subsidy system will include subsidized interest rates and rent, finance support funding, whole building rent and subsidized construction cost.

a. Comprehensive Business Establishment by Government

The typical subsidy for developers' spending is for investment funds. However, it is harder for private operators to achieve profitability as opposed to when the risk and possibility to exceed the profit limitation is 15 %. Also, providing huge subsidies for investment and securing profitability for private operators is inappropriate and difficult to justify.

The method of reward corresponds to investment and management costs incurred by private organizations, after which government, as the business entity provides the amount of subsidy and is expected to be feasible. In this case, public entities play a role of housing finance and private operators implement building construction and management (cost-and-fee system). Therefore, it is

expected to establish a public housing organization as a public business entity providing business and financial support.

b. Project Implementation of a Wholly Owned Central and Local Government

Since areas in need of social housing for industrial workers' in vicinity of the existing industrial park with workers' housing, are limited, the burden on the central and/or local governments' for total project implementation of housing supply not huge. Considering this situation, total implementation could be an option.

In this case, the subsidy is the balance between the total expenditure including construction, operation and maintenance costs, and the total income mainly rent and/or sales. The subsidized expenditure on housing supply for industrial workers has a social welfare aspect.

Issuing construction bonds for procuring investment funds is a measure to reduce the initial financial burden of construction. The amount of subsidy in this case is the balance between the total amount of redemption and total amount of project income.

It is pragmatic to outsource actual implementation activities such as construction, operation & maintenance to public, private and NGO housing entities etc.

(3) **Recommendations for Improvement of the Current Legal System**

1) **Relaxation of Business Profit Regulation**

Profit on social housing business is limited under the current legal system considering that the current REIT (Real Estate Investment Trust) market offers an interest of about 10 % annually in Vietnam. Also, considering the fact that individual investments usually generate more than the static REIT investment profit the current limit on profit for social housing (workers housing) is quite lower than this level of profit.

The Decree No.100 determines the maximum profit of social housing business as up to 10 % (sales model) or 15 % (rent model) of the total investment. This is applied institutionally and uniformly including SH. It is developed as part of profitable urban and new IP development projects. Therefore, involvement of operators in unprofitable housing business is avoided in the model site.

In view of securing profitability for operators, deregulation of the profit limitation of 10 % (sales model) and 15 % (rent model) in The Decree No. 100 is recommended as a long-term solution to social housing business during development of an IP.

2) **Introduction of Low-Interest Loans**

a. Implementation of Low-Interest Loans (for Operators)

In relation to social housing projects, it should be considered to introduce incentive interest rates, which is lower that current 5 % a year, for operators when the projects satisfy the construction requirements according to the laws and basis and set the proper selection process of residents. However, considering challenges in implementation such as risk and credit management to operators, there is need for scrutiny since there are more appropriate measures of project implementation and whole building rent by governments and public housing organizations.

b. Low-Interest Loans (for Workers and Resident)

In relation to social housing business, it should be considered to further decrease the current incentive low-interest rate (5 % level a year) as a special case of incentive interest rate for those buying houses.

Table 5-2 shows that a loan period of 20 years could enhance Q2 income groups' affordability coverage ratio against the non-profit housing price, the current basic should be 61 %, but when the

preferential interest rate is 0 %, the basic improves up to 97 %. However, its application will involve serious risk and credit management difficulties in the loan scheme.

Table 5-2 Increase in Affordability Ratio by Reducing Interest Rate (Example of Housing Unit for the Middle Class Family)

Annual Interest Rate	Const. Cost (1,000VND)	Affordability (1,000VND)	Affordable Ratio
5% (current)	528,598	323,268	61%
2%	528,598	421,723	80%
1%	528,598	463,895	88%
0%	528,598	512,022	97%

Notice: Annex 11 (1) & (2) show the calculation process and result for the construction costs and the affordable prices above.

3) **Improvement of Incentive System of Commercial Use of Social Housing Site**

20 % of the land or its equivalent floor area against the total project area is entitled to social housing projects by the Decree No.100 in view of generating profit from commercial activities. However, lucrative profitability from commercial activities is expected only in very urbanized areas and it is not expected in (semi-) rural areas.

In order to ensure contribution to commercial profit of social housing developments, it is recommended to consider:

i) Relaxation of commercial area ratio in the social housing development and

ii) Expansion of commercial activities (e.g. including related public facilities such as vocational training schools).

5.4. Implementation Priority of Policies

The policies recommended in this chapter are classified according to suitability of implementation terms based on short (within 2 years), mid (3 to 4 years) and long (more than 5 years) of the period of preparation. The result is proposed as below.

- Short-term Measures: Regardless of the economic and social situation, it is indispensable to cater for improvement of the living environment of IP workers. These measures should be thoroughly practiced in the current system and implementation should be within two years.
- Medium-term Measures: Implementation of the improvement of the living environment should be examined. It is assumed to be needed for a certain period and implementation should be within 3-4 years.
- Long-term Measures: These are to be provided in order to respond to future growth of labor demands or to changes in economic and social situations. These measures are not necessary to be executed immediately, but they are expected to be prepared for organizational systems, development systems and financial systems in future.

Table 5-3 Implementation Priority of Nationwide Policies for Improvement Social Housing

	Priority Order and Terms for Conducting Measures and Policies		
	Short-Term (within 2 years)	Mid-Term (within 3~4 years)	Long-Term (over 5 years)
5.1 Recommendations for Spatial Planning and Building Design	1(2)1). Formation of Compact Living Environment Formation, Sharing of Public Facilities and Infrastructure (Advise During Planning Examination) 1(2)2). Facilitation of Spatial Design to Medium/Small Scale Operators of Housing Development (Advise During Planning Examination) 1(3)1). Recommendations for Improvement of Housing Facility Design (Construction Basics) 1(1)1). Enhancing the Implementation of Architectural Regulation (Application of Construction Basics)	1(3)2). Improvement of Social Housing Provision (Housing Law No.54)	1(2)3). Long-term Corresponding Design of Construction (Provide Planning Design Information)
5.2 Recommendations for Institutional and Legal System		2(1)1). Articulated Coordination of Public-Private Collaboration (Decree No.100 Article 28-31, Housing Law Article 57) 2(1)2). Enhancing the Role of Public Housing Entities (Housing Law Article 57) 2(2)1). Housing Provision Enhancement by Medium /Small Scale Investors 2(2)2). Support on Housing Business Management & Operation 2(2)3). Establishment Support of a Rental Housing Dealing/ Information Center	2(1)3). Long-Term Development Correspondence by Participation of Multiple Operators (Housing Law 57 Items, Decree 37/2010/ND-CP)
5.3 Recommendations for Business and Financial Planning	3(1)1). Introduction of Contribution to Business Cost by Factory Owners (Article 31, Decree No. 100) 3(3)2). Introduction of Low-Interest Loans (Housing Law Article 58、30 Trillion VND Incentive Investment Program, Circular No. 11/2013/TT-NHNN) 3(2)1). Introduction of Rental Coupon System	3(1)1). Land Preparation and Construction of Social Infrastructure by Government) (Housing Law No.58) 3(3)1). Relaxation of the Business Profit Regulation (Decree No.100 Article 21) 3(3)3). Improvement of Incentive System for Commercial Use of Social Housing Sites (Decree No.100 Article 9)	3(2)2). Whole Building Rent by Government and Public Housing Entities 3(2)3). Comprehensive Subsidy System Implementation and Business Establishment by the Government

6. SITUATION IN THE MODEL SITE

6.1. Site Selection

Candidate sites for housing development were located at the Pho Noi Area in the Hung Yen Province. Pho Noi Area is located 15 km east of Hanoi Metropolitan area and west of Hai Duong Province. The national highway No.5 run through the area and connects area to Hanoi and Hai Phong. Therefore, the potential of the industrial development were thought to be high. The Pho Noi industrial estate and Thang Long IP II was developed in the area. Those industrial estates are categorized as a type 2 "IPs in Vicinity Rural Areas Around Large Cities/Metropolitan Areas (type 2)" as analyzed it the Chapter 3. The situation is typically expressed as quoted in the following sentence. "By increasing the direct investment into the industrial sector, it has resulted in IP developments in rural areas around large cities/metropolitan areas. Until recently, most IPs in the location lacked considerations for IP workers' SH. As a result, dwelling places were supplied through private rental rooms adjacent to or in the vicinity of surrounding communities."

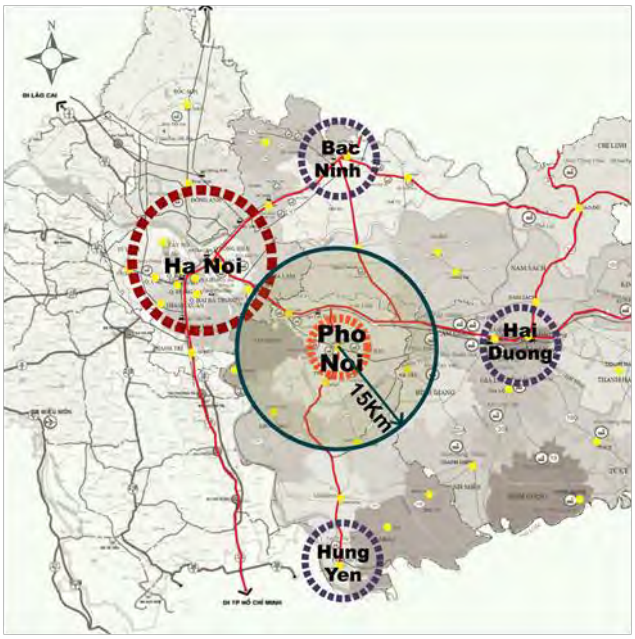


Figure 6-1 Location of Pho Noi

Although the site for housing development was determined in the initial stage of the preparatory study and signing of the Record of Discussion, development approval was given to another investor. Therefore, utilization of the site was forfeited, and preparation of a new one was required. The JICA study team requested to provide candidate sites matching the following criteria at the JSC held in April.

- Where labour force is generally young and from different areas. In addition, their working hours would be different compared to those of the people living in surrounding areas. According to our survey, the labour force hopes to stay longer in the area. Having more opportunities to socialize with local residents is essential for the workers to feel part of the local community. Their housing should be located in an area next to the city center.
- The model site shall be located in an area where the labour force can easily commute within a short time.
- The social housing projects for workers are expected to be established by private investors. Therefore, the area should have potential for residential development. (Easy access and better conditions)

Location of the candidate sites is shown below (From A to D).

Source: JST

Figure 6-2 Candidate Site

The JICA study team conducted this analysis based on the field and document survey. The results are summarized in the table below.

Table 6-1 Analysis on Candidate Site

Site No.	Location	Access to IP	Access to Public services/ facilities	Infrastructure	Cost of construction	Land price	Other business opportunities/ revenue	Community / Total evaluation	Access to Public services/ facilities
(A)	North area of Xa Ham Hoa	• 6.7km from TLIP II • 4.8km after new road construction • Not paved	• 1.5 km to Thon Chua • Not paved • 0.7 km to Phuc Xa • No road	No service	• No road network • Need to construct • 0.7 km at least from the nearest village	• Landing infrastructure construction & public facilities required	Very low	• No business opportunities except road side developments	• Huge investment required for initial development • Difficult cost-benefit
		C	C	D	D	D	A	D	**D**
(B)	North area of Xa Nham Hoa	• 8.0 km from TLIP II • Less than 2.0 km from new development area • Paved	• Expected to be about 0.5 km depending on the nominated site	• Through adjoining villages	• Need to construct from nearest villages (but not a long distance)	• Landing infrastructure construction & public facilities required	• Thought to be moderate	• Several developments are planned and on going	• Future development and residential supply needs • Matches the need for planning
		B	(C)	(B)	(C)	(C)	(B)	A	**(B)**
(C)	Xa Phung Chi Kiem (south of Xa Di Su)	• Adjacent to TLIP II	• Adjacent to Xa Phung Chi Kiem and Xa Di Su	• Through adjoining Villages	• Offered as an extension area from adjacent villages	• Landing 119infrastructure required	• Thought to be moderate	• Supplementary service to adjacent villages considered	• Expected good living conditions harmonized with adjacent village
		A	B	A	A	(B)	B	B	**A**
(D)	Lieu Xa	• Adjacent to TLIP II	• Adjacent to Lieu XA	• Through adjoining villages	• Offered as an extension area from adjacent villages	• Landing infrastructure required	• Thought to be moderate or high	• No other business opportunity because of the small site size.	• Small size • Suitable for construction of dormitories
		A	B	A	A	(B)	C	C	**B -**

The study team and their counterparts conducted this joint investigation on May 18th, 2015 and finally selected site C.

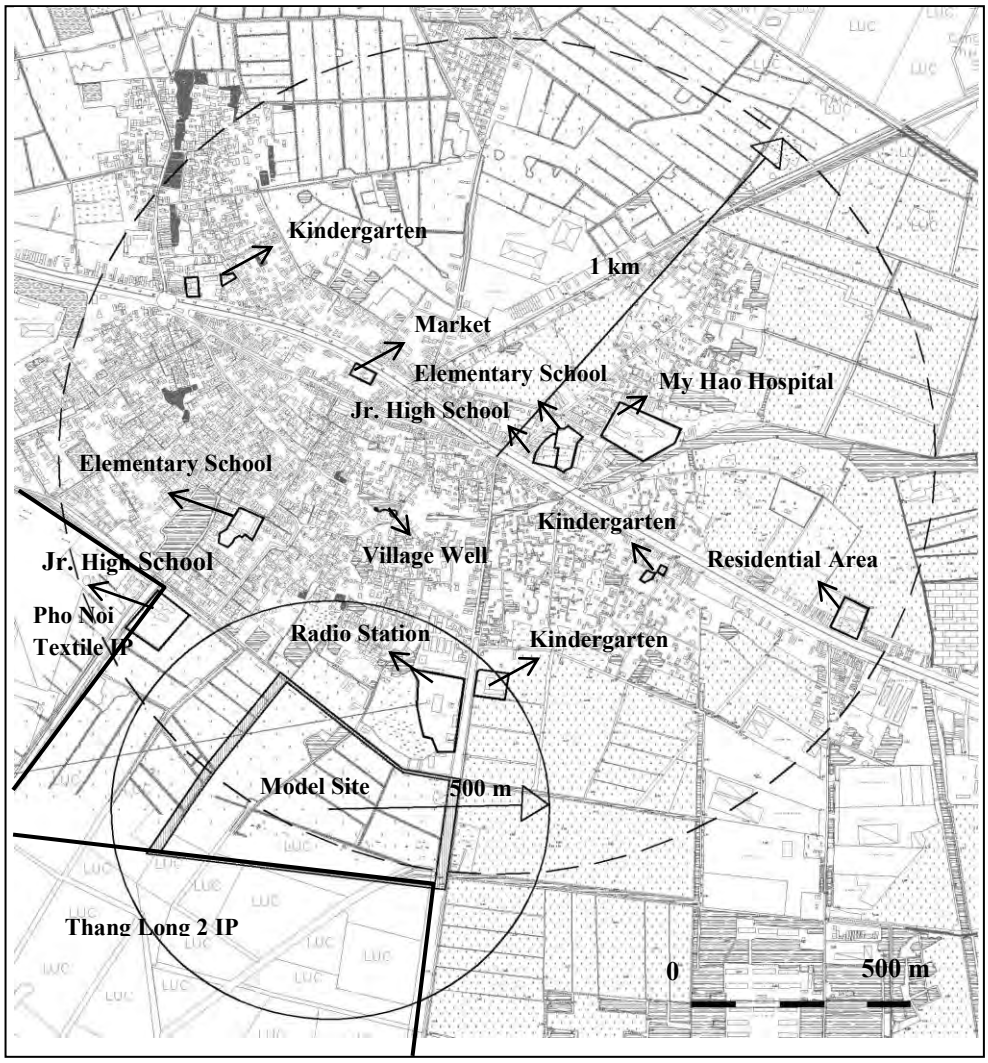
6.2. Analysis of the Study Site and its Surroundings

6.2.1. Locational Situation (e.g. Facilities) Around the Model Site

The model site is adjacent to Thang Long IP II and Pho Noi Textile IP. This is a highly convenient area with multiple commercial facilities including retail stores available along old roads in the urban area of the neighbouring community.

Educational facilities including kindergartens, elementary and junior high schools are located in the urban area between the model site and National Highway No.5. There are elementary and junior high schools and a hospital located at the opposite side of National Highway No. 5. Establishment of more public facilities is in progress.

As a special function and facility, a radio station is located nearby. The summary of model site urban planning is discussed in section 6.4.



Source: JST

Figure 6-3 Situation around the Model Site

6.2.2. Road Traffic Situation Around the Model Site

The model site is adjacent to an IP at the southern side, and there is no significant problem for the access to the IP.

Meanwhile, the road from the northern side of the model site to the National Highway No.5 is a district road in the community, and some parts pose the difficulties for general vehicles to perform bidirectional trafficking.

For that reason, it is desirable to expand and establish a main road that serves as an access road from the National Highway No.5. In the Master Plan of the district, there is a plan to establish a road network by widening and newly constructing some parts of the road that is situated on the east side of the model site.

While the Zoning Plan designs to develop on the both sides of National Highway No.5, methods to travel between the north and south urban areas across the Highway are currently limited. In order to realize the Master Plan, it is essential to properly manage intersections along the National Highway No.5 and to establish grade separation facilities for cars, motorcycles, pedestrians, etc. to safely and easily travel across the highway.

Collaboration and integration of the north and south urban areas across the National Highway No.5 may result in the effective use of educational facilities (e.g., elementary school, junior high school) and public facilities (e.g. hospital) within the service distance, and it enables to facilitate the convenient use of such facilities by the residents of the model site.

6.2.3. Living Environment Situation Surrounding the Model Site

Houses at the residential area around the model site are mainly low-rise 2-3 story detached houses and apartments, forming a medium density urban area. The living environment is quiet and calm, free from noises of factories or highway traffics. There are several ponds and creeks in the community; some of them encourage residents to stroll around and serve as communication points.

However, some creeks are facing water pollution issues.

Entrance to the model site from National Highway No. 5, which is a bottleneck of bilateral traffic for cars

Lively Chua Market

Some creeks running through the community face water pollution

Some ponds and creeks create amenity places for local residents to relax and refresh.

Roads in the residential area near the model site are wide, yet the urban area near National Highway No.5 is crowded and the roads are narrower.

The model site and the surrounding area are rice fields. The red wall is of the Thang Long IP II adjacent to the model site.

The density of the residential area around the model site is low, creating a calm living environment of Low-rise 2-3 story houses lined up.

Source: JST

Figure 6-4 Living Environment of the Neighboring Community Located in the North of the Model Site

6.3. Natural Environmental Situation

In this study, the situation of the natural environmental situation is investigated in the topics below. The details are described in Annex 8.

Location and Current Condition of the Project Site

(1) Location of Project Site

(2) The Current Condition of the Project Site

Natural Conditions

(1) The Topography and Geomorphology

(2) Climate

(3) Hydrology

(4) Engineering Geology, Hydrological Geology and Seismic

1) Engineering Geology

2) Hydrological Geology

3) Earthquake

Environment

(1) Water Source

1) Surface Water

2) Underground Water

(2) Air Environment

(3) Soil Environment

(4) Ecosystem

(5) Status of Waste Collection and Management

1) Solid Waste

2) Waste Water

6.4. Related Construction Plan

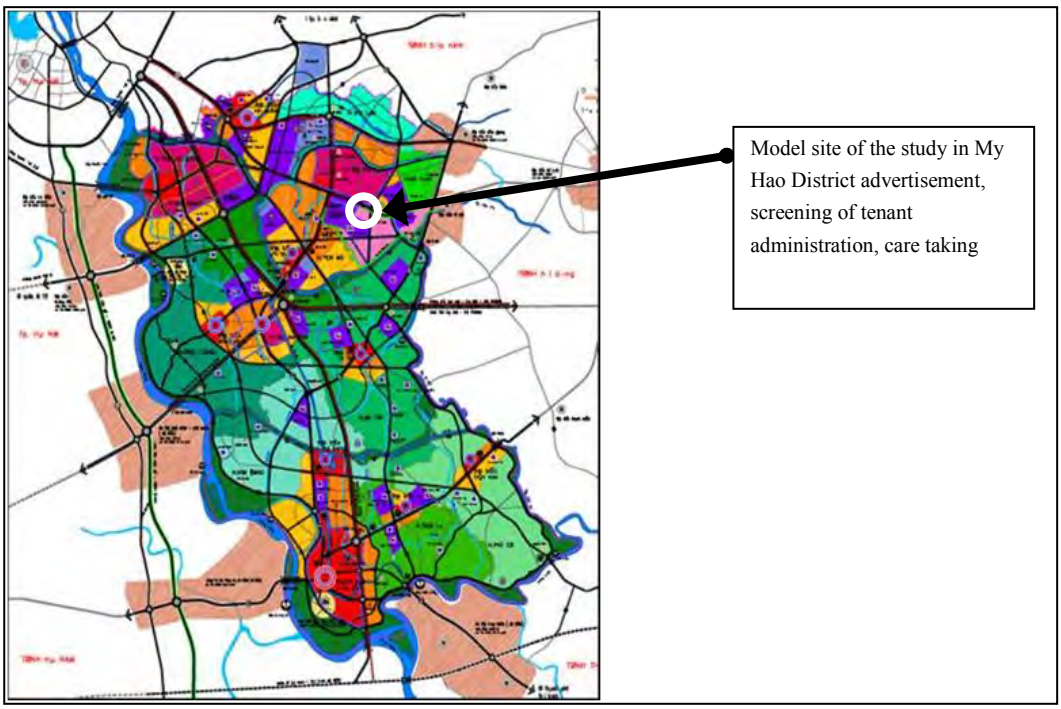
6.4.1. Regional Construction Planning of the Hung Yen Province

"Regional Construction Planning the Hung Yen 2020, Orientation to 2030 and Vision 2050" was approved in 2011, and it is the urban planning for Hung Yen province. This is intended to direct general orientation of development and to set solutions to implementation in form of a list of several projects.

The following are the major contents of this plan and related issues to planning of housing supply of the study of the model site.

- It studies prospects of population growth, industrial growth, and urbanization progress of 10 districts and areas of the entire Hung Yen Province.
- For the above mentioned growth and progress, it supposes three different industrial and urbanization developing speeds. According to these assumptions, the plan estimates that 60 to 70 % of future industry workers will be local employees and 30 to 40 % of the workers will be migrants.

- It formulates the construction plan at provincial level for each sector of infrastructure (road, water supply, electricity, etc.).
- The area of the model site is designate in the My Hao IP with related programs of development. This development policy is reflected in the detailed plans for My Hao District.



Source: Regional Construction Planning the Hung Yen 2020, Orientation to 2030 and Vision 2050

Figure 6-5 Spatial Plan of Construction Planning for the Hung Yen Province

6.4.2. General Construction Planning and Zoning Plan for My Hao District

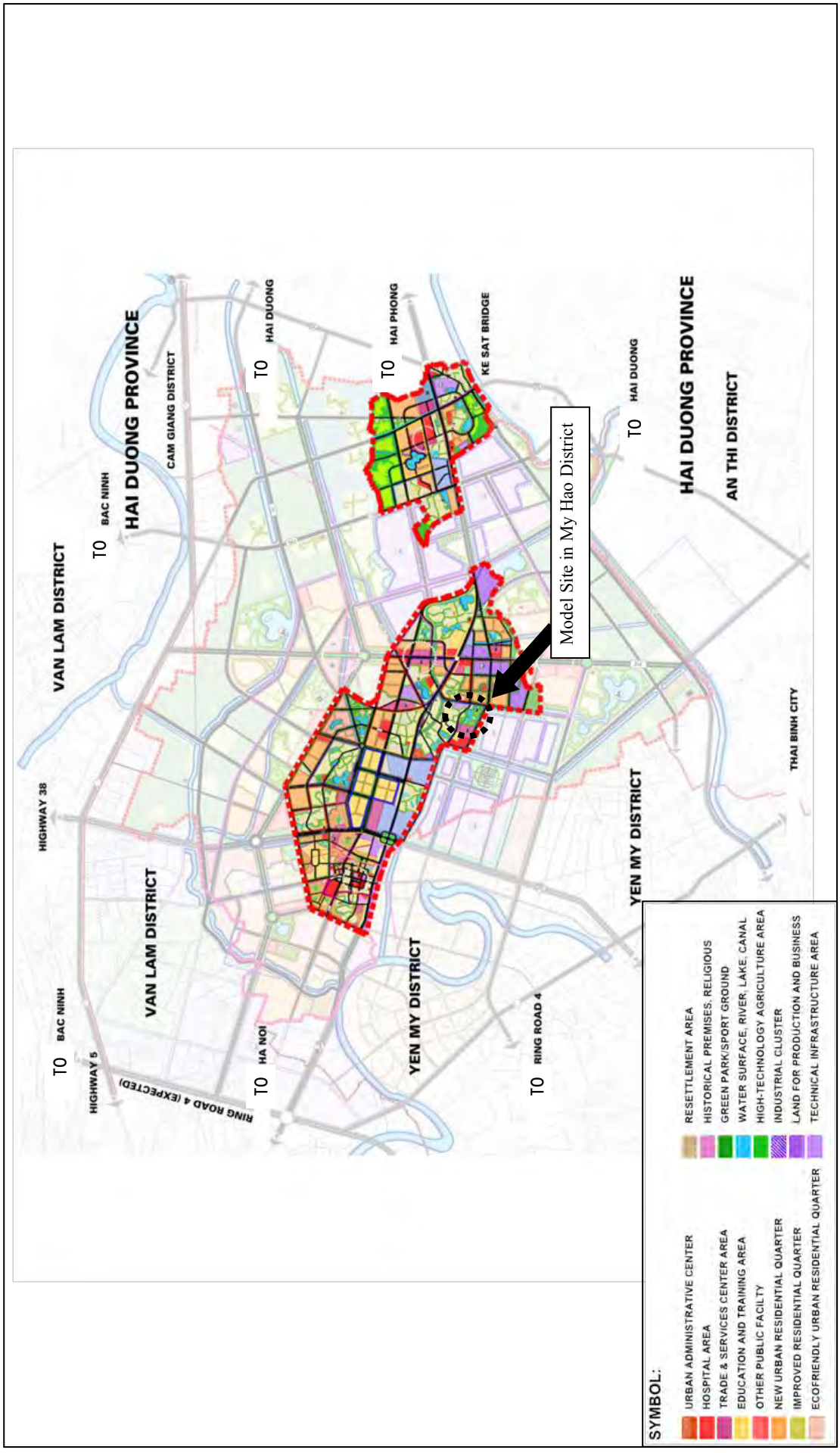
For the My Hao District, the following plans are prepared in different scales.

(1) General Construction Planning for My Hao District, Hung Yen Province, Vision 2020 to 2030

The planning document was approved in 2012. This plan is intended to direct general orientation of development outlining the future land use of the entire area of My Hao District.

The following are the major issues to be considered for the planning of the model study site.

- This study assumes population growth of the entire My Hao District to range from 98,704 in 2011 to 285,320 in 2020 and 343,000 in 2030.
- The plan supposes that population growth is mainly caused by progress of industrial development. It estimates that 60% of future industry workers are local employees and 40 % are migrants.
- It also proposes that 680 ha of housing development is for 75,000 persons. Their spatial areas are indicated in the figure below in two different development periods. The location of the model site is designated in a prior development area until 2020.
- The land use in the model site is designated as green space and open space in the planning document.
- An inter district road is planned to across trough the model site in the plan. Its alignment needs to be confirmed for purposes of spatial planning in this study.



Source: General Construction Planning of My Hao District, Hung Yen Province, Vision 2020 to 2030

Figure 6-6 Spatial Plan of the General Construction Planning of My Hao District

(2) Zoning Plan for My Hao Urban Center in My Hao District, Hung Yen Province

Following general construction planning, this study of the urbanized area of My Hao district was conducted. Its results were formulated in the zoning plan and approved in 2015.

The followings are the major issues to be considered when planning for the study of the model site.

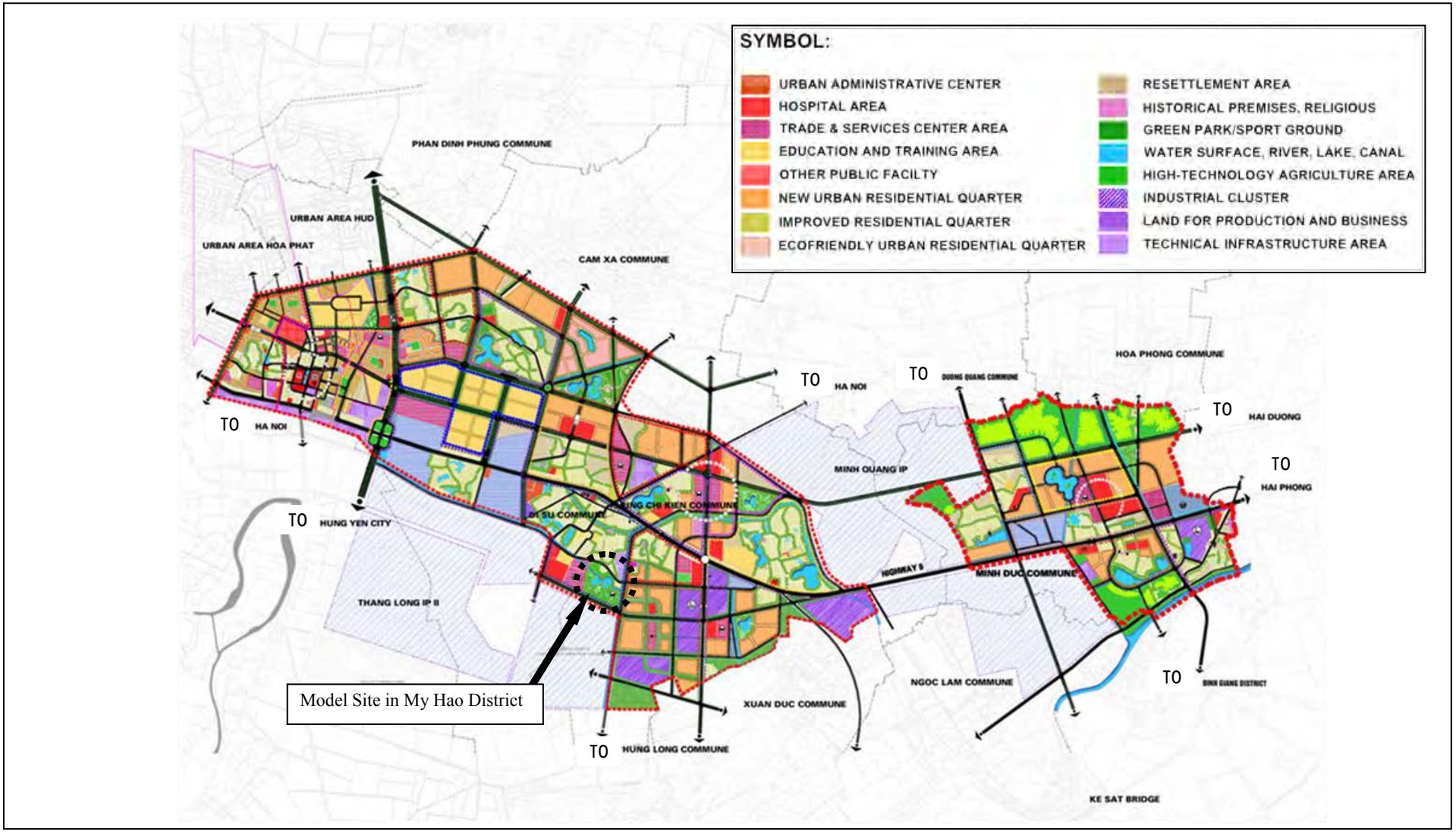
- Division of the urban center of My Hao district, this divides the currently urbanized and future development area, into 28 zones. The plan sets the land use, development capacity and future population of each zone.
- It sets the planning requirements of the model site of this study as follows.

Table 6-2 Planning Details of the Model Site in the Zoning Plan

Planning Issues	Model Site	Surrounding of the Model Site
Land use	Green/ Open space, Residential area	Trade and services
BCR (Building Coverage Ratio)	40 – 50% (residential area)	40 – 50 %
Numbers of Floors	2 – 3 floors	5 – 7 floors

Source: Zoning Plan for My Hao Urban Center of My Hao District, Hung Yen Province

- Corresponding to the spatial plan, this provides the construction policy of the network of infrastructure (road, water supply, sewage, drainage, etc.). Description of these networks corresponds to the levels outlined in the study.
- Some planning issues are not adjusted to the general construction and other related plans. Details of the planning needs are formulated based on results from further studies and discussions with corresponding departments of Hung Yen Province and My Hao District. This is during the process of preparation of the zoning and detailed plan for realization.
  For the model site, the alignment of the district road between National Road No.5 and the Textile IP should be confirmed with related entities.



Source: Zoning Plan for My Hao Urban Center of My Hao District, Hung Yen Province

Figure 6-7 Spatial Plan of the Zoning Plan for My Hao Urban Center

(3) **Planning Issues Based on the Results from Discussions**

As earlier mentioned, there is discordance between the plans for Hung Yen province and My Hao District. Some planning issues need to be finalized through discussions. Details of the issues have been confirmed from discussions with responsible organizations in the provincial and district office between May and November 2015. The corresponding sections of this report describe these details.

- Change of land use in the model site: from open/green space to a residential area for workers' housing.
- Road alignment: inter regional road between National Road No.5 and the Textile IP.
- Infrastructure networks (water supply, sewage, drainage, electricity).

(4) **General Construction Plan for Pho Noi Town 2025**

The model site is located in the New Town area adjacent to Pho Noi. The plan was authorized in the "General Construction Plan for Pho Noi Town 2025" by government in 2010.

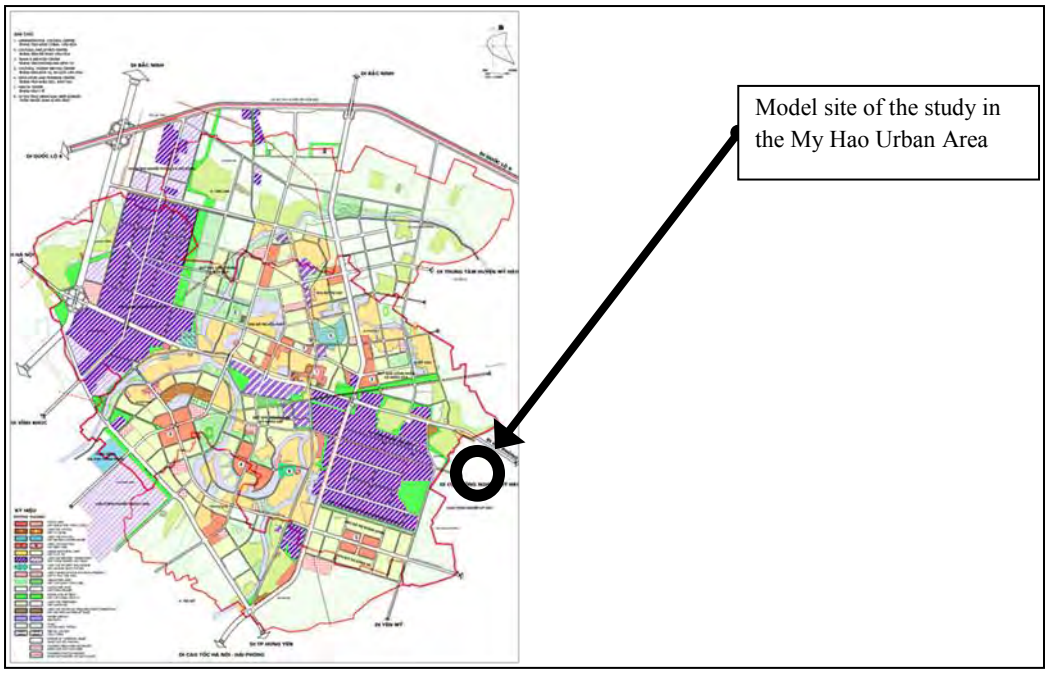
The model site is not located in the planned area of construction. Therefore, this study sets its priorities basing on the plans of My Hao district (mentioned above (2)) for the construction plan of Pho Noi. Furthermore, this study refers to the future plans of Pho Noi Town for consideration of the infrastructure network and its planning.

The plan outline is shown as below.

Table 6-3 Outline of the New Town Development Project for Pho Noi, Hung Yen Province

	Outline
Objective	Four development districts (My Hao, Yen My, Van Lam, Van Giang) that become the binding points of the main Hanoi-Hai Phong transportation route and the satellite towns of Ring Road No.4 of the Hanoi plan. This area is expected to develop as the centre of the northern economic district of Hung Yen Province (provincial capital is the center of the southern area).
Target Population	Current population (2010): 83,865 people First development (2015): 150,000 people (anticipated increase rate of 7.75%) Second development (2025): 250,000 people (anticipated increase rate of 4.4%)
Land Use Plan	Total project area: 6,694 ha First development area (2015): 3,445 ha Second development area (2025): 4,081 ha (as shown in the English translation version)
Development Location and District	Residential town development: Northern area approx. 500 ha, southern area approx. 250 ha. Divided into north and south by National Highway No.5
IPs	Pho Noi-A IP (540 ha) Pho Noi-B IP (355 ha) Ngoc Long IP (210 ha) Other (550 ha)
Infrastructure Development	Water supply plan: Construct Pho Noi-B (12,000 m^3/day) and improve the processing capability of Pho Noi District to 15,000 m^3/day. Sewage purification plan: There is a plan to construct 15,200 m^3/day at the north side of National Highway No. 5. Electricity supply plan: Distribution from the Pho Noi substation (220 kV)
Investment Status	The North side of National Highway No.5: Hoa Phat Construction residential development area (300Ha), HUD & Lac Hong Investment residential development area (175 ha) (both closer to Ha Noi) The South side of National Highway No.5; Thang Long Real Estate & SUDICO residential development area (100 ha), Hong Ha, Ha Noi Investment residential development area (200 ha) (both next to the south side of the Thang Long IP II)

Source: The General Construction Plan for Pho Noi Town 2025



Source: The General Construction Plan for Pho Noi Town 2025

Figure 6-8 The Development Plan of Pho Noi, Hung Yen Province

6.5. Urban Planning Documents and Drawings Prepared in the Study

The Study Team is going to prepare urban planning documents related to the amendment of the Zone and detailed plan based on discussions and consultation with the Vietnamese Government. These documents are legislated under the LAW ON URBAN PLANNING No. 30120091QH12, Decree No.37/2010/ND-CP, Circular 10/2010/TT-BXD and so on. Amendment of Zone plan drawings are mostly prepared using a scale of 1 to 2,000 while the detailed plan is prepared using a scale of 1 to 500. However, details of expression in the drawings are not clearly indicated by these regulations. Therefore, the study team refereed to some examples of the authorized urban plan and had consultative meetings with authorities from Hung Yen Province. Consequently, reports and drawings will be prepared as shown in the following tables.

Table 6-4 Table of Contents for Zone Plan Amendment Report

CHAPTER I: INTRODUCTION
1.1. Objective of detailed plan (scale 1/500)
1.2. Basis for formulation of detailed plan (scale 1/500)
CHAPTER II: SITE LOCATION AND EXISTING CONDITIONS

CHAPTER III: SPATIAL DEVELOPMENT ORIENTATION
1. DEVELOPMENT PERSPECTIVE
2. POPULATION CHARACTERISTICS AND SIZE
2.1 Population characteristics
2.2 Population size
3. PLANNING STRUCTURE
3.1 Development approaches
3.2 Alignment, downtowns, center point of spatial development
4. ZONING PLAN
5. LAND USE PLANNING
5.1 Land of civil area
5.2 Land outside civil area
6. SPATIAL ORGANIZATION OF LANDSCAPE ARCHITECTURE – URBAN DESIGN
6.1 Organization principles
6.2 Mainstream spaces

CHAPTER IV: ORIENTATION OF INFRASTRUCTURE SYSTEM DEVELOPMENT
1. TRAFFIC SYSTEM
1.1 Road system
1.2 Traffic head works
2. TECHNICAL PREPARATION
2.1 Land levelling
2.2 Storm water drainage
3. POWER SUPPLY SYSTEM
3.1 Power sources and demand
3.2 Orientation of power grid development
4. WATER SUPPLY SYSTEM
4.1 Water sources and demand
4.2 Solutions to water supply
5. WASTE WATER DRAINAGE SYSTEM AND ENVIRONMENTAL SANITATION
5.1 Waste water drainage
5.2 Environmental sanitation

CHAPTER V: STRATEGIC ENVIRONMENTAL ASSESSMENT
1. PREAMBLE
1.1. General objectives of SEA
1.2. The basis for SEA formulation
2. ASSESSMENT OF THE PLANNING AREAS' CURRENT STATE OF ENVIRONMENT
2.1 Water Environment
2.2 Air Environment
2.3 Land Environment
2.4 Ecosystem
2.5 Current state of garbage collection and waste management

CHAPTER VI: CONCLUSION AND RECOMMENDATION

Table 6-5 Table of Contents for Detailed Plan

CHAPTER I: INTRODUCTION
1.1. Objective of detailed plan (scale 1/500)
1.2. Basis for formulation of detailed plan (scale 1/500)

CHAPTER II: SITE LOCATION AND EXISTING CONDITIONS
2.1 Planning land area
2.2. Site location
2.3 Socio Economic Conditions
2.3.1 Population
2.3.2 Industry
2.3.3 Society
2.4. Natural conditions
2.4.1. Topographical conditions
2.4.2. Climate conditions
2.4.3. Engineering geological conditions
2.4.4. Hydrological conditions
2.5. Existing conditions
2.5.1. Land use and Construction and Architecture
2.5.2. Other conditions: (road transport, power supply, water supply, storm water drainage, and waste water treatment etc.)
2.6. General assessment

CHAPTER III: PLANNING FRAME WORK
3.1 Socio Economic Framework
3.1.1. Population
3.1.2 Economy and Society
3.2. Concept of Spatial organization

3.2.1. Principles of detailed plan formulation
3.2.2. Planning alternative
3.2.3. Targeted areas

CHAPTER IV: PLANNING CONTENTS
4.1. Planning scale and land area
4.2. General layout plan(Layout Plan or Land Use Plan)
4.2.1 Architectural and spatial organization
4.2.2. Technical infrastructure planning
4.3. Construction items

CHAPTER VI: TECHNICAL INFRASTRUCTURE PLAN
5.1 Land preparation planning(ground levelling and site reclamation)
5.1.1 Basis for planning
5.1.2 Solutions to Construction (technologies applied, specification, method)
5.1.3. Summary of work quantities
5.2. Road Transport planning
5.2.1. Basis for road planning
5.2.2. Planning for outbound roads
5.2.3. Planning for internal roads within planning area
5.2.4. Structural solutions (technologies applied, specification, method)
5.2.5. Summary of work quantities
5.2.6. Marker planning for red-line boundaries and construction boundaries
5.3. Water supply planning
5.3.1. Basis for planning
5.3.2. Planning for water supply
5.3.3. Solutions (technologies applied, specification, method)
5.3.4. Summary of work quantities
5.4. Power supply planning
5.4.1. Basis for planning
5.4.2. Planning for power supply
5.4.3. Solutions (technologies applied, specification, method)
5.4.4. Summary of work quantities
5.5. Waste water treatment
5.5.1. Basis for planning
5.5.2. Planning for waste-water treatment
5.5.3. Solutions (technologies applied, specification, method)
5.5.4. Summary of work quantities
5.6. Storm water drainage
5.6.1. Basis for planning
5.6.2. Planning for Storm-water drainage
5.6.3. Solutions (technologies applied, specification, method)
5.6.4. Summary of work quantities
5.7. Environmental criteria

CHAPTER VI: STRATEGIC ENVIRONMENTAL ASSESSMENT
6.1. Construction phase
6.1.1. Major impacts
6.1.2. Countermeasures
6.2. Completion and operation stage
6.3. Overall assessment

CHAPTER VII: FINANCIAL ANALYSIS
7.1. Basis of total cost estimation
7.2. Total project cost
7.3. Capital sources of investment
7.4. Investment efficiency
7.4.1. Economic efficiency

7.4.2. Social efficiency

CHAPTER VIII: PROPOSALS ON REQUIREMENTS OF CONSTRUCTION PLANNING MANAGEMENT
8.1. Regulations on red line and construction boundaries
8.2. Management zoning of architectural landscape
CHAPTER IX: CONCLUSIONS AND RECOMMENDATIONS
9.1. Conclusions
9.2. Recommendations

Table 6-6 List of Drawings for Zoning Plan Amendment

No	Title of Drawings	Scale	Remarks
1	Location Map	1/10,000 or 1/25,000	
2	Current status map of landscape architecture and construction land assessment	1/2000 or 1/5000	
3	Current status map of technical infrastructure system and environmental protection		
3.1	Road and Transport	1/2000 or 1/5000	
3.2	Water Supply		
3.3	Waste Water Treatment		
3.4	Drainage		
3.5	Power Supply		
4	Land use planning map	1/2000 or 1/5000	
5	Diagram of landscape architectural space organization	1/2000 or 1/5000	Social infrastructure is excluded.
6	Transportation planning, red line and construction construction boundaries	1/2000 or 1/5000	
7	Technical infrastructure system and environmental protection planning map		
7.1	Water Supply	1/2,000 or 1/5,000	
7.2	Waste Water Treatment		
7.3	Drainage		
7.4	Power Supply		
8	General map of the lines and pipeline of technology	1/2,000 or 1/5000	
9	Map of SEA	1/2,000 or 1/5,000	

Table 6-7 List of Drawings for Detailed Plan

No	Title of Drawings	Scale	Contents
1	Location Map	1/2,000 or1/5,000	
2	Current status map of landscape architecture and construction land assessment	1/500	
3	Current status map of technical infrastructure system		
3.1	Road and Transport	1/500	
3.2	Water Supply	1/500	
3.3	Waste Water Treatment	1/500	
3.4	Drainage	1/500	
3.5	Power Supply	1/500	
4	Land use planning map	1/500	
5	Diagram of landscape, architecture and space organization	1/500	Social Infrastructure is excluded.
6	Maps of red line boundaries, construction boundaries and protection corridors for technical infrastructure	1/500	
7	Technical infrastructure system and environmental protection planning map		
7.1	Road and Transport	1/500	(Other planning maps of technical infrastructure system and environmental protection planning map)
7.2	Water Supply	1/500	
7.3	Waste Water Treatment	1/500	
7.4	Drainage	1/500	
7.5	Power Supply	1/500	
8	General map of the lines and pipeline of technology	1/500	(Combined Map) from 7.1 to 7.5
9	Map of SEA	1/500	

The legal regulations and basis referred to be listed at the end of the report.

6.6. Related Regulation on Planning Standards and Plans

6.6.1. Planning for Residential Units

In accordance with QCVN: 01/2008/BXD of the Vietnam Building Code on Regional and Urban Planning and Rural Residential, the plan must be based on the following criteria.

(1) **Planning Requirements for Residential Unit:**

A plan for residential units must ensure the provision of essential daily-life services (e.g. pre-school education, lower-secondary education, culture and information, marketplaces, commercial services, sports and physical training, spaces for strolls and leisure, etc.) for inhabitants within a radius of 500 m or less.

(2) **Land Use Planning Regulations for Residential Unit**

Regulations for use as residential;

- The minimum space of residential unit-based land is 8 m²/person. The average occupancy of residential unit-based land of urban centres must not exceed 50 m²/person.
- The public-use greenery land around a residential unit must be at least 2 m²/person, of which greenery land within a group of residential houses must be at least 1 m²/person.
- Land for pre-schools, primary schools and lower-secondary schools must be at least 2.7 m²/person.

Land for combined use (including residential and production/business) will be converted into land for the corresponding categories according to the ratio of floor area used for each function.

For residential quarters of low-income earners or social houses, land occupancy under the planning for a residential unit must represent at least 70 % of the above occupancy rate. At the same time, the minimum cross section of roads (within a group of residential houses) must be ≥ 4 m.

For quarters of special households (single-person households, dormitories, etc.), land occupancy should be adjusted appropriately.

6.6.2. Planning for the System of Urban Service Works

In accordance with QCVN: 01/2008/BXD of the Vietnam Building Code on Regional and Urban Planning and Rural Residential, the plan must be based on the following criteria.

(1) **Requirements for the Structure of the System of Urban Service Works**

1) **Urban Service Works within a Residential Unit**

Urban service works (school, market, etc.) around a residential unit must be within a service radius not exceeding 500 m. Particularly for areas with complicated topographical, the service radius must not exceed 1.0 km.

2) **Other Service works in Urban Centers**

Other service works in urban centres must be planned to suit the urban structure and ensure the exploitation of their positions and links with other functional zones in urban areas.

6.6.3. Planning for the System of Urban Service Works

In accordance with QCVN: 01/2008/BXD of the Vietnam Building Code on Regional and Urban Planning and Rural Residential, the plan must be based on the following criteria.

The planning on the system of service works needs to meet the requirements in the table below, taking into account the demands of adjacent areas, non-residents and development requirements in each period.

Table 6-8 Minimum Requirements for Basic Urban-Service Works

Type of Works	Management Grade	Minimum Occupancy Rate for Works Use		Minimum Occupancy Rate for Land Use	
		Unit of Calculation	Rate	Unit of Calculation	Rate
1. Education					
a/ Preschool	Residential unit	Places/1,000 people	50	m²/place	15
b/ Primary school	Residential unit	Places/1,000 people	65	m²/place	15
c/ Lower secondary school	Residential unit	Places/1,000 people	55	m²/place	15
d/ Upper secondary school, job-training school	Urban area	Places/1,000 people	40	m²/place	15
2. Healthcare					
a/ Health station	Residential unit	Station/1,000 people	1	m²/station	500
b/ General clinic	Urban area	Work/urban center	1	m²/station	3,000
c/ General hospital	Urban area	Bed/1,000 people	4	m²/hospital bed	100
d/ Maternity hospital	Urban area	Bed/1,000 people	0.5	m²/hospital bed	30
3. Physical training and sports					
a/ Exercise ground	Residential unit			m²/person ha/work	0.5 0.3
b/ Basic sports ground	Urban area			m²/person ha/work	0.6 1.0
c/ Stadium	Urban area			m²/person ha/work	0.8 2.5
d/ Physical training and sports center	Urban area			m²/person ha/work	0.8 3.0
4. Culture					
a/ Library	Urban area			ha/work	0.5
b/ Museum	Urban area			ha/work	1.0
c/ Exhibition center	Urban area			ha/work	1.0
d/ Theatre	Urban area	Places/1,000 people	5	ha/work	1.0
e/ Cultural palace	Urban area	Places/1,000 people	8	ha/work	0.5
g/ Circus	Urban area	Places/1,000 people	3	ha/work	0.7
h/ Children's palace	Urban area	Places/1,000 people	2	ha/work	1.0
5. Market					
	Residential unit	Work/residential unit	1	ha/work	0.2
	Urban area				0.8

- Kindergartens, schools, and hospitals must not be located adjacent to roads of urban or higher grade, to ensure adequate area for grounds, gardens, greeneries and parking lots,
- Cultural, trade and service works must be located along trunk roads according to service grade,
- Accesses to service works reserved for the elderly, children and the disabled must not cross urban trunk roads even if there are no underpasses or overpasses,
- Each area with a population of 20,000 people or more must have at least one upper secondary school.

6.6.4. Urban Greenery Planning

In accordance with, QCVN: 01/2008/BXD of the Vietnam Building Code on Regional and Urban Planning and Rural Residential, the plan must be based on the following criteria;

(1) **Regulations on the Area of Public-Use Greenery Land**

Public-use greenery land outside residential units in urban areas embraces parks, flower gardens serving one or more residential units, and the whole urban area or region (including theme parks).

Also, water surface area can be converted into greenery land area per person. However, water surface area must not exceed 50 % of the total area for public-use greenery land outside a residential unit, excluding special-purpose greeneries.

Table 6-9 Public-Use Greenery Land Occupancy Outside Residential Units in Urban Areas

Urban-Area Grade	Occupancy (m²/person)
Special	≥7
I and II	≥6
III and IV	≥5
V	≥4

A newly built unit must have at least one flower garden (which may be combined with an outdoor sports ground or place for community activities) of at least 5,000 m² serving the whole residential unit.

6.6.5. Permitted Maximum Net Building Coverage

In accordance with QCVN: 01/2008/BXD of the Vietnam Building Code on Regional and Urban Planning and Rural Residential, the plan must be based on the following criteria.

(1) **Residential Houses:**

The maximum building coverage of a land lot for the construction of groups of adjoining houses, separate houses, and apartment buildings are specified in tables below.

Table 6-10 Building Coverage of a Land Lot for the Construction of Groups of Adjoining Houses or Separate Houses (Garden Houses, Villas, etc.)

Land Lot Area (m²/house)	≤ 50	75	100	200	300	500	≥ 1,000
Maximum Building Density (%)	100	90	80	70	60	50	40

Table 6-11 Maximum Building Coverage of Groups of Apartment Buildings According to Land Lot Area and Work Height

Construction Height from the Ground Level (m)	Maximum Building Coverage (%) According to Land Lot Area			
	≤ 3,000 m²	10,000 m²	18,000 m²	≥ 35,000 m²
≤ 16	75	65	63	60
19	75	60	58	55
22	75	57	55	52
25	75	53	51	48
28	75	50	48	45
31	75	48	46	43
34	75	46	44	41
37	75	44	42	39
40	75	43	41	38
43	75	42	40	37
46	75	41	39	36
>46	75	40	38	35

(2) **Educational, Healthcare, Cultural Facilities and Markets:**

The maximum building coverage of public facilities such as educational, healthcare, cultural, physical training, sports grounds, markets and supply chains in newly built areas is 40%.

6.6.6. Gross Building Coverage

In accordance with QCVN: 01/2008/BXD of the Vietnam Building Code on Regional and Urban Planning and Rural Residential, the plan must be based on the following criteria.

- The permitted maximum gross building coverage of a residential unit is 60 %.
- The maximum gross building coverage of resorts is 25 %.
- The maximum gross building coverage of public parks is 5 %.
- The maximum gross building coverage of theme parks is 25 %.
- The maximum gross building density of special-purpose greeneries (including golf courses) and natural environmental protection regions is specified depending on their functions and according to relevant regulations. However, these must not exceed 5 %.

6.6.7. Ratio of Land for Greeneries in Land Lots for Work

In accordance with QCVN: 01/2008/BXD of the Vietnam Building Code on Regional and Urban Planning and Rural Residential, the plan must be based on the following criteria

In land lots for work construction, the requirements on the minimum ratio of land for greeneries specified in the table below must be satisfied.

Table 6-12 Minimum Ratio of Land for Greeneries in Land Lots for Work Construction

In Land Lot for Work Construction	Minimum Ratio of Land for Greeneries (%)
1. Residential houses:	
- Standalone (garden houses, villas)	20
- Groups of apartment buildings	20
2. Public houses:	
- Kindergartens, schools	30
- Hospitals	30
- Cultural houses	30
3. Factories:	
- Built dispersedly	20
- Built in IPs or clusters	20

7. PLANNING FOR THE MODEL SITE

7.1. Planning Policy

The model site is located close Thang Long IP II. The IP has the same features as those of IP type 2 stated in Section 3.4 in Chapter 3. The planning policy for improvement of the living conditions of workers resumes according to the following measures.

7.1.1. Policy on Housing Supply Policy

The following issues were observed in this area.

Existence of several developments being carried out or currently ongoing around this area (e.g. developments in the new town of Pho Noi and Green city). However, it is difficult to anticipate large-scale housing construction. As of now, the occupancy in these developments is low.

In the area, there are many rent rooms buildings. They take a role to adjust housing supply and demand.

The new development and the extension of IPs gradually continue. The momentary high demand for housing provision from workers is not obvious at a time.

According to the above mentioned, the following issues are set in the planning policy for this area.

- Introduction of housing supply schemes for small scale and individual investors:

This housing supply policy is reflected in the spatial plans.

  - Involvement of many housing developers and entities in housing supply and application of several housing types together with creation of districts of various capacities and sizes.
  - Housing supply through upgraded buildings with single rooms for rent
  - Supposition of housing supply both for rent and sale

- Correspondence through development phases:

The need for housing around IPs depends on the tendencies of factory owners in the IP. It is difficult to anticipate on their behalf. In order to have an appropriate scale of investment that is in properly timed, it is desired that development plans correspond to the phase of development.

- Consideration of a rental apartment/room/dormitory building for many companies (one building used by many companies).
- Harmonization of housing supply with neighboring communities:
  When determining housing capacity, it is necessary to consider balanced development and supply within surrounding areas.

7.1.2. Spatial Planning Policy

While planning for the model site, vicinity of surrounding villages was highly valued when considering the location for construction workers' housing.

1) **Considerations for the Sharing of Functions and Public Facilities**

The following criteria are considered when planning for sharing of social facilities and services with neighbouring villages.

- Preparation of housing land considering connectivity with neighboring villages and cities.
- Creation of compact living spaces within existing villages and towns.

- Shared use social and public facilities with existing villages and towns.

The preferred development processes for future development policies are listed below.

STEP1: to improve necessary public facilities for the locals as much as possible during preparation of workers' housing by developers.

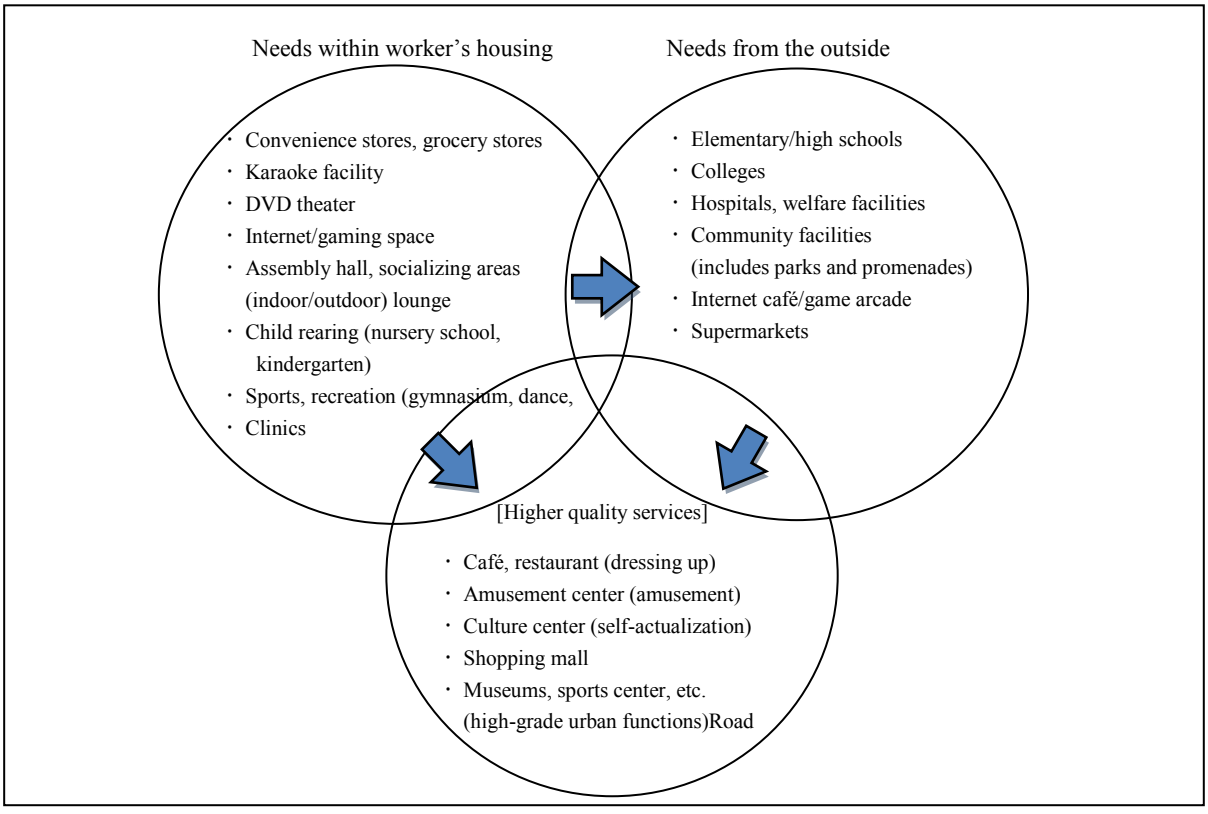
STEP2: to positively impact development of nearby urban areas and encourage enhancement of various urban facility functions.

STEP3: to provide public facilities etc. suited for the urban area during development.

By carrying out the above development steps, a favourable living environment is created at an early stage.

In a newly developed housing area, the model site is opened to outside communities by eliminating physical barriers, like fences and the mutual use of its functions is advanced further.

Urban functions desired to be introduced to workers' housing are shown below. These refer to desirable facilities for comfortable living of workers and desired public facility functions for this area.



Source: JST

Figure 7-1 Basic Idea of Shared Use of Public Facilities as per Their Function

2) Encouraging Business Participation of Local Investors

For continuous and long-term business, it is necessary for landlords in neighbouring villages to provide workers' housing. It is therefore essential to plan housing districts applicable for small sized investment of local investors like landowners. This will enable them to provide decent housing.

7.1.3. Architectural Planning

Architectural planning in the model site will be determined based on the architectural problem listed in 3.7 in Chapter 3 and the housing survey around Thang Long IP II. The architectural planning policy is shown below.

- Composite function planning

A composite function such as housing, commercial facility, hospital and school is planned in consideration of the inhabitant's convenience. Plans for some housing will include complex and commercial facilities.

- Planning based on building use

The building location, layout and shape will be planned based on building use.

- Low building cost

From field surveys of the area around Thang Long IP II, industrial workers tend to live in low cost housing despite of it is of poor quality. We plan to design low cost housing that meets minimum housing standards.

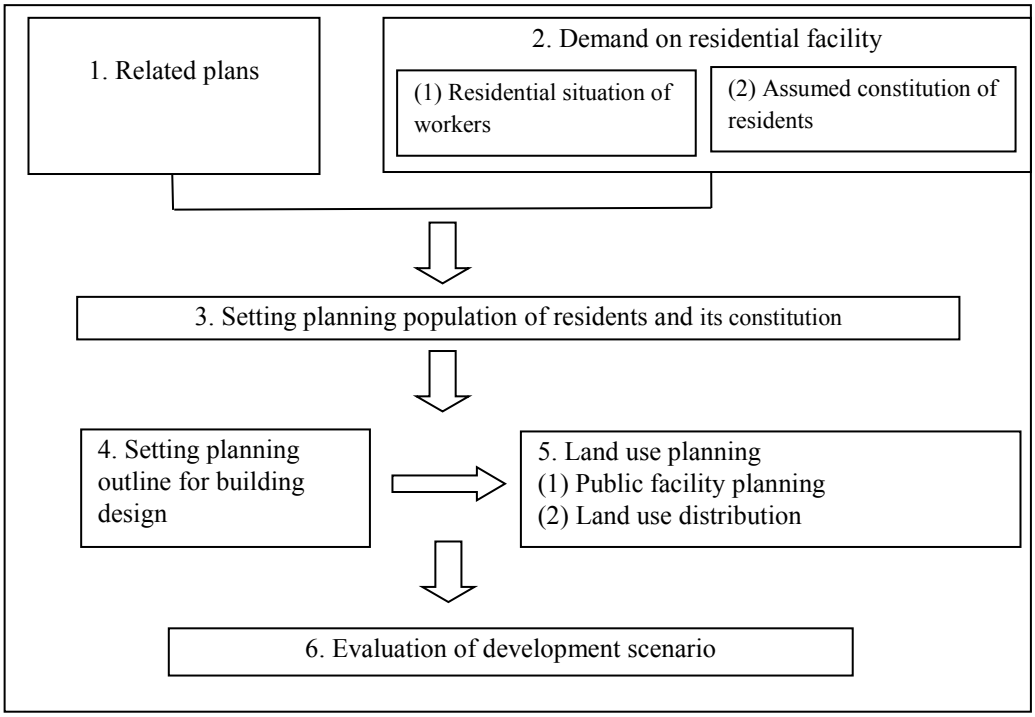
7.2. Frame Work and Land Use Specification

In this section, planning population and land-use are discussed. To arrive at the planning population of the model site, this study discusses the following contents;

(1) Potential housing demand in the model site,

(2) Relationship between the model site and general population based on the number of residential units, and,

(3) Application of planning population and land use plan.



Source: JST

Figure 7-2 Basic Planning Process for Land Use Plan

7.2.1. Potential Housing Demand in the Model Site.

(1) Potential Demand for Housings by IPs

Located adjacent to the model site, Thang Long IP II is operated in the South. Also, Pho Noi Textile and Garment IP is located in the West.

As seen above, development of these IPs has a huge impact on housing demand.

Estimates in this section show potential for capacity of workers in these IPs to be fully realized when factory operations follow assumed progress. The following table shows the anticipated increase in labor, calculated referring to the development outlines of IPs around the model site. Housing for 23,200 migrant workers will be required in the long-term[24].

Table 7-1 Long-Term Housing Needs of the Labor Force

Name of IP	Number of Labors	Increase of Labors	Population by Housing Type			
			Local Labors (Parents House, 60%)	House for Migrant Single Population (15%)	House for Migrant Family (25%)	
					Workers Population	Family Population
Thang Long II	60,000	48,000	28,800	7,200	12,000	24,000
Pho Noi Textile and Garment	12,000	10,000	6,000	1,500	2,500	5,000
Total	72,000	58,000	34,800	8,700	14,500	29,000

Note: Distribution of housing types is based on the results of upper plans and questionnaire survey

Source: JST

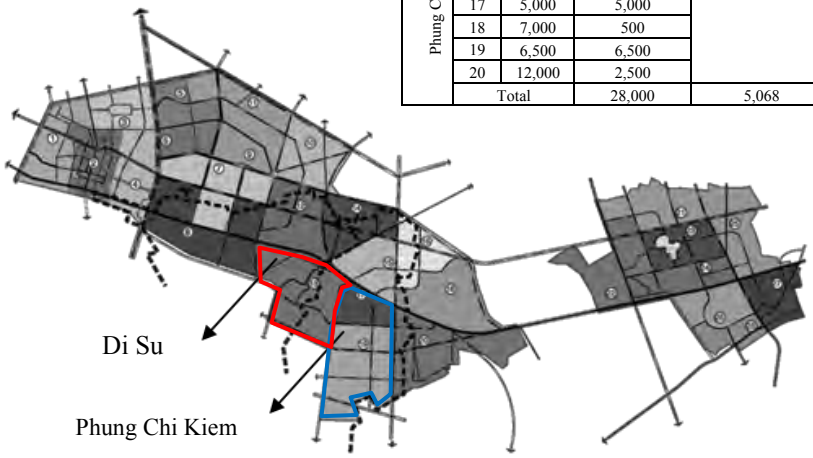
(2) Assumed Increase of Population and Housing Supply of Upper Plans

Corresponding to future migrant population, the general plan for My Hao district anticipates an increase of 36,000 people in the model site (23,000 people in Phung Chi Kien commune: model site location, and 13,000 people in Di Su commune: adjacent to the site). Housing supply in the model site will correspond to part of housing development.

[24] It is common for factory owners to prepare future expansion area in the factory lot from the beginning. It is assumed that it takes more than ten years to operate a full size factory although it largely depends on market and economic conditions.

Planning population of Di Su and Phung Chi Kieu commune in 2030

	No	Planned population in 2030		Current population	Increase until 2030
		All Zone	Classification		
Di Su	7	9,000	1,500		
	8	11,000	11,000		
	12	6,000	4,000		
	13	9,000	5,000		
	14	6,000	2,000		
	Total		23,500	10,335	13,000
Phung Chi Kieu	13	9,000	4,000		
	14	6,000	2,000		
	15	5,500	5,500		
	16	5,500	2,000		
	17	5,000	5,000		
	18	7,000	500		
	19	6,500	6,500		
	20	12,000	2,500		
	Total		28,000	5,068	23,000



Source: JST

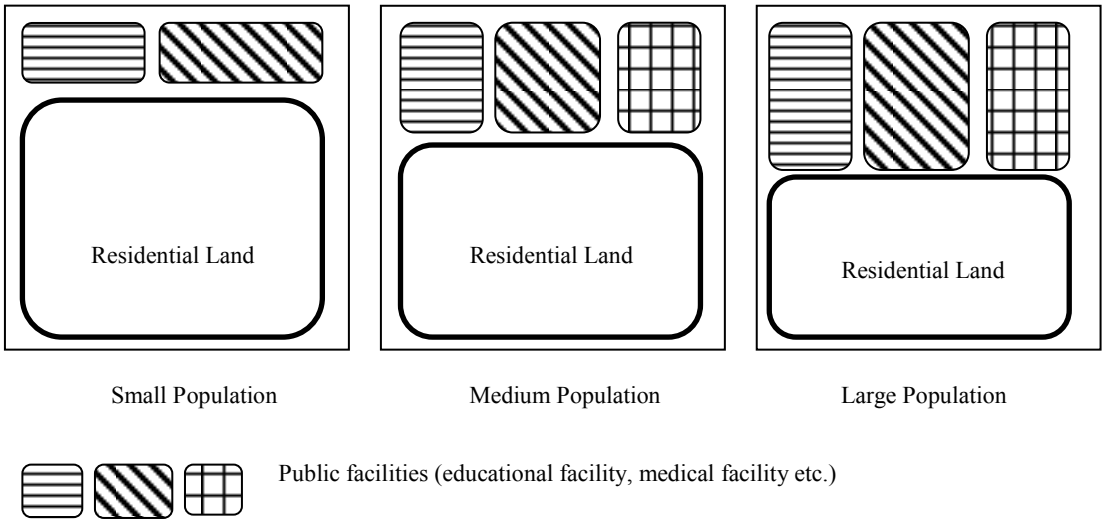
Figure 7-3 Assumed Increase of Population in the Upper Plans (Zoning Plan for My Hao Urban Center)

7.2.2. Planning Specifications of a Typical Residential Unit in the Model Site

(1) Preparatory Study on Adequate Population Size and Planning Specifications

In view point of balanced spatial development, it is preferable to develop housing units for WIPs as a community. The upper plan ("Zoning Plan for My Hao Urban Center") sets the population between 5,000 to 12,000 people for each planned residential unit. This study examines adequate population size for the model site to occupy a residential unit.

The figure below shows this schematic relationship between legal spatial requirements and available land for residential and other valuable uses. For a small population, required area for public facilities is small and limited. The larger area could be used as a residential area. On the other hand, a larger population requires a larger area for public facilities. In this case, areas for residential development become proportionally smaller when planning population is larger, and its development density becomes higher.



Source: JST

Figure 7-4 Population Requirements of the Related Law

In order to determine the target population of the model site, this study ratifies the spatial situation and its conformity by assuming different planning population scenarios corresponding to the area and land use distribution.

This study follows the planning examination process below.

1) **Establishing the Development Scenario: The Study Sets Three Development Scenarios for Examination**

For development corresponding to the population size of a typical residential unit, it sets the following population range.

- Lower scenario: examines 6,000 people. (corresponding 5,000 – 7,000)
- Medium scenario: examines 9,000 people. (corresponding 8,000 – 10,000)
- Higher scenario: examines 12,000 people. (corresponding 11,000 – 13,000)

Table 7-2 Assumed Planning Population for Workers' Housing and Constitution

	Scenario 1 (Lower development)	Scenario 2 (Medium development)	Scenario 3 (Higher development)
Single resident	2,000 people	3,000 people	4,000 people
Family resident (Adult: Worker)	2,000 people	3,000 people	4,000 people
(Children etc.)	2,000 people	3,000 people	4,000 people
Total	**6,000 people**	**9,000 people**	**12,000 people**

Source: JST

2) **Requirements for Public Facilities: The Study Examines the Required Spatial Space**

For the four public spaces below, this study follows legal requirement (QCVN: 01/2008/BXD).

- Preschool
- Primary school
- Lower secondary school
- Health station, general clinic

In regard to requirement for green space, reference is made to regulation 2.4.2 of (QCVN: 01/2008/ BXD). It states the requirement for green space for a residential unit as 2.0 m²/pers., and 70 % for social housing.

- Green space: 1.4 m²/person

For traffic and road space, reference is made to requirements in the "Zoning plan for the My Hao district".

- Traffic space, road: about 20-22 % of the area

Below are the required public spaces of the model site.

Table 7-3 Assumed Public Facilities for a Typical Residential Unit

	Scenario 1 (Lower Development: 6,000 People)		Scenario 2 (Medium Development: 9,000 People)		Scenario 3 (Higher Development: 12,000 People)	
Pre School	Use neighboring school		Construct for 5,000 people	3,750 m²	Construct for 5,000 people	3,750 m²
Primary School	For 10,000 people including neighbors	9,750 m²	Construct for 10,000 people	9,750 m²	Construct for 10,000 people	9,750 m²
Lower Secondary School	For 10,000 people including neighbors	8,250 m²	Construct for 10,000 people	8,250 m²	Construct for 10,000 people	8,250 m²
Health Station General Clinic	To construct	3,000 m²	To construct	4,500 m²	To construct	6,000 m²
Subtotal	21,000 m² = 2.1 ha		26,250 m² = 2.6 ha		27,750 m² = 2.8 ha	
Green Space	0.67 ha		1.26 ha		1.68 ha	
Total	**2.77 ha**		**3.86 ha**		**5.08 ha**	

The requirements for preparation of public facilities differ corresponding to the planning population. This difference is examined in decisions of project capacity.

- For a planning population of 0 to 4,000: The development corresponds individual development and it is not requested to construct public facilities. It is also not necessary to have a lot of public intervention for this size of development.
- For a planning population more than 4,000 but less than 20,000: Development corresponds to residential units and there is a need to construct public facilities. The size of development should be considered in context of a district and should satisfy needs of the surrounding area. This planning population size is adequate for concerted public development of workers' housing by both public and private sectors.
- For a planning population over 20,000: Development corresponds to many residential units. It should be examined and resolved in the context of urban development rather than workers' housing development.

3) **Trial Building Design for Confirmation:**

This study describes the typical building model to be confirmed and it will be designed in accordance with current regulations.

For planning, requirements of regulation (QCVN: 01/2008/BXD, described in 6.6 et al.) are considered.

4) **Approval of Conformity to Planning Requirements:**

This study confirms conformity to the planning index as a result of planning requirements for buildings (result of (iii)).

It examines FAR and BCR. The general zoning plan for My Hao district defines a FAR of 150 % for the model site.

Table 7-4 Assumed Land Use Distribution of the Model Site for Typical Residential Purpose

		Scenario 1			Scenario 2			Scenario 3		
Housing	Workers Housing (Net, 7 m²/P)	1.40	ha	(FAR 150%)	2.10	ha	(FAR 150%)	2.20	ha	(FAR 200%)
	Family (Net, 40 m²/ Housing)	4.00	ha	(FAR 150%)	6.00	ha	(FAR 150%)	6.00	ha	(FAR 200%)
	Luxury	2.13	ha		0.00	ha		0.00	ha	
	Subtotal	7.90	ha		8.10	ha		8.20	ha	
Public Facilities	Facility	2.10	ha		2.60	ha		2.80	ha	
	Green Area Park	0.67	ha		1.26	ha		1.68	ha	
	Subtotal	2.77	ha		3.86	ha		5.08	ha	
Traffic, Road		4.30	ha		4.30	ha		4.30	ha	
Commercial, Other Facilities, Housing Lot for Sale		3.60	ha		1.94	ha		1.22	ha	
Total		**18.20**	**ha**		**18.20**	**ha**		**18.20**	**ha**	

Source: JST

While comparing lower, medium and higher development scenarios, this study established conformity with planning requirements of the medium development scenario with a planning population of approximately 9,000 people (corresponding to between 8,000 to 10,000 people.) for the model site (18.2ha).

The higher development scenario (planning population of 12,000 people) will not satisfy FAR requirements of the My Hao district general construction plan. It will only provide a small area for commercial and other facilities (1.32 ha).

The Lower development scenario (planning population of 6,000 people) does not allow for effective use the model site.

As a result, it is therefore confirmed that approximately 12-25 ha of the construction site need to be prepared for typical residential development of workers' housing for a planning population of between 5,000 to 12,000 people.

(2) **Conclusion from Discussions with Related Entities**

The outline of planning specifications for the model site was accepted by related entities. The following are the issues suggested by local government offices. These will be reflected during the formulation of plans of the model site (18.2ha).

- Current planning requirements (such as BCR, FAR and number of floors) should be respected during planning. Furthermore, plans should meet legal regulations and targets.
- A target population of about 8,000 to 10,000 people is considered adequate in accordance with current planning requirements of the model site.
- The related entities acknowledged that a planning population of between 8,000 to 10,000 people partly satisfies the housing demand by migrant workers. Excess demand will be met in future development of neighboring areas.
- The planning population for educational facilities are confirmed as 5,500 people based on the opinions from Hung Yen PPC related entities.

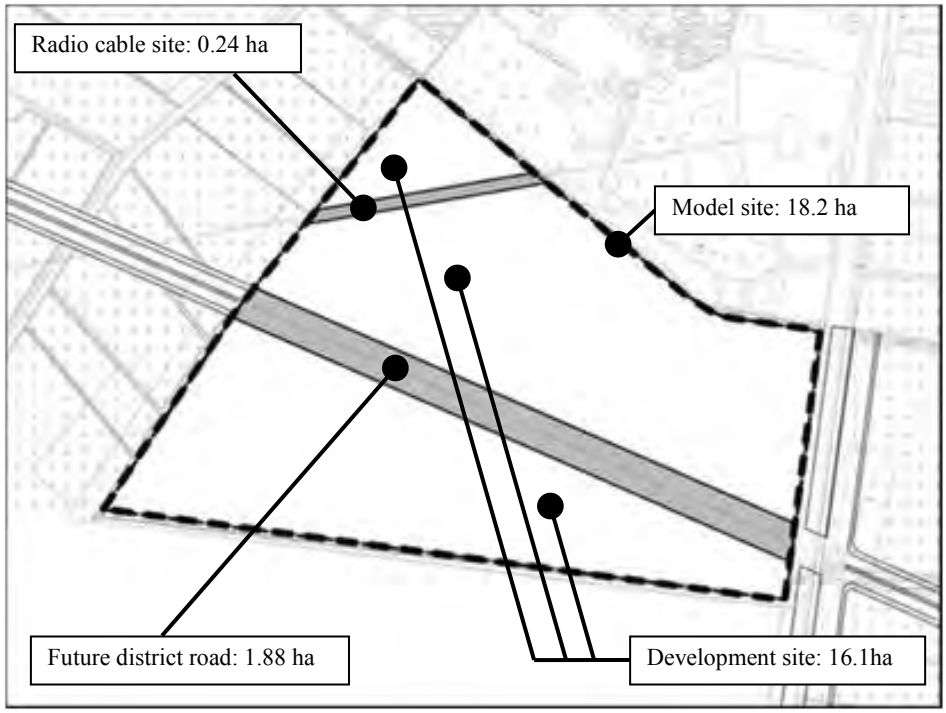
7.2.3. Adjustment of Land Use Distribution and Planning Population

From the results of the preparatory study, planning specifications and population are formulated in accordance with existing conditions in the model site.

(1) **Issues to be Considered When Planning for the Model Site**

As a result of discussions on planning conditions with the local government office, the following issues should be taken into account.

- Future inter district road area (approximately 1.88 ha)
- Current radio cable site (approximately 0.24ha)



Source: JST

Figure 7-5 Considerations During Model Site Planning

With exception of the above areas, about 16.1ha can be used for residential development. Planning specifications for typical residential units in the preparatory study are formulated for an area of 18.2 ha.

For the model site, this study aims to bring housing supply closer to a planning population of between 8,000 to10,000 in a residential area of 16.1ha.

(2) **Results of Land Use Distribution and Planning Population**

From the preparatory study results, the basic spatial plan is examined and formulated. The following are land use distribution and planning specifications. The summaries of low raised and medium raised housing lands are planned as expecting the construction planning study result stated in the 3.5.3 section in Chapter 3. This plan satisfies planning requirements for typical residential units as a result of discussions with the local administrative office. This is computed for a planning population of 7,916 people.

Apartment in Long Hau IP

Row Housing in a Large Land Lot
nearby Long Thanh IP

Row Housing in Ascendas Singapore Tech Park

Row Housing with Shops in My Phuoc IP

Source: JST

Figure 7-6 Examples of Apartment Housing (Medium Rise) and Row Housing (Low Rise)

Table 7-5 Land Use Distribution and Planning Population

Land Use Category	Area (ha)	Planning Specification			Planning Population
		Building Use	FAR	Floors	
Low Rise Housing	4.14	Housings for a single worker	1.00	1-2	Single: 1,832
Medium Rise Housing	5.15	Housings for a single worker and family	1.50	3-5	Single: 924
Mixed Use Commercial Housing	1.41	Housings for a single worker and family, Commercial Facility	2.00	3-5	Family: 5,160
Public Facilities	0.24	Medical facility is assumed	1.50	3	
Education (School)	1.23	Schools for 5,500 residents, kindergarten	1.50	3	
Green and Park	1.33	Water treatment facility and kindergarten in the site excluded	-	2	
Infrastructure	0.23	Waste water treatment plant	-	1	
Internal Road	2.37		-	-	
(Sub Total of Residential area)	16.12				
Future Inter Regional Road	1.88		-	-	
Voice of Vietnam (hereinafter referred to as "VOV") Radio Cable Site	0.24		-	-	
Total	**18.23**				**Single: 2,756** **Family: 5,160** **Total: 7,916**

Source: JST

7.3. Proposed Design Plan

7.3.1. Land Use Planning

(1) Spatial Issues to be Considered During Land Use Planning

Corresponding to the current spatial situation and related plans of the site, the following issues should be taken into account.

1) **Arterial Road Passing Through the Model Site**

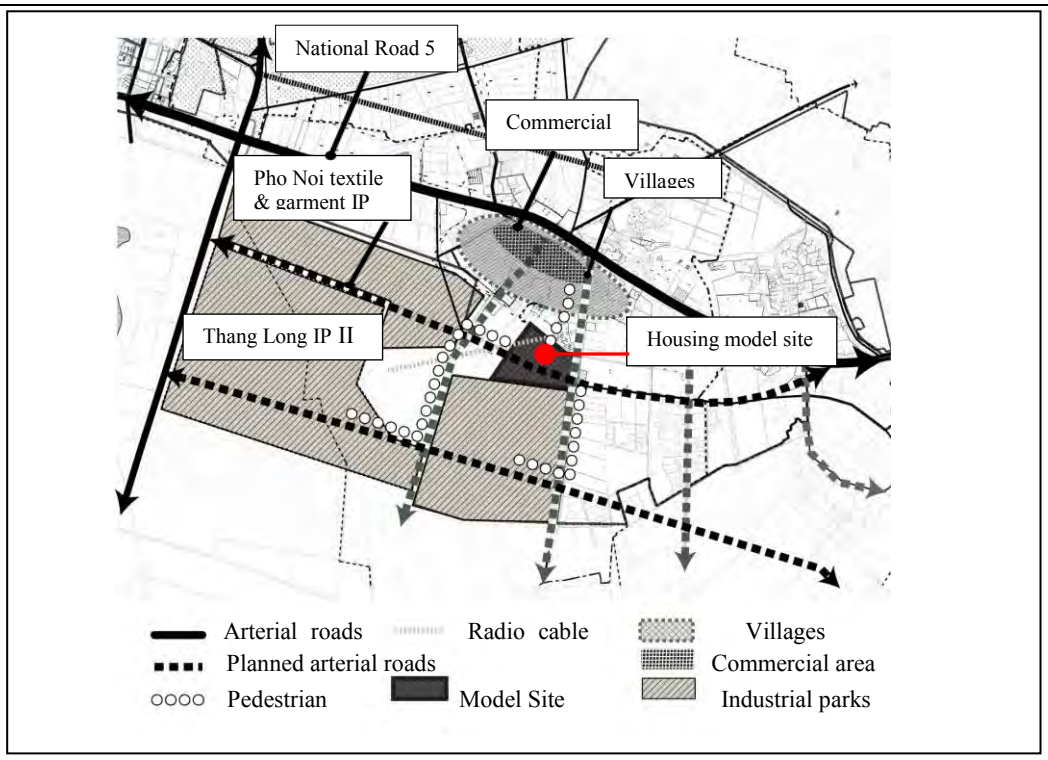
- Since the arterial road passing through the model-site is not a trunk road connecting regions, it is therefore not expected to have a large number of vehicles passing through this area.
- However, it is anticipated that a large number of vehicles from/to adjacent IPs will pass through the main road.
- Therefore, it is necessary to establish a buffer zone taking into account of noise and dust.
- In addition, safety measures for when using the road are crucial. This is especially for school routes of children and students. For this, pedestrian bridges are proposed.

2) **Public Facility and Infrastructure Facilities for the Model Site**

- It is necessary to consider people from neighboring communities intending to visit commercial facilities and clinics in the model-site.
- It is also anticipated that housing need in the model site will increase with improved access to existing villages located north of the model site.
- Widening and renovation of the current roads and the bridges in surroundings are not necessary at the current moment since the residents are expected to take a bicycle or walk for commuting between the model site and the northern part of village. Their improvement will be executed according to the demand in the future progress of development.
- On the other hand, the road across from east to west needs to be constructed as constructing a new arterial road in the site.
- The road connected to the southern part of model site needs to be reconsidered in spatial planning as the situation change in IP next to the site in order to secure the convenience.

3) **Spatial Connectivity to the Surrounding IP**

- The implementations of sidewalks, bicycle lanes and roads for motorcycle are expected to increase the commute safety for residents and workers, and they improve the connectivity with the southern side of Thang Long II IP and the west side of the Pho Noi garment and textile IP.
- The pedestrian route shown in the figure 7-7 is expected as the accessing road at this moment. When an adjacent IP establishes a new accessing road and approach, the spatial planning needs to be renewed correspondingly.



Source: JST

Figure 7-7 Considerations for Spatial Configuration around the Model Site

(2) **Approach to Spatial Planning in the Model Site**

With regard to the model site, six categories of facilities and land-use will be considered, namely; medium and low-rise housing, commercial and residential complexes, public facilities, schools, and parks. Since there will be a main road running through the site in the future, medium-rise housing, commercial and residential complexes are planned. These will be located along the main road with low-rise housing behind them.

With the site divided into two sections by the main road, planned location of housing, commercial complexes and public facilities (e.g. schools, hospitals and parks) will depend on convenience.

The following headings are reflected in the plan for each land layout corresponding to use.

The following planning principals are considered and applied.

1) **Residential Zone**

- Medium-rise housing will be located along the main road.
- Low-rise housing will be located behind medium-rise housing in considering relationship with existing northern communities.

2) **Commercial and Residential Complex Zone**

- Commercial functions will be located in the middle of the site along the main road considering overall convenience in the site.

3) **Public Facility Zone**

- Public facilities include clinics, sports facilities and other governmental facilities.
- Public facility zones are planned to be located at junctions, similar to zones for commercial and residential complexes.

4) **Educational Facility Zone**

- Location of educational facility zones will be determined with special attention to convenience to residential zones.
- Educational facility zones will not be located along the main road.
- Since the site is divided by the main road, elementary and junior high schools will be located at each section, respectively.

5) **Parks and Greeneries**

- With the site divided into two sections by the main road, there is an axis linking the pedestrian network in consideration of symbolic continuation.
- Kindergartens will also be located in the areas.

6) **Water Purification and Sewage Treatment Plant**

- The water purification plant is planned to be located in a park.
- A sewage treatment plant is planned Northeast of the model site, with consideration to geological levels for easy collection and discharge of water.

7) **Others**

- A radio cable that connects the radio tower and radio station will run through the site. This should be within the area of low raised housing.
- A buffer for the greenery is planned adjacent to Thang Long IP II.

Source: JST

Figure 7-8 Land Use Plan

7.3.2. Block and District Spatial Plans

In this section, the basic policies for block and spatial planning in the model site are discussed. They include expected spatial construction requirements. They will be used as ideas for design by each district.

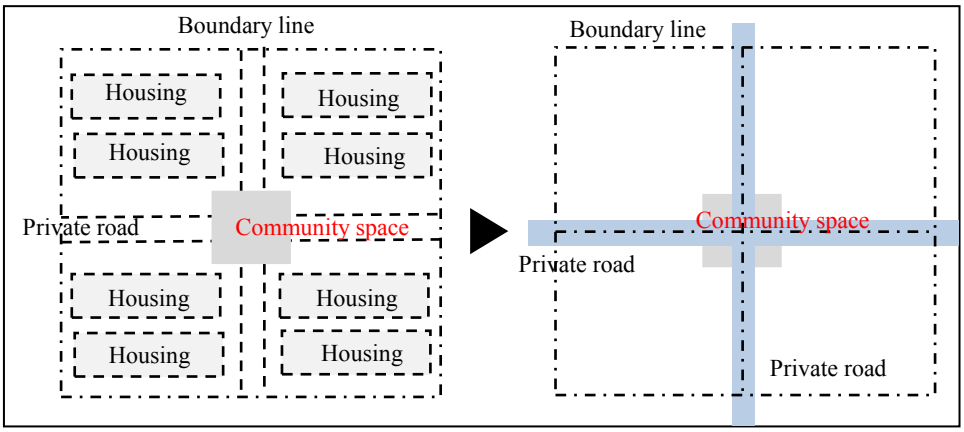
(1) **Approach to Block and Spatial Plans**

- A 2m setback is planned for low-rise housing and a 3 m setback for mid-rise housing. This is so as to maintain a better environment with proper ventilation, lighting and safety.
- A 3m setback will be maintained for commercial, residential complexes and medical facilities for the same reason. However, a further set back is planned for zones facing symbolic parks and roads with greenery used as semi-public space for street stands, cafes, etc.

(2) **Approach to Spatial Planning for Each Zone**

1) **Low-Rise Housing Zone**

- Low-rise housing zones will be planned with capacity for layout of low rise housing.
- The district is planned to be divided into various sizes with expected business participation of local, medium and small sized investors.
- Initial planning for the shared zones (community space) will be by the district. This space is for commercial and entertainment facilities that support residential areas.
- An agreement and design guideline will be prepared among real-estate developers to include building lines and street width. Community space shall also be clearly specified.



Source: JST

Figure 7-9 Image of a Shared Space in Low-Rise Housing Site

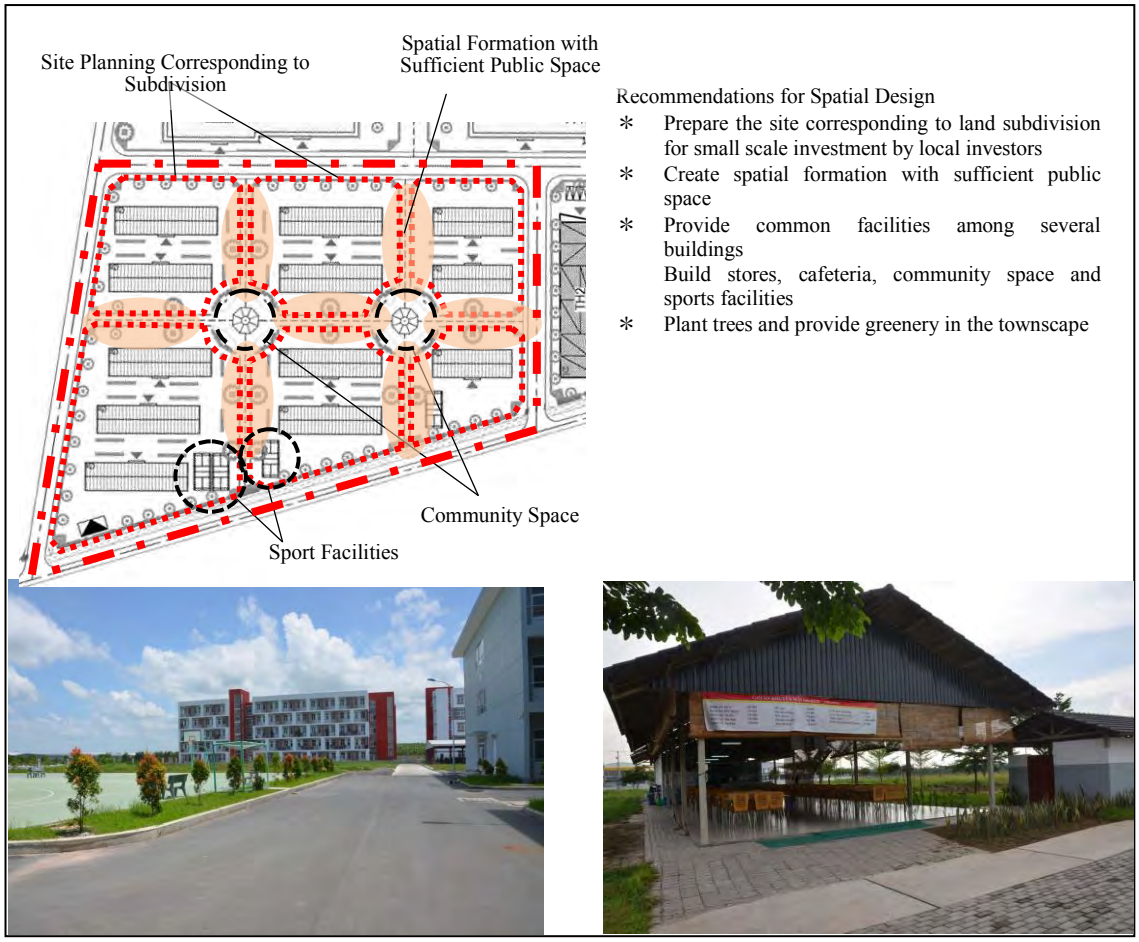


Figure 7-10 Image of Common Space

2) **Medium-Rise Housing Zone**

- As the district becomes larger, initial establishment of roads within the site needs to be done considering connectivity with the roads outside the site. Also, expansion of the road adjacent to the site will be considered.
- An agreement and guideline shall be prepared for several real-estate developers and operators. This shall be clearly specified to include the building line and street width of the site.
- Parking areas for motorcycles will be located within medium-rise buildings. Access roads to parking space entrances shall be planned paying attention to pedestrians.
- Automobile and motorcycle access to the main road through the model site shall be restricted for safety reasons. In the district plans, accessibility is limited to the road adjacent to the model site. This is for automobiles and motorcycles as per the regulations and for safety.

3) **Commercial and Residential Complex Zone**

- Security will be ensured by having a larger boundary line around the central green road in the model site. This space is for semi-public use with street stands or cafés.
- Motorcycle and automobile parking lots shall be planned at the backside of buildings across the central green road. Special attention shall be paid to medium-rise housing located within the district during planning of the access road.

4) **Public Facility Zone**

- The building line facing the central green road in the center of the model site shall have a larger setback than others to ensure security in the community. The space can be utilized as semi-public spaces like street stands or cafes.
- One public building is planned in this zone of the model site. Entrances shall be determined paying attention to access from other zones and the relationship with symbolic roads and greeneries.

5) **Educational Zone**

- Design standards for schools shall be applied to education facilities to include building layout and entrance design.

6) **Parks and Greenery Zone**

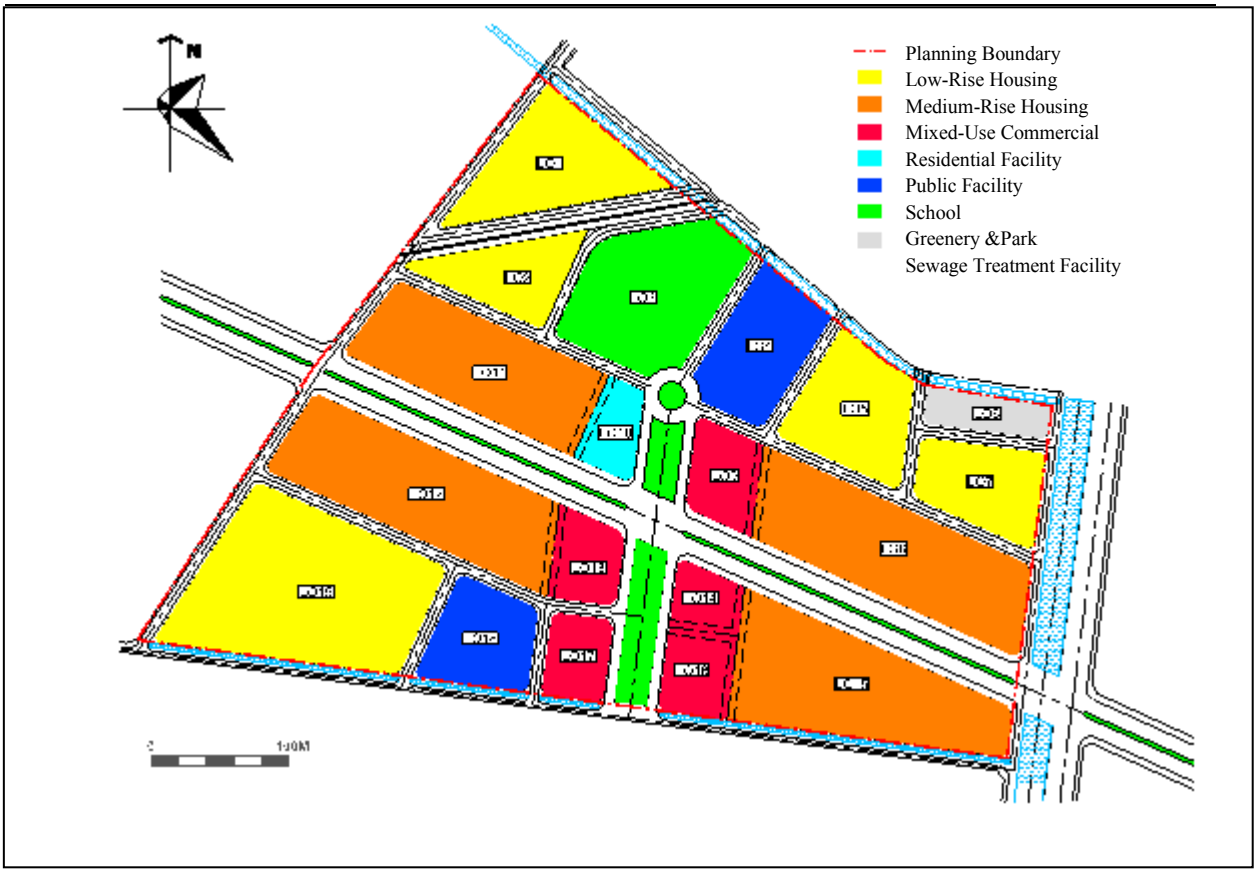
- Parks shall be planned as places of relaxation and refreshment for residents in the site and neighboring communities.
- Their layout will include water and greenery based on spatial planning.
- Kindergartens shall be located in parks paying attention to the integrity of the park.

7) **Sewage Treatment Plant Zone**

- From the conversion of the upper side of the facility into greenery, it will be used as public space.

7.3.3. Housing Plan

Integration of results of studies on land use, block and layout plans into the detailed plan will be prepared taking into account land lot area, road, building coverage and floor area ratio, required minimum area per capita and design (construction boundary lines) This is shown in the figure below.



Source: JST

Figure 7-11 Numbering of Each Land Lot

In the model site, there are six zones for medium and low-rise housing, commercial/residential mixed-use facilities, hospitals, schools and parks. The planned housing design shall consider safety, sanitation and decent environmental aspects in accordance with housing guidelines. The minimum construction boundary for low and medium-rise housing shall be a 2 m and 3 m set back respectively from the site. The minimum setback for land lots facing arterial roads must be 5 m from the site boundary.

The building coverage and floor area ratio is set in harmony with the neighbouring northern area for continuity of urban development.

Design of the housing plan proceeds under the following conditions.

Table 7-6 Building Coverage/Floor Area Ratios for Each Housing Type

Housing Type	Building Coverage Ratio	Floor Area Ratio
Low-Rise Row Housing	Under 40 %	Under 100 %
Medium-Rise Apartments	Under 50 %	Under 200 %
Medium-Rise Apartments (Mixed-Use Commercial/Residential)	Under 50 %	Under 200 %

Summarized outline of housing plans in each land-lot is prepared taken into account overall land area and population framework as well as issues listed be A summarized outline of the Housing plan in each land-lot is prepared taking into account of the overall area and population framework as well as other issues listed below.

- Low-rise housing (for row housing) shall be designed for two story buildings.
- Medium-rise housing (for a family) shall be designed for five story buildings with parking lots for motorcycles the on the first floor.

- Medium-rise housing (Mixed-use building for commercial/residential for single occupancy) shall be designed for four story buildings with commercial facilities and parking lots for motorcycles on the first floor and housing from the second to fourth floor.
- Unit floor area for medium-rise housing will be approximately 40 m² and unit floor area for low-rise housing will be approximately 17 m².

The building layout plan is shown below.

Figure 7-12 Architectural Planning for Each Land Lot

Basing on the above ideas/analysis, estimates will be; 6,084 for medium-rise housing and 1,832 for low-rise housing, family households 5,160 people (1,290 families, 2,580 adults, 2,580 children) and 2,756 single people (the medium-rise housing 231 units shared by four, low-rise housing with 916 rooms shared by two people). For architectural layout planning, building coverage and floor area ratio will be calculated excluding internal roads. However, the building coverage and floor area ratio is 24 % and 87 %, respectively in line with the national calculation method which allows inclusion internal roads.

Currently, it is projected that approximately 8,000 people live in the model site. In future, it will be possible to increase the number of residents by adjusting building coverage and floor area ratio.

Table 7-7 Residents Summary Sheet in Each Building Types in the Model Site

Building Type	Resident Number	Unit Number	Resident Status	Residents (Breakdown)
Medium-Rise Housing	6,084	Household units 1,290 units 1 family/4 people	Adult 2,580 Children 2,580	5,160
		Single rooms 231 units 4 people shared	Industrial workers 924	924
Low-Rise Housing	1,832	Single rooms 916 rooms 2 people shared	Industrial workers 1,832	1,832
Estimated Gross Number of Residents				7,916 Family residents 5,160 For single people 2,756

Figure 7-13 Image of Bird's-Eye View

The details of buildings are set and their results are listed as table 7-8 to 7-10 based on the development framework, areas extent and floor area ratio.

Table 7-8 Information and List of Land Lots

Land lot number	LO1	LO2	LO3	LO4	LO5	LO6
Land lot area	7,685 m²	4,543 m²	10,165 m²	6,297 m²	6,644 m²	2,307 m²
Land use	Low-rise housing 5 LK1~LK5Sports court	Low-rise housing 4 LK6~LK9 Sports court	Park CX, Kindergarten, Water supply facility	School TH (As a reference)	Low-rise housing 6 LK10~LK15, Sports court	Sewage treatment facility
Number of rooms	170 rooms	104 rooms	-	-	140 rooms	-
Number of residents	340 (single people)	208 (single people)	-	-	280 (single people)	-
Number of floors	2-stories	2-stories	-	3-stories	2-stories	1-storey
Building Height	8.85 m	8.85 m	-	11.25 m	8.85 m	4.05 m
Floor Height	GF (0.45 m) 1F(3.6 m) 2F (3.3 m)	GF (0.45m) 1F (3.6 m) 2F (3.3 m)	-	GF (0.45 m) 1F(3.6 m) 2F (3.6 m) 3F (3.6 m)	GF (0.45 m) 1F(3.6 m) 2F (3.3 m)	GF (0.45 m) 1F(3.6 m)
Gross Floor Area	4,040 m²	2,506 m²	-	2,550 m²	3,408 m²	740 m²
Building Coverage	2,020 m²	1,253 m²	-	850 m²	1,704 m²	740 m²
BCR	26 %	27 %	-	17 %	25 %	32 %
Floor Area Ratio	52 %	55 %	-	51 %	51 %	32 %
Motor-cycle parking slots	340	200	-	-	308	-

Table 7-9 Information and List of Land Lots (Cont'd)

Land lot number	LO7	LO8	LO9	LO10	LO11	LO12
Land lot area	5,135 m²	13,527 m²	3,326 m²	2,374 m²	11,135 m²	13,489 m²
Land use	Low-rise housing 5 LK16~LK20 Sports court	Medium-rise housing 4 TT6~TT9, Sports court	Medium-rise Commercial/Residential Mixed-use 1 TT5	Public facilities 1 CC1 (As a reference)	Medium-rise housing 4 TT1~TT4, Sports court	Medium-rise housing 4 TT10~TT13, Sports court
Number of rooms	130 Rooms	360 households	57 rooms	-	288 households	344 households
Number of residents	260 (single people)	1440 (family people)	228 (single people)	-	1152 (family people)	1376 (family people)
Number of floors	2-stories	5-stories	4-stories	3-stories	5-stories	5-stories
Building Height	8.85 m	19.25 m	15.5 m	15.75 m	19.25 m	19.25 m
Floor Height	GF(0.45 m) 1F(3.6 m) 2F(3.3m)	GF (0.45 m) 1F(3.6m) 2F(3.3 m) 3F(3.3 m) 4F(3.3 m) 5F(3.3 m)	1F(3.6 m) 2F(3.3 m) 3F(3.3 m) 4F(3.3 m)	GF(0.45 m) 1F(4.6 m) 2F(4.6 m) 3F(4.6 m)	GF(0.45 m) 1F(3.6 m) 2F(3.3 m) 3F(3.3 m) 4F(3.3 m) 5F(3.3 m)	GF(0.45 m) 1F(3.6 m) 2F(3.3 m) 3F(3.3 m) 4F(3.3 m) 5F(3.3 m)
Gross Floor Area	3,140 m²	24,885 m²	4,380 m²	3,590 m²	20,415 m²	23,895 m²
Building Coverage	1,570 m²	4,977 m²	1,095 m²（Coml.897 m²）	1,195 m²（Coml.897 m²）	4,083 m²	4,779 m²
BCR	30 %	36 %	32 %	50 %	36 %	35 %
Floor Area Ratio	60 %	184 %	131 %	151 %	183 %	177 %
Motor-cycle parking	260	752	114 (+9 vehicle)	-	544	688

Table 7-10 Information and List of Land Lots (Cont'd)

Land lot number	LO13	LO14	LO15	LO16	LO17	LO18	LD19
Land lot area	2,977 m²	2,128 m²	13,351 m²	3,023 m²	2,630 m²	5,000 m²	17,355 m²
Land use	Medium-rise Commercial/Residential Mixed-use 1 TT14	Medium-rise Commercial/Residential Mixed-use 1 TT16	Medium-rise housing 3 TT18~TT20, Sports court	Medium-rise Commercial/Residential Mixed-use 1 TT17	Medium-rise Commercial/Residential Mixed-use 1 TT15	School TH (As a reference)	Low-rise housing 12 LK21~LK32, Sports court
Number of rooms	51 rooms	27 rooms	298 households	45 rooms	51 rooms	-	372 rooms
Number of residents	204 (single people)	108 (single people)	1192 (family people)	180 (single people)	204 (single people)	-	744 (single people)
Number of floors	4-stories	4-stories	5-stories	4-stories	4-stories	3-stories	2-stories
Building Height	15.5 m	15.5 m	19.25 m	15.5 m	15. 5 m	11. 25 m	8.85 m
Floor Height	1F(3.6 m) 2F(3.3 m) 3F(3.3 m) 4 (3.3 m)	1F(3.6 m) 2F(3.3m) 3F(3.3 m) 4F(3.3m)	GF (0.45 m) 1F(3.6 m) 2F(3.3 m) 3F(3.3 m) 4F(3.3 m) 5F(3.3 m)	1F(3.6 m) 2F(3.3 m) 3F(3.3 m) 4F(3.3 m)	1F(3.6 m) 2F(3.3 m) 3F(3.3 m) 4F(3.3 m)	GF (0.45 m) 1F(3.6 m) 2F(3.6 m) 3F(3.6 m)	GF (0.45 m) 1F(3.6 m) 2F (3.3 m)
Gross Floor Area	3,980 m²	1,988 m²	20,405 m²	3,580 m²	3,980 m²	2,550 m²	9,156 m²
Building Coverage	995 m² (Coml.796 m²)	497 m² (Coml.497 m²)	4,081 m²	895 m² (Coml.695 m²)	995 m² (Coml.796 m²)	850 m²	4,578 m²
BCR	33 %	23 %	30 %	29 %	37 %	17 %	26 %
Floor Area Ratio	133 %	93 %	153 %	118 %	151 %	51 %	52 %
Motor-cycle parking	108 (+8 vehicle)	102 (+5 vehicle)	596	90 (+7 vehicle)	102 (+8 vehicle)	-	260

7.3.4. Building Plan

(1) Planning Principle

The following are issues observed in the model site.

- Many buildings with single rooms for rent exist in this area and will vie for residential use in future.
- Some factories (companies in IPs) will consider using dormitories in future, as they are not thinking of preparing their own living facilities.
- There are no investors or developers intending to construct a considerable scale of residential buildings in this area.
- Almost half of the workers stay in single rooms and the remaining half stay in their family houses and commute to their work place.

From the above issues, the following are set as policies for architectural development.

- Improve quality of buildings with single rooms for rent

For this policy, application of the design guidelines will improve quality of buildings. These guidelines should be applied not only to buildings in new areas of development but also to those in existing villages and towns.

Below is the proposed draft guideline.

Table 7-11 Design Guideline for a Worker's Apartment

Architectural Design	• It requires a minimum floor area of 8 m² per capita for better living conditions • The level of ground floor necessary for the first floor is + 500.
Sanitary Condition	• It requires planning for kitchens, toilets and showers for the household.
Environmental Condition	• It considers planning for windows to provide natural lighting in each room. • It considers planning for fans to provide ventilation in each room.
Security	• It considers planning for a security system providing 24-hour entrance surveillance, key system, CCTV, biometric device, etc.

- Consideration for future conversion to different room types and residential units.

The design layout should be flexible to allow for renovation/conversion into different housing types in the future. For example, two rooms (17+17 m²) for single workers can be combined and converted into one room (34 m²) for a family.

- Introduction of low cost building

House rent and price as well as investment is low. This corresponds to affordability of the labourers and low investor interest. Therefore, although the introduction of medium-rise buildings is planned due to development requirements and land availability, construction costs need to be minimum.

(2) Architectural Concepts

In housing planning, while taking into account feedback from interviews of the labor force, it is necessary to consider the issues below. These are categorized into three: common issues, medium raised buildings and row houses.

【Common Issue】

- In any case, introduction of low cost building is necessary. Therefore, double loaded corridors are introduced for both row houses and medium-rise apartments for space efficiency.
- It should comply with the required minimum per capita housing area of 8 m².

- Housing should be planned/considered with storage space and a kitchen due to the demands of industrial workers in the interviews.
- Water and power supply shall be through the planned network in the corresponding sections. Kitchen gas is to be provided with each house equipped with a propane tank. Wastewater is to be treated at the central plant connected through the sewer network. However, septic tank shall be installed in other projects where a sewer network is not available.
- In future, two housing units/rooms will be combined into one house/room as a duplex flat or horizontally expanded making it is easy to increase floor area to meet the demands for better living conditions. The JST proposed that walls should be made of light-gaged steel with plasterboard instead of conventional bricks allowing for future renovation. Solid waste shall be collected through the existing municipal network.
- It should be prepared to design enough expected space/slopes for Universal Design as barrier-free or for handicapped people.

【Row Houses (Low-Rise Housing)】

- Workers tend to priorities need for private space. However, it is difficult to design private space for the long life of the building with the current rent fee. Therefore, rooms are planned to be shared by two persons as the floor plan area is planned closely to the minimum requirement. Also, it considers a Vietnamese custom that the two persons are friends and come from the same province.
- So as to accommodate two persons, room area for row houses shall be set at 17 m². Loft space will be created to ensure as much privacy as possible. Tables in living spaces will enable workers to spend time studying among other activities.
- A single room shall accommodate three people in the event that workers chose to pay less for housing. This will still comply with the set guidelines for minimum floor area of social housing of 4.5 m² per person. It will also accommodate a small family with one child as it is equipped with its own kitchen and rest room.
- A worker can rent a single room in future when salaries and living standards increase.
- Distance between buildings will ensure privacy and better environmental space.
- A housing unit shall be used as a module when adjusting the length of a building corresponding to the land lot. Therefore, its span will be changed depending on the length of the building.

【Medium-Rise Housing】

- Four to Five story buildings could be introduced taking into account limits on building coverage and floor area ratios indicated in the plans for this area.
- “I” shape building could be mainly introduced due to its low cost, while “L” shape building could also be introduced to fit the shape of the land. The first floor of “I” shaped buildings will be used as a parking lot for motorcycles, while shops will occupy the first floor of “L” shaped buildings. In addition, community space for habitants will also be provided on the first floor.
- Shops will be introduced on the side facing the main road with the backside used as a parking lot for motorcycles.
- A family size housing unit fit enough for two parents and two children will be set at 40 m².
- A dormitory room for singles will also be set at 40 m² with the basic layout plans almost similar to those of a family unit.

- A span of 6 to 7 m is adopted in designing a housing unit. This is the average unit size in Vietnam.
- A housing unit shall be used as a module when adjusting the building length corresponding to the land lot. Therefore, its span will be changed depending on the length of the building.
- Plans for future expansion of rooms are also proposed. This will be done by merging two rooms to meet increased future demand due to improved living standards. Two plans will be prepared; one for horizontal expansion and the other for Vertical integration.

(3) **Motor-Cycle Parking Lots**

The following issues should be taken into account during planning.

- In medium rise housing, it shall be planned to have parking for motorcycles on the first floor.
- Assumed number of motorcycles per household/room is two. In addition, design space for one motorcycle shall be 3 m².
- For commercial facilities, the planned parking lot for one car is 100 m² per gross floor area.

(4) **Structural Design and Technology**

The following issues will be considered for structural designs and technology.

- With regard to low-rise housing with two stories and providing a comprehensive range of ground improvement, results of soil investigation suggest the use of a mat foundation during planning.
- With regard to medium-rise housing with four to five stories and as the building becomes heavier, use of friction piles rather than using tip-bearing piles in consideration of cost advantage shall be planned for.
- For two and four story housing, it shall be considered to plan for a framing structure with an infilling brick wall rather than a brick wall structure itself.
- The JST will not introduce double layer floors for installation of water pipes and electrical wiring. This allows for easy renovation and bathroom units are an alternative technology. However, this technology is introduced in Annex 3.

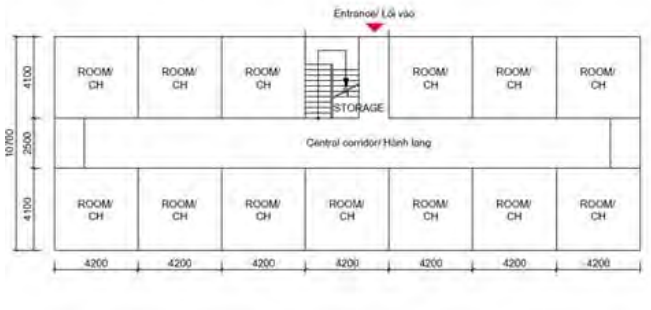
(5) **Construction and Housing Plans**

Below are the architectural concept drawings.

Low- Rise House

- The room is planned to share with two persons within the current affordable rent and minimum area
- Room area for low houses set to be 17 ㎡.
- Loft space is prepared with bed.
- One worker can occupy one room in future when salaries and living standards increase.
- Housing unit is used as modular for adjusting length of the building to land lot.

Elevation Side

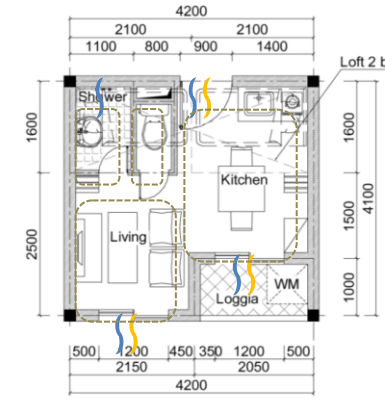


First floor

Housing layout model (room)

Facilities for Individual Housing Units

* Two Beds in Loft
Residents have their own bed for each person.
* Kitchen
Residents can cook anytime they want.
* Shower, Toilet
Shower and toilet are separated.
* Washing Machine
Residents can wash their clothes anytime they want.



Room Plan

* Living, Kitchen and Loft Space
* 17.22m^2 for two residents
8.61m^2 per person

Entrance

* Key System

Kitchen

* Clean Water

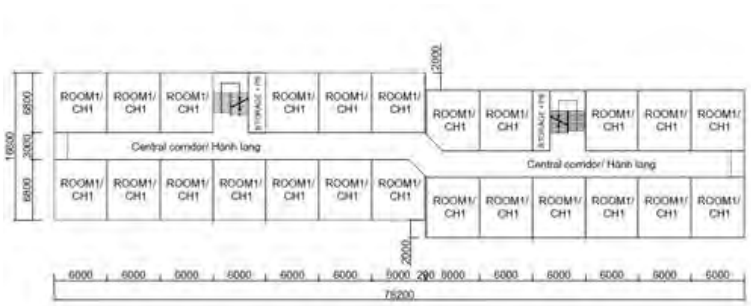
Veranda

Figure 7-14 Drawing Plan (Low-Rise Housing)

Medium- Rise Housing

- Four to five story buildings are introduced taking into account limits on building coverage and floor area ratio.
- "I" shape building is mainly introduced due to low cost.
- The first floor used as a parking lot for motorcycles and community space for residents is also provided on this floor.
- A family-size housing unit fit enough for two parents and two children is set at 40m^2.
- A housing unit is used as modular for adjusting length of the building corresponding to land lot.

Elevation

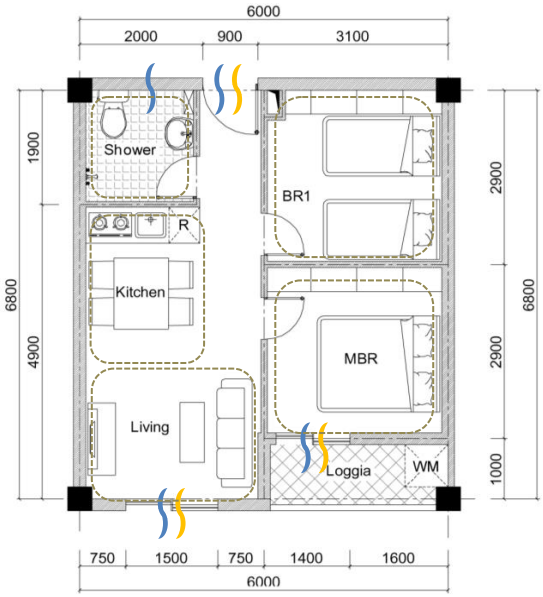


First floor

Housing layout model (room)

Facilities for an Individual Housing Unit

* Two Bed Rooms
  Residents have their own bed.
* Kitchen
  Residents can cook anytime they want.
* Living Room
  Residents enjoy family conversation.
* Shower, Toilet
  Shower and toilet for private use.
* Washing Machine
  Residents can wash their clothes anytime they want.



Room Plan

*Living room.
Two bed rooms
Surface of a Room:
*40.8 m^2
*10.2 m^2 per person

Figure 7-15 Drawing Plan (Medium-Rise Housing)

7.3.5. Exterior and Public Space Planning

(1) Approach to Exterior and Public Space Planning

The following contents are recommended as common regulations in the model site district exterior design.

1) **Exterior Space Planning**

a. Approach to Boundary Space Design

- Basically, exterior walls or fences are prohibited. The site shall be open to the neighboring areas.

b. Townscape Design

- Integrated design concept shall be prepared for the reference of each site design.

2) **Building Line Control**

- Integrated building line control shall be introduced for the entire site in order to ensure ventilation, lighting, safety and environment. The setback for low-rise housing areas will be 2 m and for medium-rise housing areas, commercial and residential complexes and public facilities will be 3 m.
- A larger setback from the building line shall be created for zones facing parks, greeneries or arterial roads. This will create a pleasant environment of semi-public space with street stands, cafés, etc.

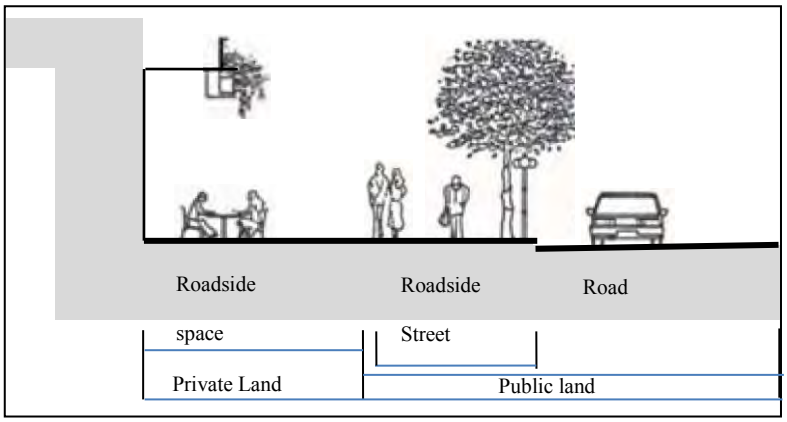


Figure 7-16 Image of the Building Line Setback

3) **Approach to Greening Planning Approach**

- Greening shall be planned in each zone to create an image of continuity in the area and better environment.
- According to this design concept, volume and height of greeneries shall be proposed in the following section.

(2) External and Public Space Planning for Each Zone

The following contents are recommended as the issues to consider for each purpose of land use in the external structure design for each district of the model site.

1) **Low-Rise Housing Zone**

- Low and medium-height trees shall be planted at the site boundary to ensure privacy.
- Areas surrounding houses are most likely to be used as parking lots for motorcycles. Passage for residents shall be created by placing low plants, planter boxes, etc. around entrances.

- Greeneries and plants shall be placed as a buffer and screen in spaces where radio lines run through.
- In accordance to the law and for promoting better health, spaces for sports courts should be planned.

2) **Medium-Rise Housing Zone**

- A courtyard is planned between medium-rise buildings as a refreshment and relaxation or community space for residents.

Apartment in Long Hau IP
Housing Complex with a Feel of Being Covered in Green

Long Thanh Japanese Company "O" Dormitory Characterized by a Large Symbolic Tree in the Courtyard

Figure 7-17 Example of Utilization of a Courtyard

- Creation of a resting space: This is proposed for through use of open spaces in housing lots along the continuous green ways.
- Play areas for little children are proposed in the courtyards. Playground equipment will be installed in spaces where children can be watched over not only by their parents but also by other residents.

Apartment in Long Hau IP
Playing Space for Small Kids in nearby Housing

Figure 7-18 Example of Pocket Space

3) **Commercial and Residential Complexes**

- Greenery shall be planned in surrounding car and bicycle parks, garbage collection areas and water tanks, so that they are not clearly visible.

4) **Public Facility Zone**

- In view of security and privacy for inpatients of the clinic, the periphery of the buildings shall be divided by hedges.

5) **Parks, Greeneries, and Sewage Treatment Plant Zones**

- Green ways or passages shall be planned as the backbone for greening in and around the site.
- In case there is need to fence, green areas shall be considered.

Apartment in Long Hau IP
Promenades That Run Around the Housing Complex

Figure 7-19 Example of Green Way

7.3.6. Road Plan

(1) **Related Regulations and Planning Standard**

Key regulation and a number of planning standards related to this study are summarized below.

1) **Regulation**

QCXDVN 01:2008/BXD Vietnam building code on regional and urban planning and rural residential planning

This code consists of provisions to be adhered to during the preparation, appraisal and approval of the construction plan. Specifically, it states that the ratio of land for traffic flow and static traffic within in areas during construction of residential blocks shall be at least more than 18 % of the internal roads.

2) **Standards**

TCXDVN 104:2007 Urban Roads − Specifications for Design

This standard specifies the requirements when planning a new construction design, renovation and upgrading roads in urban cities.

TCVN 4054:2005 Highway − Specifications for design

This standard specifies requirements for construction design, renovation and upgrading of roads. It also applies to specialized roads like highways, urban, industrial, forest and other types of roads. It will also be applied to other appropriate grades when designing rural roads.

22 TCN 211:2006 Flexible pavement − design specification and guidance

This standard specifies the requirements for the design, structure and flexible pavement intensity calculation for all grades of highways, urban roads and specialized highways. This also applies to cases of newly constructed or renovated pavement.

TCXDVN362:2005 − Greenery planning design for public utilities in urban areas

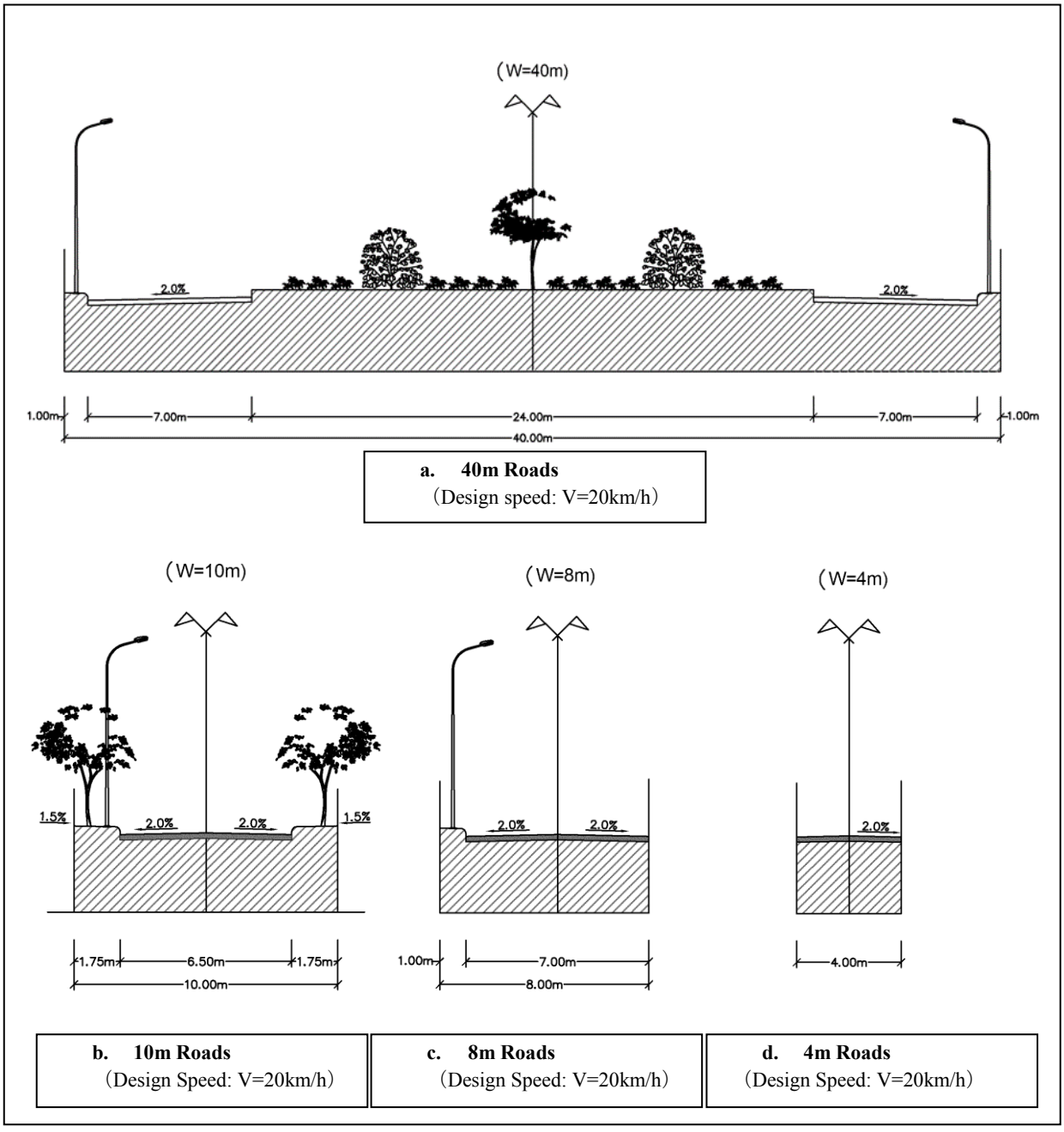
This standard specifies the requirements for tree planting designs in urban cities.

TCXDVN259:2001 − Standards for Design of Artificial Lighting System for Urban Roads and Square

This standard specifies the requirements for road lighting designs in urban cities.

3) **Typical Cross Section**

Basing on rules of above 1) and 2) above, four typical cross sections for internal roads shall be proposed as below.



Source: JST

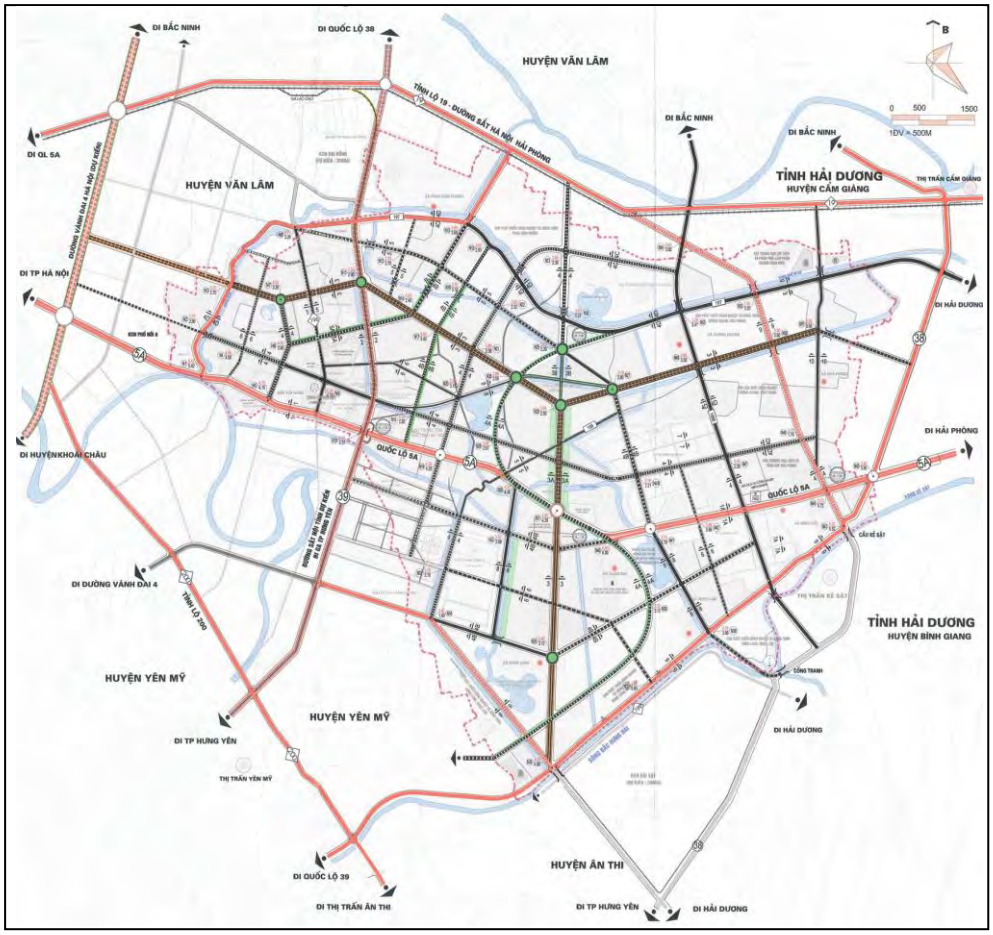
Figure 7-20 Typical Cross Section of Internal Roads

(2) **Related Plans**

Current city plans of Hung Yen Province and My Hao district shall be reorganized to influence the model site.

Highway QL5 runs in the east-west direction 0.8km north of the model site.

Planning is underway for three highways around the model site: 24 m width road on the east side, 24~42 m width road on the west side and 34 m width road in the center. The road plan is shown below.



Source: My Hao General Construction Plan to 2020, vision 2030

Figure 7-21 My Hao District Road Plan from 2020 - 2030

(3) Details of the Model Site and Surrounding Areas

1) Current Road Conditions

A road south of QL5 connects to the east of the model site. It is 3.8 m wide with concrete pavement and no lighting. The distance from QL5 to the north-eastern area of the site is about 0.78 km. A waterway, approximately 10 m wide, runs parallel to the east side of the road.

Source: JST

Figure 7-22 Road in the East of the Model Site

A concrete road 3.5 m width runs in the south of the model site with no provision for lighting. A waterway, approximately 2 m wide, runs parallel to the north side of the road.

Source: JST

Figure 7-23 Road in the South of the Model Site

The mall of Thua is a road approximately 700m length and 6m width. It is sufficient to carry bicycle traffic.

Roads in villages are too narrow to carry automobiles.

2) **Present Traffic Situation**

There is a signal intersection at the connection with QL5 west of Thua. This can access all directions.

East of Thua, the connection with QL5 is only to access Hai Phong. There is no U-turning for heavy vehicles accessing Hanoi up to a number of kilometres. Corresponding to this situation, currently, vehicles travel 70 m in reverse, via Thua Mall, towards Hanoi.

A pedestrian overpass is provided on the 70 m west point from the connection with QL5 east of Thua.

Source: JST

Figure 7-24 Pedestrian Overpass on QL5

A trailer has been left by the roadside of QL5 section, along the road from Thang Long IP II to Thua village.

The crossing of QL5 and QL39, in front of Thang Long IP II, is the interchange of grade-separation. It is accessible from all directions, but too wide for bicycles and pedestrians.

QL39, adjacent to Thang Long IP II, is a two-lane road. There is high traffic volume including trucks and trailers and during peak hours, many drivers break traffic rules. This creates confusion and increases possibility of traffic accidents.

Source: JST

Figure 7-25 QL39

3) **Commuting Situation**

Many workers in Thang Long IP II work in shifts. It is especially those on duty from 6 am to 2 pm that cause congestion at 2 pm when commuting.

Most workers commute using motorcycles. Bicycle users are the minority. Workers who walk are probably very few. There is also no shuttle bus.

Serious traffic congestion currently does not occur in this area.

Source: JST

Figure 7-26 Commuting Situation of Workers

4) **Survey on Traffic Status by the Other Implementation Cases**

a. Location of Survey

In order to understand the traffic situation around industrial zones near Hanoi city, in Bac Ninh and Hai Duong province, the study team conducted site visit surveys. This was on the current condition of the previously developed IP and neighbouring residential areas in view of construction traffic planning.

b. Current Road Conditions

The following was observed;

- A speed limit of 30 to 40 km/h for roads in the IP.
- There are speed humps before and after most crossings to restrict the speed of vehicles.
- Roadways are asphalt while most sidewalks are paved using interlocking blocks.

- There are streetlights in all areas of the IP.
- There are bicycle-lane markings in Vietnam and Singapore IPs. However, provision of bicycle lanes is recommended.
- There exists little walkable space in IPs and residential areas including QUE VO IP and Dinh Bang communal house (under construction), where lights and trees are installed even on narrow sidewalks.
- A pedestrian bridge is located along QL5 in front of PHUC DIEN IP. It separates vehicle traffic from pedestrians. Bicycles are also able to use the bridge.

Source: JST

Figure 7-27 Dinh Bang Communal House

c. Current Traffic Conditions

The following situation is observed.

- Dozens of shuttle buses belonging to the Samsung factory are parked in Yen Phong IP, Bac Ninh province. They are the main commuting means for workers. The Noi Bai bus station is also located near the main gate of the factory.
- B's factory in PHUC DIEN IP is located next to a workers' dormitory showing that some workers walk to factories.
- C's factory is located in Tien Son IP of Bac Ninh. It is also close to a workers' dormitory and it has vacant store space temporarily being used for motorcycle parking. This shows that there is not enough parking spaces for all motorcycles. There are 24-hour security guards, resident in both the normal and temporary parking lots.

Source: JST

Figure 7-28 Case of Japanese Company "C" Workers' Dormitory

- An automated teller machine (hereinafter referred to as "ATM") was installed near the main gate of Tan Truong IP in Hai Duong. It causes congestion of users during the clock-out time. Many motorcycles parked in front of ATMs obstruct traffic. It was especially remarkable on the Friday that this survey was performed.
- In Dai An IP of Hai Duong, street vendors operate shops on the commuting route for factory workers. Workers park their motorcycles in front of stalls and this affects traffic flow.

Source: JST

Figure 7-29 Dai An IP: Stalls and Workers Leaving a Factory

(4) **Solutions and Considerations for Housing Development**

1) **Principles and Tasks of the Road Plan**

The following construction requirements are used during road planning of the model site.

a. Ratio of Road Area

Internal road area: 30,425 m²/Residential area：163,527 m² = 18.6 % ≧min 18.0 %

b. Design Speed

In IPs, the speed limit is between 30 to 40 km/h and this is good. In residential areas, design speed shall be V=20km/h according to the requirement of TCXDVN104:2007,12.7.2.

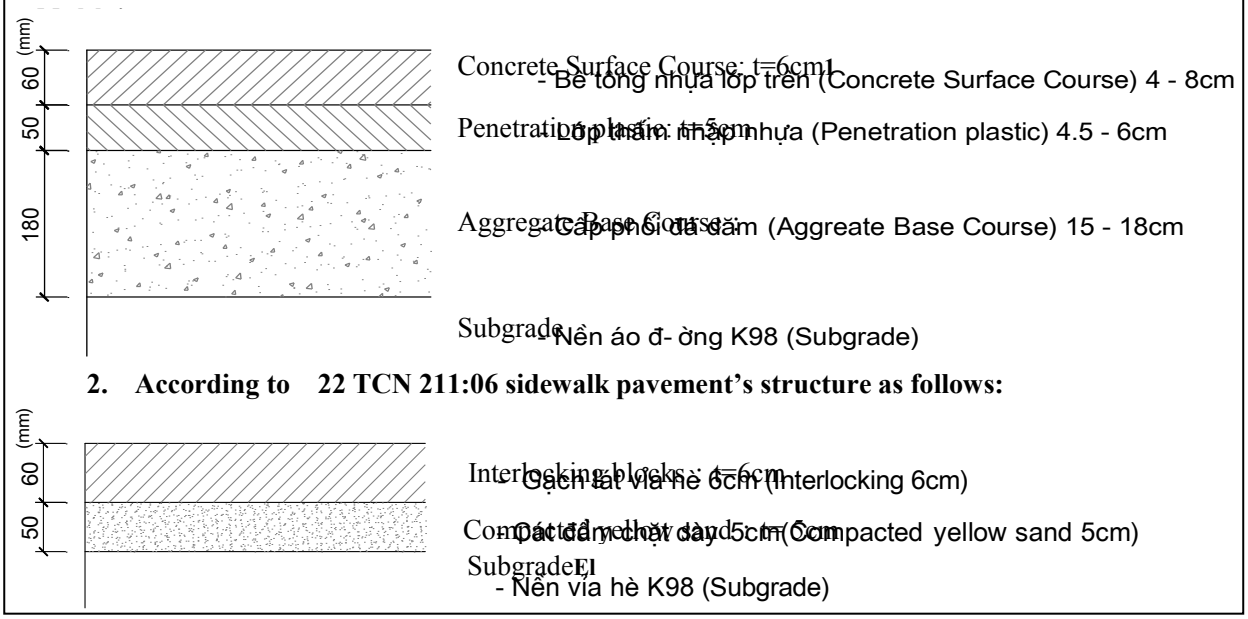
c. Speed Control

Speed humps are used widely in Vietnam to restrict speed of vehicles. They shall also be installed in the planned roads for residential areas. This is required as per the study on bicycle safety and rainwater drainage.

d. Pavement

Pavement thickness is defined below according to the requirement of 22 TCN 211:2006.

1. According to 22 TCN 211:06 internal road pavement's structure A2 as follows:



2. According to 22 TCN 211:06 sidewalk pavement's structure as follows:

Source: JST

Figure 7-30 Structure of Pavement and Sidewalk

e. Planting

Trees shall be planted on sidewalks of internal roads in accordance with requirement TCXDVN 362:2005.

- Standard tree stem diameter shall be 6 cm.
- Standard tree height shall be 3 m.
- Standard spacing between trees shall be 2 m ~ 4 m.

f. Lighting

Streetlights shall be installed in accordance with the requirement TCXDVN259:2001 as below.

Table 7-12 Road Lighting Design Criteria

No	Road Width	Height (m)	Interval (m)	Column Layout	
				One Side	Both Side
1	W=25 m～	10	35		Same direction
2	W=11 m～16 m	8	60		Chess board patterns
3	W=10 m	7	40	+	
4	W=9 m	7	40	+	
5	W=8 m	7	40	+	

Note: According to TCXDVN 259:2001- Artificial lighting for urban road, street and square, Design standard.

Source: JST

2) **Principles and Tasks of the Traffic System**

Below are the planning issues needed to be discussed regarding the surroundings of the model site.

a. Access Control

Currently, there is only one road from QL5 accessing the residential area in the model site. It is about 800 m long and 3.5 m wide, and too narrow to allow for bilateral traffic. It is therefore necessary to construct the planned roads before developing the site.

b. Thang Long IP II

The crossing between QL5 and QL39 in front of Thang Long IP II is an interchange of grade-separation. It is accessible from all directions but too wide for bicycles and pedestrians. Therefore, a bridge shall be installed in view of preventing crossing of QL5 at grade and connecting the south to the east side.

c. Thua Village

There is a signal intersection at the connection with QL5 west of Thua, enabling access to all directions. On the other hand, it is just able to access Hai Phong in the east, though a pedestrian crossing bridge exists on the road. A new signal intersection east of Thua will increase higher accessibility.

7.3.7. Water Supply Planning

(1) Related Regulations and Planning Standards

1) Regulations

There are many regulations relating to water supply and drinking water. A few key regulations relating to the project are summarized below.

- DECREE No. 124/2011/ND-CP of Dec 28, 2011 on clean water production, supply and consumption

This decree provides for activities in the domains of production, supply and consumption of clean water. This is for those under the complete concentrated water supply systems in urban areas, rural areas, IPs export processing zones, hi-tech parks and economic zones, the rights and obligations for organizations, individuals and households engaged in activities related to clean water production, supply and consumption in the Vietnam.

- QCVN 01 2009/BYT National technical regulation on drinking water quality

This technical regulation stipulates limits of quality in the criteria for selecting water to be used for drinking and processing food. This regulation applies to institutions, organizations, individuals and households who exploit and trade in drinking water including piped water providers for domestic purposes with a capacity of 1,000 m^3/day or above.

- QCVN 02 2009/BYT National technical regulation on domestic water quality

This technical regulation stipulates limits of quality in the criteria for water for domestic use but not for drinking or processing food. This regulation applies to institutions, organizations, individuals and households who exploit and trade in domestic water including piped water providers for domestic purposes with a capacity of less than 1,000 m^3/day.

- QCVN 01 2008/BXD Vietnam building code on regional and urban planning and rural residential planning

This code contains regulations that must be complied with in the process of elaboration, evaluation and approval of construction plans. It also serves as a legal ground for promulgation and application of construction planning standards and regulations in construction management under local planning.

2) **Standards**

- TCXDVN 33/2006 Water supply – Distribution system and facilities design standard

This standard applies to design for new construction, renovation and expansion of urban water supply systems, rural population centers and IPs.

- TCVN 2622 – 1995 Fire prevention and protection for buildings and structures - Design requirements standards.

This standard defines basic requirements for fire prevention and protection when designing, a building or improving buildings and structures. It defines the requirements when assessing designs and approving buildings and structures.

(2) **Related Plans**

There are three related plans concerned with the model site. One is 'General Construction Plan for Pho Noi Urban Town until 2025', the other is "Zoning Plan for Downtown of My Hao Urban Quarter" and the third; is "General Construction Plan for My Hao District, Hung Yen province until 2020 with vision to 2030". The model site is in proximity to the target area of Pho Noi Plan, while My Hao Zoning Plan covers the model site.

1) **General Construction Plan for Pho Noi Urban Town until 2025**

In this urban plan, the total water demand in 2025 is calculated as 57,000 m^3/day for 250,000 residents including some other usage like in school, public, commercial and irrigation.

In order to expand supply capacity of treated water, construction of a water treatment plant and construction of distribution pipes are planned. The total construction cost is assumed to be 291,165 million VND.

a. Zoning Plan for Downtown of My Hao Urban Quarter

In this plan, water demand amounts to about 46,000 m^3/day. It should be mentioned that, distribution pipes shall comply with the "General Construction Plan".

b. General Construction Plan for My Hao District

In this plan, water demand is calculated as shown below (by unit demand). From the calculation result, total water supply-demand in 2020 and 2030 is about 55,000 m^3/day and 81,000 m^3/day, respectively.

Table 7-13 Water Supply Standard of General Construction Plan for My Hao District

No.	Service Area	Water Supply % (2020-2030)	Standard 2020-2030 (l//person/ day)	Public Use %Qsh	Water for Road Washing, Public Tree Watering %Q sh	Water for Reserve, Leakages (% of Total Volume of Previous Items)	Water Supply for the Treatment Plant (% of Total Volume of Previous Items)
1	Urban Area	90-100	120-150	10	10	20	5
2	Rural Area	80 – 100	80-100	10	10	20	5
3	Centralized Industrial Premises	40-60	20 m^3/ ha.day				
4	University, Trade and Services Premises	60-90	15 m^3/ ha.day				

Source: General Construction Plan for My Hao District, Hung Yen province until 2020 with vision to 2030

In order to supply treated water, some projects are planned as described below;

- Upgrade the capacity of water plants of Di Su WTP and Bach Sam WTP
- Construct new water supply network pipes and connect them to the existing system

(3) Analysis on the Study Site and Surroundings

There is no water supply pipeline at the model site. Although the model site is located in My Hao urban area and the water supply system is planned in the My Hao District, a, schedule for the development is not consistent to the model site development. Therefore, an independent water supply system shall be planned for.

(4) Solutions and Considerations for Housing Development

1) Water Supply Demand

The conditions for water supply-demand calculation based on regulation, standard and related plans, are summarized in table below.

Table 7-14 Conditions of Water Supply Demand Calculation

No.	Component	QCVN 01 Building code	TCXDVN 33 Water Supply Design standard	Pho Noi Urban Plan	My Hao Urban Plan
1	Daily Life	100 L/capita/day	100 L/capita/day	130 L/capita/day	150 L/capita/day
2	Public Works and Services	10 % of daily life 10 L/capita/day	10 % of daily life 10 L/capita/day	15 % of daily life 20 L/capita/day	20 % of daily life 30 L/capita/day
3	Tree Watering and Road Cleaning	8 % of daily life 8 L/capita/day	Based on width of area	10 % of daily life 13 L/capita/day	10 % of daily life 15 L/capita/day
4	Small production and Industries	8 % of daily life 8 L/capita/day	Based on area of land use	Based on area of land use	Based on area of land use
5	Reserve and Leaking	25 % of total 32 L/capita/day	15 % of total 17 L/capita/day	15 % of total 24 L/capita/day	20 % of total 39 L/capita/day
6	Water Treatment Works	4 % of total 6 L/capita/day	10 % of total 13 L/capita/day	5 % of total 9 L/capita/day	5 % of total 12 L/capita/day

Note: unit demand for public works and services of My Hao urban plan refer the Internal Market Zoning plan

Source: JST

The unit rate for the water consumption of the My Hao urban plan is much higher than that of QCVN 01 and TCXDVN 33. Therefore, the unit rate of the My Hao Urban Plan was applied for the water demand projection.

The estimated population is 8,000 residents and water consumption is projected as described in the table below. The components include public works and services, tree watering, road cleaning, reserve and leaking. Water demand for small production industries is not projected, because there are no facilities that are planned for as such. The water supply-demand for the model site will be approximately 2,000 m^3/day.

Table 7-15 Conditions of Water Supply Demand Calculation

No.	Component	Unit Demand	Water Supply Demand (m^3/day)	Remarks
1	Daily Life	150 L/capita/day	1,200	= 8,000 x 150 lcd
2	Public Works and Services	20 % of daily life 30 L/capita/day	240	= 8,000 x 30 lcd
3	Tree Watering and Road Cleaning	10 % of daily life 15 L/capita/day	120	= 8,000 x 15 lcd
4	Small Production and Industries	Based on Area of land use	0	
5	Reserve and Leaking	20 % of total 39 L/capita/day	312	= 8,000 x 39 lcd
6	Water Treatment Works	5 % of total 12 L/capita/day	96	= 8,000 x 12 lcd
	Total		1,968	=1,200+240+120+312+96 =1,958 ≒ 2,000

Source: JST

According to the TCXDVN 33 Water Supply Design standard, daily maximum peak factor is set from 1.2 to 1.4 and hourly maximum peak factor is set from 1.2 to 1.5. Therefore, the average value is applied for this planning. Daily maximum peak factor is 1.3, while hourly maximum peak factor is 1.35. The daily maximum water supply volume and the hourly maximum water supply volume are 2,600 m^3/day and 3,510 m^3/day, respectively.

2) **Water Sources and Water Treatment Plant**

The intended water source for My Hao Urban area is groundwater. Based on the results of the natural environmental survey, the groundwater quality is in relatively good condition, but high iron content was noted. Thus, a deep well and a treatment plant should be planned at the model site. A specification of the deep well is summarized below.

Table 7-16 Specification of Deep Well

No.	Contents	Specification	Remarks
1	Number	2 nos	
2	Depth	80 m	
3	Pump Capacity	60 m^3/hr	=2,600 m^3/day / 24hr / 2nos

Source: JST

In this plan, the following treatment process is proposed for the plant.

1) Aeration >> 2) Filtration >> 3) Disinfection

3) **Pumping Station**

The land is almost flat and the height of housing is estimated at 20 m. Therefore a pumping station for water supply shall be planned for in order to ensure the required pressure in distribution pipes.

In order to set residual pressure a specification, of a pump capable of supplying heights greater than 20 m, is described in the table shown below.

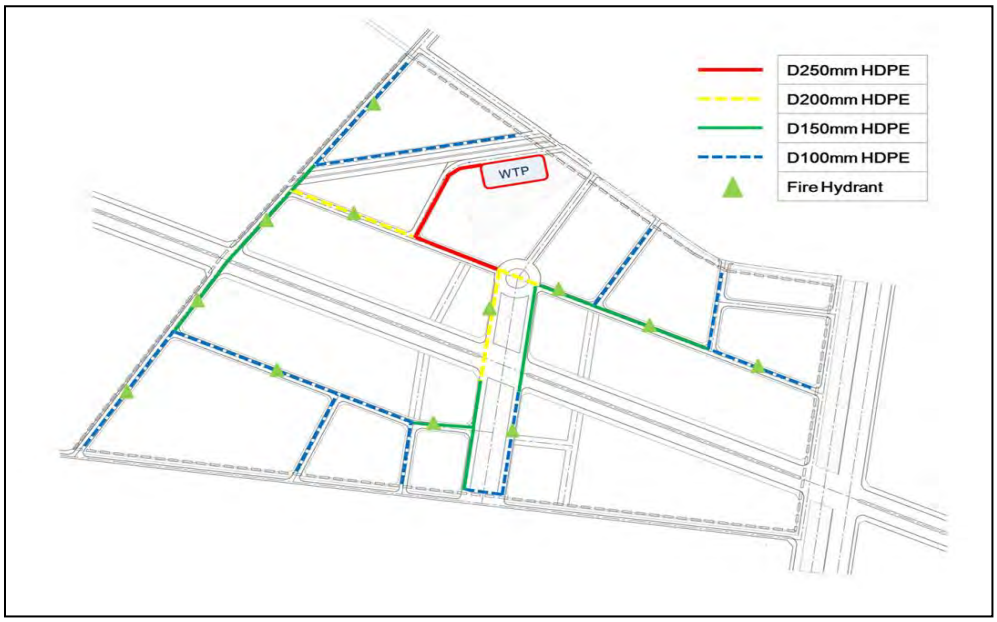
Table 7-17 Specification of Pump Station

No.	Contents	Specification	Remarks
1	Number of pump	3 nos	2 duty, 1 stand-by
2	Capacity of each pump	1.22 m^3/min	=3,510m3/day /24hr/60min / 2nos
3	Total head	25 m	
4	Motor output	15 kW	

Source: JST

4) Distribution Pipe and Fire Hydrant

For the planning of the distribution pipe, the diameter was calculated by using E-PANET systems. As a result, distribution pipes of 250 mm diameter from those of 100 mm diameter are necessary in the model site as shown in figure below.



Source: JST

Figure 7-31 Plan of Distribution Pipes

In addition, the number for fire hydrants was set at 16 based on TCVN 2622-1995 fire prevention and protection for buildings and structures.

5) Summary of Water Supply Plan

The summary of the water supply plan is presented in table below.

Table 7-18 Outline of Water Supply Plan

No.	Contents	Summary	Quantity	Remarks
1	Deep Well	80 m with Pump	2 well	Pump Capacity 60 m^3/hr
2	Treatment Plant	Aeration, Filtration, Disinfection	1 plant	Capacity 2,860 m^3/day
3	Pump Station	3 Pumps	1 station	1.35 m^3/min-25 m-15kW
4	Distribution pipe	D 100 mm D 150 mm D 200 mm D 250 mm	1,218 m 648 m 271 m 188 m	HDPE pipe or equivalent
5	Fire Hydrant		12 sets	

Source: JST

7.3.8. Waste Water Treatment Planning

(1) Related Regulations, Planning Standard

1) Related Regulations

There are many forms of regulations regarding wastewater treatments; some important regulations related to the study for the model site are summarized below.

- Law on environmental protection, 2005

This Law regulates environmental protection activities; policies, measures and resources for protection of the environment. It regulates the rights, obligations of organizations, family households and individuals with respect to protection of the environment.

- DECREE No.88 2007/ND-CP urban and IP water drainage

This decree caters for water drainage activities in urban centers and IPs, economic zones, export processing zones, hi-tech parks. It caters for rights and obligations of organizations, individuals and households involved in water drainage activities in the Vietnam.

- QCVN 01 2008/BXD Vietnam building code on regional and urban planning and rural residential planning

This code consists of regulations that must be complied with in the process of elaboration, evaluation and approval of construction plans. It serves as a legal ground for management of; the promulgation and application of construction planning standards and regulations on construction management under local planning.

- QCVN 08 2008/BTNMT National technical regulation on surface water quality

This regulation specifies to what degree the parameters for surface water quality are followed. This regulation exists to assess and control the quality of surface water, as a basis for the protection and ensure water is used appropriately.

- QCVN 09 2008/BTNMT National technical regulation on ground water quality

This regulation specifies the standard for the parameters for groundwater quality. This regulation exists to assess and monitor the quality of groundwater resources.

- QCVN 10 2008/BTNMT National technical regulation on coastal water quality

This regulation acts as a yardstick for parameters for coastal water quality. This regulation applies to assess and control the quality of coastal waters, for the purpose of sports, water recreation, aquaculture and other purposes.

- QCVN 14 2008/BTNMT National technical regulation on domestic wastewater

This regulation stipulated the parameters for maximum allowable values of polluted wastewater discharged into the environment. This regulation applies to wastewater discharged into the environment form public institutions, armed forces' barracks, service facilities, apartment buildings/residential areas and businesses.

- QCVN 24 2009/BTNMT National technical regulation on industrial wastewater

This regulation stipulated permissible values of the pollution parameters in industrial wastewater discharged into the water courses.

2) Related Standards

TCVN 7957 2008 Drainage and sewerage – External networks and facilities – Design standard

This standard prescribes the mandatory requirements or recommendations applied to the design for construction/renovation, expansion and upgrading of the sewerage system in urban centers, residential zones and IPs.

(2) **Related Plans**

There are three related plans concerned with the model site. Firstly, 'General Construction Plan for Pho Noi Urban Town until 2025', The other being the "Zoning Plan for Downtown of My Hao Urban Quarter' and thirdly, the 'General Construction Plan for My Hao District, Hung Yen province until 2020 with vision to 2030'. The model site is located outside Pho Noi but it is in proximity to the area. On the other hand, My Hao area covers the model site.

1) **General Construction Plan for Pho Noi Urban Town until 2025**

In this urban plan, the total wastewater volume discharged from 250,000 residents and public works is calculated as 37,000 m^3/day

In order to treat wastewater by a separate wastewater drainage system, other projects need to be planned.

2) **Zoning Plan for Downtown of My Hao Urban Quarter**

The wastewater supplied is 80% of the water supply volume in this plan. Then the amount of wastewater is 28,521 m^3/day.

The planned wastewater drainage system covers the model site.

3) **General Construction Plan for My Hao District, Hung Yen Province until 2020 with Vision to 2030**

The urban area of My Hao is divided into four wastewater drainage basins in the urban plan. The model site is located in basin-2, which includes the area south of highway 5. The capacity of the wastewater treatment plant of basin-2 should be 10,000 m^3/day by the year 2030.

(3) **Analysis on the Study Site and Surroundings**

There is no wastewater system and treatment plant at the model site for now. Although the wastewater drainage system will be developed according to the My Hao urban plan, the schedule is not consistent with the model plan. Therefore, a treatment system shall be designed.

(4) **Solutions and Considerations for Housing Development**

1) **Wastewater Volume and Quality**

Wastewater volume is projected at about 80% of water supply volume, based on regulations and standards. Projection of wastewater volume is shown in the table below;

Table 7-19 Wastewater Volume Projection

No.	Component	Water Supply Unit	Wastewater Generation Rate	Wastewater Generation Unit	Wastewater Generation Volume
1	Daily Life	150 L/capita/day	80 %	120 L/capita/day	960 (=8,000x120lcd)
2	Public Works and Services	20 % of daily life 30 L/capita/day	80 %	24 L/capita/day	192 (=8,000x24lcd)
3	Tree Watering and Road Cleaning	10 % of daily life 15 L/capita/day	0 %	-	
4	Reserve and Leaking	20 % of total 39 L/capita/day	0 %	-	
	Total				1,152 ≒**1,200**

Source: JST

The daily maximum peak factor is set to 1.3; that of the hourly maximum peak factor is set to 1.35 similar to the water supply plan. The daily maximum wastewater volume and the hourly maximum wastewater volume are 1,560 m^3/day and 2,106 m^3/day, respectively.

Wastewater discharged from the model site is domestic since there is no unique pollutant source in the model site. Therefore, the wastewater quality of Biochemical Oxygen Demand (hereinafter referred to as "BOD") and suspended solids (SS) is estimated at 300 mg/L and 350 mg/L, respectively.

2) **Wastewater Treatment Method**

Required specification of the treatment plant is set to satisfy the quality of effluent standards regulated by QCVN14. Class B is applicable for this plan. See table below.

Table 7-20 Discharge Standard for Domestic Wastewater: QCVN14

No	Parameter	Unit	Standard Value C	
			Class A	Class B
1	pH	-	5 – 9	5 – 9
2	BOD_5	mg/l	30	50
3	TSS	mg/l	50	100
4	Total Dissolved Solid (TDS)	mg/l	500	1000
5	Sulphide	mg/l	1.0	4.0
6	Ammonia	mg/l	5	10
7	Nitrate	mg/l	30	50
8	Animal-Vegetable Fat and Oil	mg/l	10	20
9	Total active substances surface	mg/l	5	10
10	Phosphate	mg/l	6	10
11	Total coli forms	MPN/100ml	3,000	5,000

Source: QCVN14:2008/BTNMT

The project might introduce a private-public partnership type of initiative for improving private companies profit potential. Public organizations develop land and utilities, while the private company builds and operate the housing. That is the one reason why centralized treatment is introduced in the planning because it decreases the cost of building operation. Treatment volume is expected to be large enough for efficient operation of the centralized treatment system. Anaerobic treatment process, which is commonly used in Vietnam, is proposed. This will make for easy operation. The proposed facility consists of a large size fiber reinforced plastic (hereinafter referred to as "FRP") packaged on-site for wastewater treatment. (See figure below).

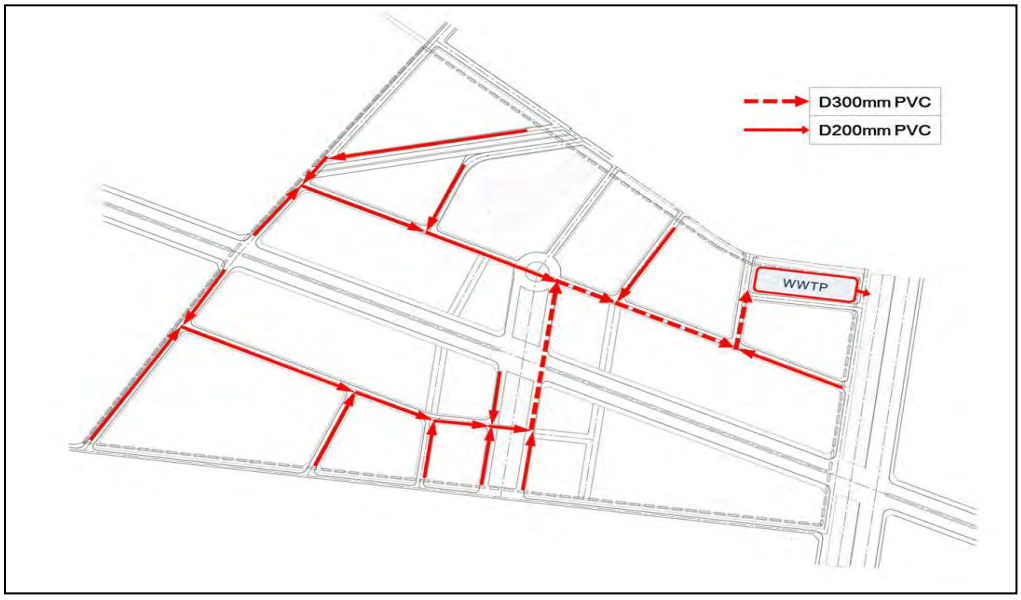
Source: http://vesaco.vn

Figure 7-32 Example for Pre-Fabricated FRP Packaged On-Site Wastewater Treatment

The required area for the wastewater treatment plant is projected to be approximately 0.3ha. The site is planned at the northeast corner of the model site for easy discharge to the channel after the treatment.

3) **Sewer Pipe Plan**

Sewer pipes are planned based on TCVN 7957 2008 Drainage and Sewerage Design Standard. 200 mm and 300 mm sewer pipes are planned as shown in the figure below. All sewer pipes are laid at 0.003 gradients.



Source: JST

Figure 7-33 Plan of Sewer Pipe

4) **Outline of Wastewater Treatment Plan**

The summary of the wastewater treatment plan is presented in table below.

Table 7-21 Outline of Wastewater Treatment Plan

No.	Contents	Summary	Quantity	Remarks
1	Sewer Pipe	D 200 mm D 300 mm	1,741 m 386 m	3‰ Maximum length of manhole is 30m
2	Treatment Plant		1 set	Pre-Fabricated FRP

Source: JST

7.3.9. Drainage Planning

(1) **Related Regulations, Planning Standard**

1) **Related Regulations**

There are many forms of regulations regarding the drainage plan; some important regulations related in the project are summarized below.

- DECREE No.88 2007/ND-CP urban and industrial park water drainage

This decree caters for water drainage activities in urban centers and IPs, economic zones, export processing zones and hi-tech parks. It also caters for rights & obligations of organizations, individuals and households involved in water drainage activities in the Vietnam territory.

- QCVN 01 2008/BXD Vietnam building code on regional and urban planning and rural residential planning

This code consists of regulations that must be complied with in the process of elaboration, evaluation and approval of construction plans. It serves as a legal ground for management of the promulgation and application of construction planning standards and regulations on construction under local planning.

2) **Standards**

TCVN 7957 2008 Drainage and sewerage – External networks and facilities – Design standard

This standard prescribes the mandatory requirements or recommendations applied to the design for construction or renovation, expansion and upgrading of the sewerage system in urban centers, residential zones and IPs.

(2) **Related Plans**

There are three related plans concerned with the model site.

a. General Construction Plan for Pho Noi Urban Town until 2025

b. Zoning Plan for downtown of My Hao Urban Quarter.

c. General Construction Plan for My Hao District, Hung Yen province until 2020 with vision to 2030.

The model site is located outside of Pho Noi but in its vicinity. On the other hand, The My Hao area covers the model site.

1) **General Construction Plan for Pho Noi Urban Town until 2025**

In this urban plan, the rainwater drainage system is planned as a completely separate. A two year return period is applied for hydraulic calculation in the urban housing area.

In order to prevent inundation, some projects are planned and the total construction cost is calculated as 495,055 million VND.

2) **Zoning Plan for Downtown of My Hao Urban Quarter**

Regarding the rainwater drainage system, My Hao urban area is divided into two major basins. The model site is located in Basin-1, south of Highway 5. Storm drainage networks comply with the General Construction Plan for My Hao District.

3) **General Construction Plan for My Hao District, Hung Yen Province until 2020 with Vision to 2030**

Foundation level in My Hao District is determined by the requirement range. According to the calculations of the water level, foundation level should be above the range 3.3 m to 3.5 m.

Regarding the rainwater drainage system, My Hao urban area is divided into two major basins. Many box culverts and drainage pipes are planned based on existing ground levels.

(3) **Analysis on the Study Site and Surroundings**

The model site is surrounded by an irrigation system as shown the pictures below.

Source: JST

Figure 7-34 Irrigation System around the Model Site

In this plan, the river flowing east side of the model site will not be altered. The middle sized canal flowing north and south of the model site will not be altered either.

(4) **Solutions and Considerations for Housing Development**

1) **Some Conditions for Hydraulic Calculation**

a. Return Period and Rainfall Intensity Formula

Return period set to 1 year; based on table 3 of TCVN 7957:2008 (see below table).

Table 7-22 Return Period

	Chanel	Main Drain	Local Branch Drain
Urban Area of Category I	10	5	2-1
Urban Area of Category II, III	5	2	1-0.5
Other Category	2	1	0.5-0.33

Source: TCVN 7957:2008

Rainfall intensity curve has been set on appendix B of TCVN 7957:2008 for each province. Hung Yen province's intensity curve is set as below:

$q = A(1+C \log P) / t+b)^n$

q : Rainfall intensity (l/s.ha)

P : Return period (year)

t : Time of concentration (minutes)

A, b, C, n : Constants depend on local rainfall conditions

Table 7-23 Constants Value for Rainfall Intensity

Province	A	C	b	n
Hung Yen	760	0.59	20	0.83
Ha Noi	5,890	0.65	20	0.84
Hai Duong	4,260	0.42	18	0.78

Source: TCVN 7957:2008 Appendix B

Regarding rainfall intensity calculated by above formula, Hung Yen's rainfall intensity is much smaller than that of the other two provinces. It is assumed that constant values for Hung Yen province are incorrect. Therefore, in this plan, constant values of Ha Noi, that is the nearest province to the model site were applied.

b. Runoff Coefficient

The percentage of rainfall that appears as storm water run-off from a surface is called the run-off coefficient. At the detailed design stage, runoff coefficient is determined by the percolation calculation model. In a planning stage, runoff coefficient is determined in accordance with table 7-24 of TCVN 7957:2008; depending on the nature of the surface cover of the basin and the return period. The coefficient for 2 year's return period is applied for this plan due to lack of coefficient data for 1 year's return period.

Table 7-24 Runoff Coefficient

	Return Period				
	2 Year	5 Year	10 Year	25 Year	50 Year
Asphalt	0.73	0.77	0.81	0.86	0.90
Roof, Concrete	0.75	0.80	0.81	0.88	0.92
Lawn, Yard, Park					
- Small Slope 1 – 2 %	0.32	0.34	0.37	0.40	0.44
- Average Slope 2 – 7 %	0.37	0.40	0.43	0.46	0.49
- Relatively Steep	0.40	0.43	0.45	0.49	0.52

Source: TCVN 7957:2008

The runoff coefficient is to 0.65 based on land use plan.

2) **Ground Level**

According to an interview from the residents, there has been no inundation and flooding recorded around the model site. The irrigation pump has been set lower than road level. Taking into account these conditions, it is assumed that there has been no flooding in recent years. Therefore flooding will be prevented, if the ground level of the model site were set to above the existing road level.

Therefore, the ground level should be adjusted to above the existing road level and high water levels projected on My Hao urban plan.

3) **Pumping Station and Retention Facility**

A pumping station for rainwater drainage is unnecessary at the model site on condition that ground level is set above the existing road level.

Regarding a retention facility, there are regulations for constructing rainwater retention facilities in a large area development, based on articles 4.2.13, 4.2.14, and 4.2.15 TCVN 7957:2008. Meanwhile in the case of the development size of this plan, it is not required to construct a rainwater retention facility.

However, the pond located in the green-space is used as an additional retention pond in order to increase safety in this plan.

4) **Rainwater Drainage Pipe Plan**

Rainfall runoff volume is calculated by the formula below (on the basis of TCVN7957:2008).

Q= q . C . F

Q: Rainfall runoff (m^3/sec)

q: Rainfall intensity calculation (L/s-ha)

C: Flow coefficient

F: Basin area (ha)

Direction of rainwater drainage is shown in the figure below. These drainage pipe sizes were calculated by the manning formula based on the conditions mentioned above.

Source: JST

Figure 7-35 Plan of Drainage Pipe

5) **Outline of Rainwater Drainage Plan**

The summary of rainwater drainage plan is presented in the table below.

Table 7-25 Outline of Rainwater Drainage Plan

No.	Contents	Summary	Quantity	Remarks
1	Drainage Pipe	D 400 mm	2,289 m	3.0‰
		D 600 mm	1,193 m	3.0‰
		D 800 mm	741 m	2.5‰
		D1000 mm	199 m	2.0‰
		BOX1200*1200mm	277 m	1.5‰

* Concrete pipe with manhole and collecting hole.
* Maximum length of manhole is 50m.

Source: JST

7.3.10. Electricity Planning

(1) Related Regulations, Planning Standard

TCVN (Vietnamese Standard) and local code, regulations & standards are listed as follows.

Table 7-26 Related Regulations, Standards and Basics in Vietnam

Vietnam code, regulation and standard for design of power system:

QCVN 01:2008/BCT National technical regulation on Electric safety
QCVN 12:2014/BXD National Technical Regulation on Electrical Installations of Dwelling and Public Buildings
QCXDVN 01: 2008/BXD Vietnam Building Code. Regional and Urban Planning and Rural Residential Planning
Electric Equipment Norms: 11TCN-18-2006; 11TCN-19-2006; 11TCN-20-2006; 11TCN-21-2006
TCXDVN 259:2001 Artificial lighting for urban road, street and square
TCXDVN 333:2005 Artificial outdoor lighting for public buildings and urban
TCVN 9385:2012 Protection of structures against lightning - Guide for design, inspection and maintenance
TCVN based on International Electro technical Commission (hereinafter referred to as "IEC");
TCVN 7447-5-53_2005 Electrical installations of buildings - Part 5-53: Selection and erection of electrical equipment - isolation, switching and control
TCVN 7447-5-54_2005 Electrical installations of buildings - Part 5-54: Selection and erection of electrical equipment - earthling arrangements, protective conductors and protective bonding conductors
TCVN 7447-1_2010 Low-voltage electrical installations Part 1: Fundamental principles, assessment of general characteristics, definitions
TCVN 7447-4-41_2010 Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock
TCVN 7447-4-42-2005 Electrical installations of buildings - Part 4-42: Protection for safety - Protection against thermal effects
TCVN 7447-4-43_2010 Low-voltage electrical installations - Part 4-43: Protection for safety - Protection against over current
TCVN 7447-4-44_2010 Low-voltage electrical installations - Part 4-44: Protection for safety - Protection against voltage disturbances and electromagnetic disturbances
TCVN 7447-5-51_2010 Electrical installations of buildings - Part 51: Selection and erection of electrical equipment - Common rules
TCVN 7447-5-52_2010 Low-voltage of electrical installations - Part 5-52: Selection and erection of electrical equipment – Wiring systems
TCVN 7447-5-55_2010 Electrical installations of buildings - Part 5-55: Selection and erection of electrical equipment - Other equipment
TCVN 7447_6_2011 Low-voltage of electrical installations verification

*Note: The design of all electrical system such as 22/0.4kV transformers and low voltage distribution facilities shall comply with TCVN for electrical application in Vietnam. All requirements of which are mirrored from IEC. As far as the local specific requirements for construction such as road lightings, billing system etc. are concerned, the investor/contractor should confirm the applicability of local regulations, codes & standards with Hung Yen Power Company (North Power Company) or the competent state agencies prior to their design work.

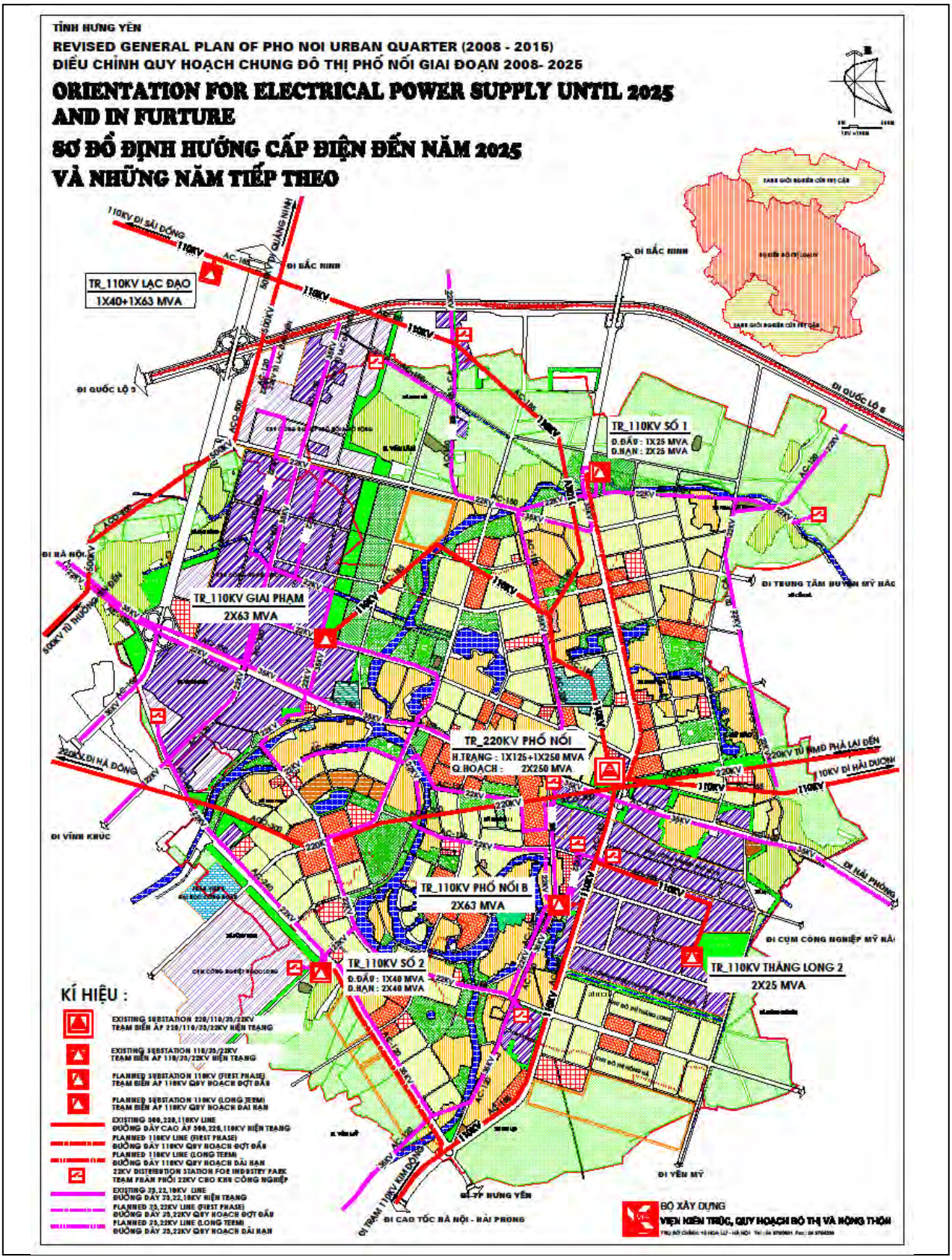
(2) **Related Plans; (Pho Noi New Residential Town Development)**

The existing Pho Noi residential towns receive power from a 35 kV or 22 kV overhead line of the Power Company. In each residential housing (buildings) area, several units of an outdoor cubicle type, 35 kV or 22 kV/0.4 kV and 1250 or 2 x 750 KVA substations (occupying 6 m x 3 m) supply 400/230 V power to the respective residential buildings. They are allocated along the area perimeter (inner-road side) inside a site. The substations are considered to be distributed at a rate of 1 substation for 2000 residents or 300 households.

Figure 7-36 Existing Substation

1) **Orientation of Power Grid Development**

According to a 2010 environmental research (by JICA) around the study site, the existing power supply system had reportedly low reliability due to frequent power outages. However, the power supply system is improving under the general plan of Pho Noi Urban Quarter (2008-2015). It will be capable of and contribute to the stability of sufficient power supply to Pho Noi area with 125 MVA capacity-up of the main substation. For reference, see the below-attached 'ORIENTATION FOR ELECTRICAL POWER SUPPLY UNTIL 2025 AND FUTURE'.



Source: Prepared by Hun Yen Province

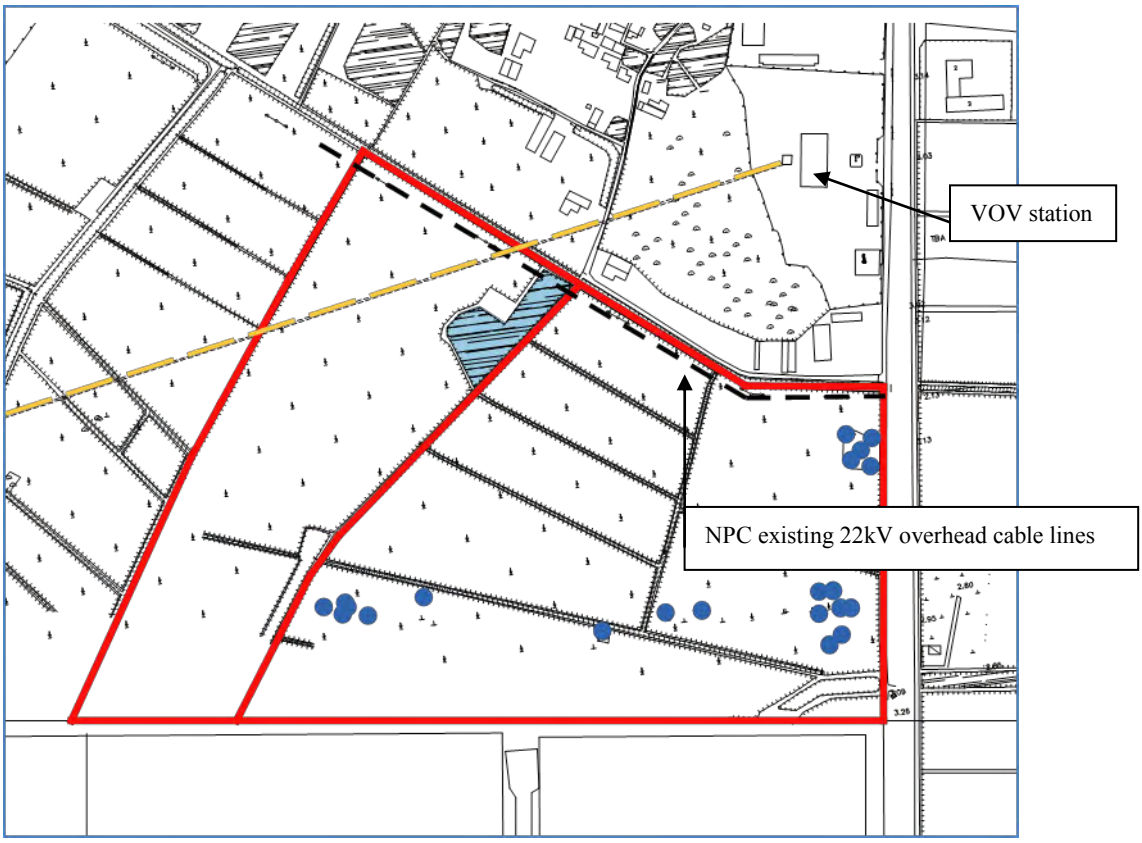
Figure 7-37 Orientation for Electrical Power Supply until 2025 and Future

2) **22kV Grid Line**

The existing 22 kV overhead line is running along the west perimeter, 400 m away from the west side of the study site. The existing 22 kV supplying the VOV overhead line is also running along the northern perimeter of the site. This 22 kV line will be available to supply 22 kV power to the new residential town at the study site. A new 110/22 kV substation for the study site will not be set up but the size-up of the existing 22 kV cables or additional cables might be provided by the Northern Power Corporation (hereinafter referred to as "NPC").

3) **NPC's 22kV Overhead Line Interfered**

The existing 22 kV overhead line supplying to VOV running with poles along the northern perimeter of the study site has interfered with the designated study site area at the north-east corner (Around 5 m offset from the boundary and 300 m long along the northern boundary). See drawing below;



Source: JST

Figure 7-38 Study Site Map

(3) **Solutions and Considerations for Housing Development**

1) **Total Electric Power Demand**

Total maximum consumption loads should be calculated based on the total number of residential households. The power consumed by one household will be projected at 3 kW according to Vietnam Building Code.

In this model case of the study site, 8,000 residents in total have been estimated. For the calculation of demand, it takes a total of 9,000 residents comprising 3,000 single-workers, 3,000 family-workers and 3,000 children. Where 2 - 4 single-workers compose 1 residential household, the number of residential households equals 1,000 for 3,000 single-workers. Where one family includes 2 adults (1 parent) plus 2 children, it totals 1,500 households for 3,000 family-workers and 3,000 children. Therefore, a total of 2,500 residential households are estimated in the model case.

Accordingly, the sum of maximum consumption loads for each resident use is calculated:

2,500 x 3 kW = 7,500 kW

This value is apparently the total number of loads at the time when all 2,500 households consume their full power simultaneously and it would be much bigger than the real consumption loads. So the maximum total demands should be substantially calculated as, multiplied by a Diversity factor (Simultaneity factor %) which simulates the average timing demand. Simultaneity factor 0.49 is recommended for 20-24 apartment blocks according to IEC 60439. However, considering such local specific conditions, the full operation of air conditioners in most households during summer, a safer value 0.6 should be taken:

7,500 kW x 0.6 = 4,500 kW

These values of kW represent the maximum total demands for resident use only. For the total demands at the site, the public consumption loads for public buildings such as hospital, school, market etc. is projected at 30 % of load for daily life as per the Vietnam building code. Table 6-5, grade IV of Decree No. 42/2009/ND-CP should be added so that 1.3 is multiplied to the above value:

4,500 kW x 1.3 = 5,850 kW

Then the maximum total demands should be estimated at 6,000 kW as a round-up.

So the power supply facility should be planned to have a capacity of 6,000 kW; to reach 3 kW targeted consumption load for a respective residential household.

2) **Basis for Planning**

a. Number of Substations

The number of transformers and substations should be determined taking into consideration the total loads, allocation of loads (total quantity of residential buildings) and receiving voltage (22 kV). It must account for the power receiving point from power company, area coverage (18 ha), the existing power supply aspect around the site (1 substation per 2,000 residents), as based on a more efficient distribution (the fewer, the better) and more economical system (the more, the better) are balanced.

For the study site, 5 substations with 2,000 KVA transformer capacities are suitable for the above conditions.

b. Allocation of Substations

The 5 substations are allocated in the area in a balanced sequence at the roadside along the perimeter of site surrounding resident buildings. This is because 22 kV underground cables connecting between substations are easily routed and the low voltage power distributions (380/220 V) to each building have a shorter spacing.

c. Incoming Voltage

The system incoming voltage (receiving voltage from the power company) shall be 22 kV as specified on Vietnam Building Code, Clause 7.3.1.

d. Transformer Capacity

The transformer capacity of 2,000 KVA of each substation is capable of supplying sufficient power to 5 buildings with around 200 kW loads and 1 branch of 200 kW for the public demands.

e. 22 kV Tie-In Point

NPC will supply this power to the project owner at one point but not to the several points unless otherwise specifically stated. The actual tie-in point shall be decided after discussion and bilateral

agreement between NPC and project owner prior to the project commencement. In this study, the tie-in point is selected at the point of the incoming disconnection switch on the nearest pole of the project area close to the main substation. It is shown as 'Power Layout' and 'Details for NPC's Tie-in Point to the Study Site hereinafter attached.

f. 22 kV Switchgear Type

All switchgears on the 22 kV circuit should be Vacuum Circuit Breaker (hereinafter referred to as 'VCB') considering its sufficient current rating, compact size, applicability and interchangeability.

For safety operation of 22 kV circuit, all VCB shall be mechanically combined with Earthing Switch (ES) as interlocked, whenever it is drawn-out.

g. 400 V Main Circuit Breaker

The 400 V main circuit breaker (Transformer Secondary Switch) has no other option other than the Air Circuit Breaker (hereinafter referred to as 'ACB') 3,000 due to its large current rating.

h. 400V Branch Breaker

The 400 V branch breaker should be a 4 pole Molded Case Circuit Breaker (hereinafter referred to as 'MCCB') to supply and switch to a 3 phase 4 wire 400/230 V feeder. The trip coordination of short circuit fault between these MCCB and downstream branch MCCB in building should be pre-checked prior to the actual design of the system. The calculation for the accurate short circuit current reduced by the installed cable impedance must be made.

i. Outdoor Cubicle Substation

The 22/0.4 kV substations should be of an outdoor cubicle shaped- metal enclosure construction accommodating 22 kV switchgears (VCBs), 400 V distribution panels (1ACB + 5 MCCBs) and the connection buses. The power transformer of 2,000 kVA will be located adjacent to the cubicle with surrounding fence protection. It is advisable to accommodate the transformer in the cubicle if it is compact-sized or if the transformer is downsized.

These cubicle type substations are employed because of their economical and safety aspect and are similar to the existing substations in Pho Noi residential town.

j. Installation Cable

The cable installation should be underground and directly buried from a safety and easy installation point of view. The armored XLPE (cross-linked polyethylene insulation) cables should be employed to operate safely and durably for many years.

k. Road Lighting

Road lighting of the internal roads in the study site should be allocated so that the illumination level can be maintained at 8 Lx for low traffic and 12 Lx for high traffic as grade C, in accordance with TCXDVN 259:2001(Artificial lighting for urban road, street and square, Design standard) Table 4.1 & 4.2.

NPC tie-in point shall be confirmed between NPC and Project Owner prior to the construction design.

3) **Power Supply Planning**

The power supply plan comprises of 3 drawings as in a single line diagram; power layout and the details for tie-in point with NPC here in after attached:

a. Conceptual Single Line Diagram of 22/0.4 kV Substations

This SLD is conceptual and shows the system topology of the distribution network from 22 kV down to 380 V-220 V level, with switching equipment and transformer.

b. Power Supply Layout

The 22 kV main-substation is located at the corner of south west, nearest to the NPC 22 kV overhead lines. Main and branch substations are located as shown together with their 22 kV cable route.

c. Details for NPC's Tie-In Point to the Study Site

The tie-in point image is typical and illustrated as shown below. .

NPC tie-in point shall be confirmed between NPC and the project owner prior to the construction design.

4) **The Power Company's Requirements and His Responsibility**

The power supply plan shall be established subject to several conditions, technologies, specification and methods required by the power company (EVN[25]/NPC) as well as the regulations, codes and standards. Prior to the project design for construction, the project contractor shall duly confirm that the NPC agrees to their proposal of the power supply system so that it can comply with the following conditions;

i) The contract between NPC and the consumer (each resident) for electricity selling and purchasing will not be conducted directly through the project owner.

ii) NPC shall be responsible for installing the kWh meter at each consumer's house/room as its billing system.

iii) NPC will have responsibility for all electricity systems up to the kWh meter including the distribution system. After the substations constructed by the project contractor are completed, the project owner shall hand over these substations to NPC for operation and management. Subsequently, the NPC shall be responsible for the repair and maintenance of these substations. The responsibility for the electrical system inside the house (household electricity) behind the kWh meter shall belong to the owner.

iv) The number of tie-in points depends on the current condition of the local electricity supply system and the agreement between NPC and the project owner. If there are available tie-in points, then it is possible to have several. However, one tie-in point is a basic principle for NPC and it is the normal way to supply electricity to modest consumers such as residential towns with minimal demands.

5) **Bill of Quantities**

The quantity summary of the power supply system includes the whole distribution system facility from NPC's 22 kV tie-in point to the 380/220 V incoming distribution board of each building.

All electrical facilities, equipment and materials in building, such as distribution boards (DB) on each floor of any building, room DB, power DB, lighting fixtures, socket outlets, lightning arrester, fire detection & alarm, satellite TV and internet LAN are included within the M & E facility of a residential building.

[25] Vietnam Electricity

22/0.4kV outdoor substation	5	stations
22kV disconnector + 10m pole	1	set
380/220V incoming DB	30	sets
35kV armored cable	1500	m
500V armored cable	9000	m
Earthing materials	1	lot
22kV Termination material	1	lot
Cable trench and duct bank	1	lot

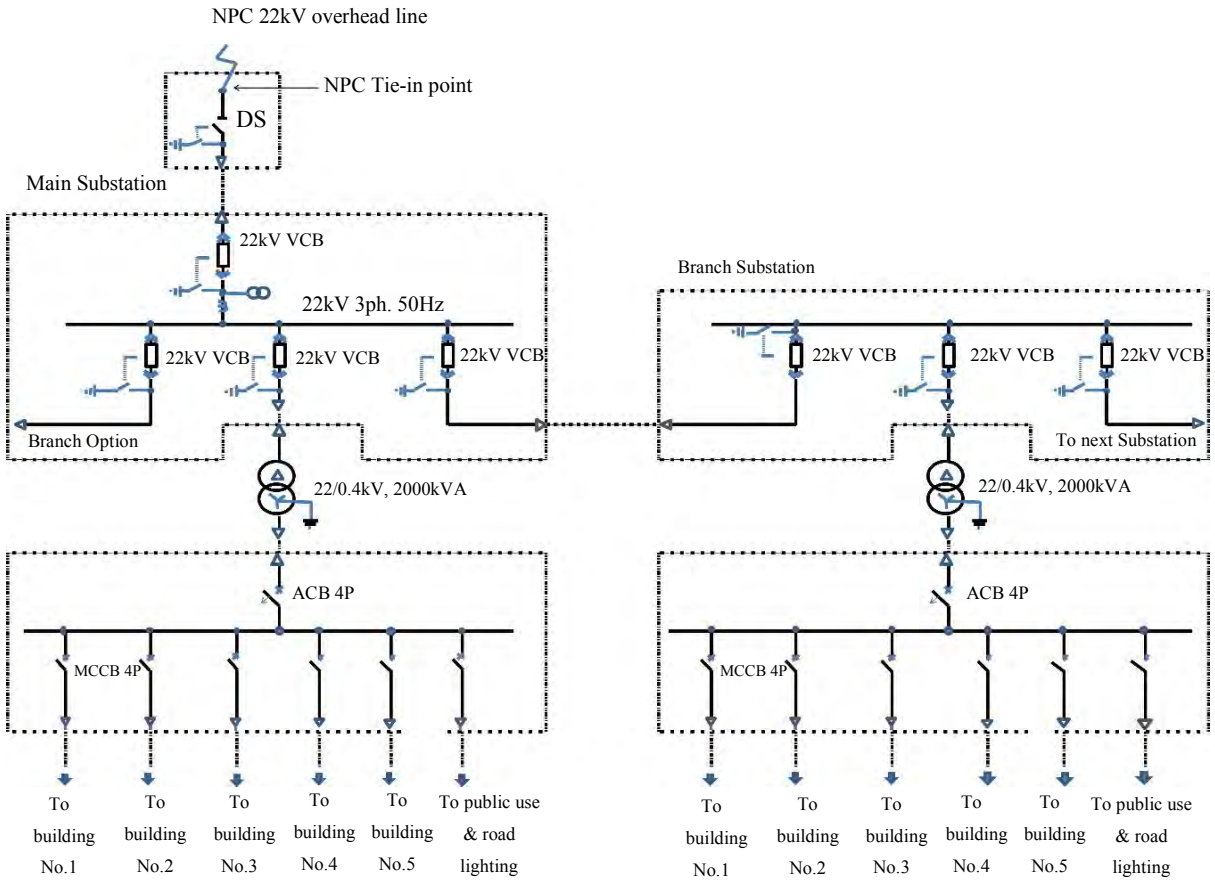


Figure 7-39 Conceptual Single Line Diagram for 22/0.4kV Substations

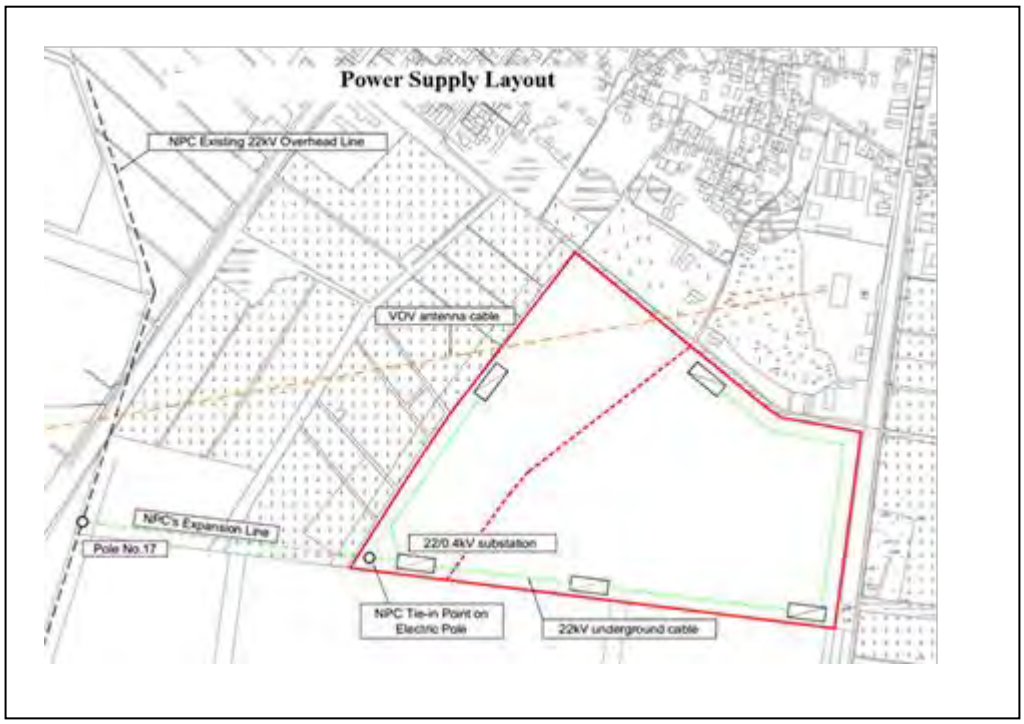


Figure 7-40 Power Layout

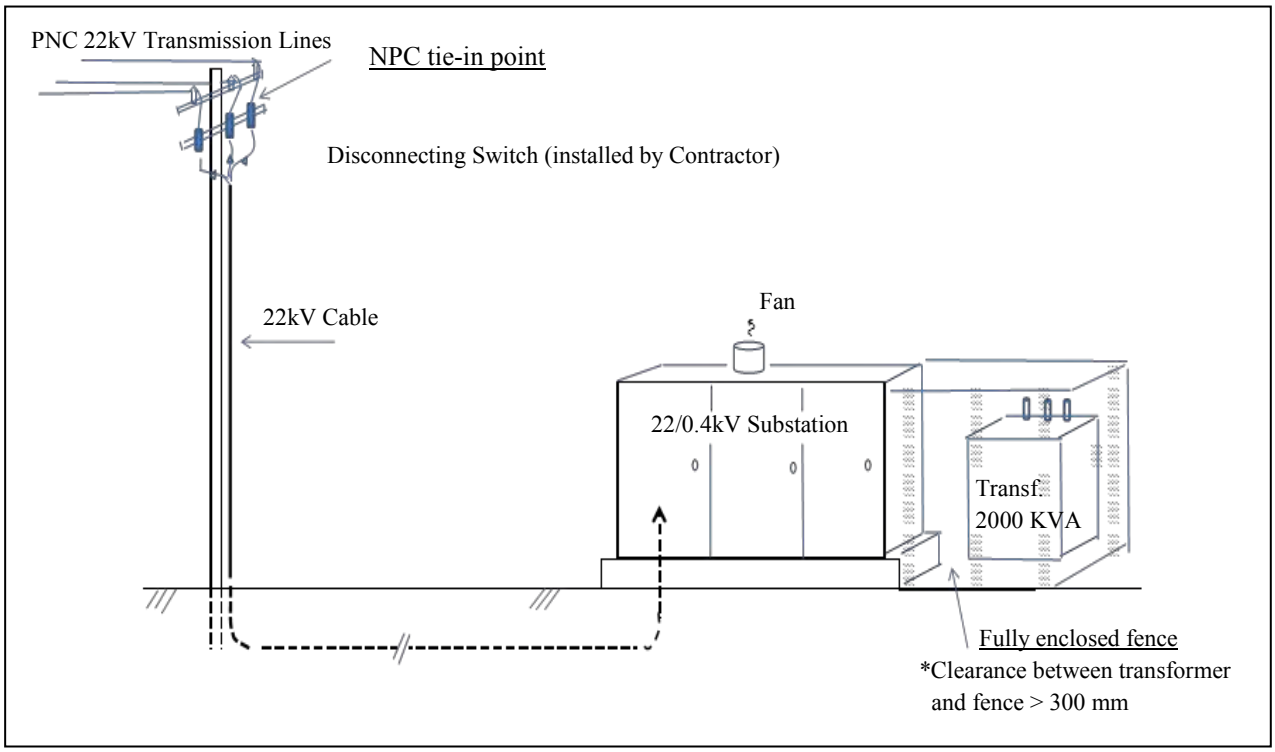


Figure 7-41 Details for NPC's Tie-In Point to the Study Site

7.3.11. Landing Plan

The model site (18.2 ha) is adjacent to the northeast corner of Thang Long IP II (TLIP-II).

The site has roads, a canal on the east side and an agricultural waterway in the north and south side, thus it is necessary to take care in preventing water immersion. This is achieved by setting the level of the site to the proper height based on the analysis of the rainfall amount of 100-year probability and surrounding circumstances. In addition, many examples of ring levee were found when looking for a construction method in similar projects. The feature of ring levee protects the area from flowing water or soil by making a ring-like filling (see picture below), which is an advantage during construction it reduces the amount of earthworks. Since this ring levee method has already been applied in Thang Long II, this project will use the same method.

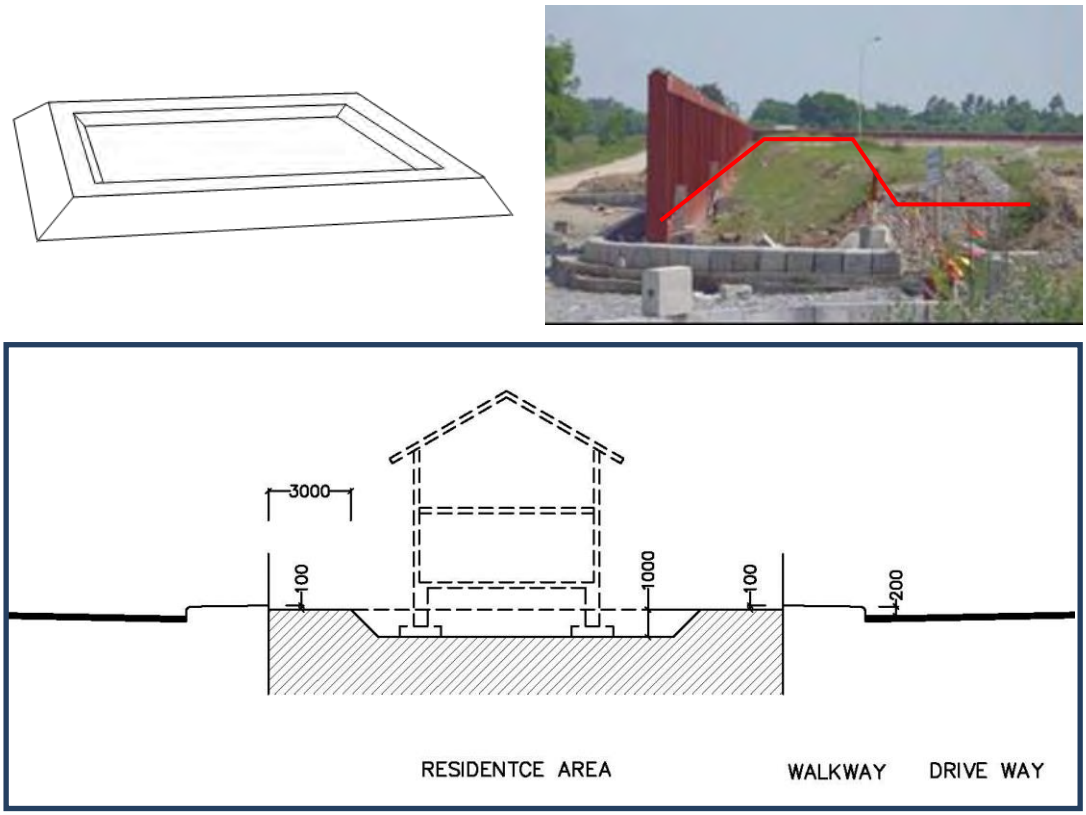


Figure 7-42 Image of Ring Levee

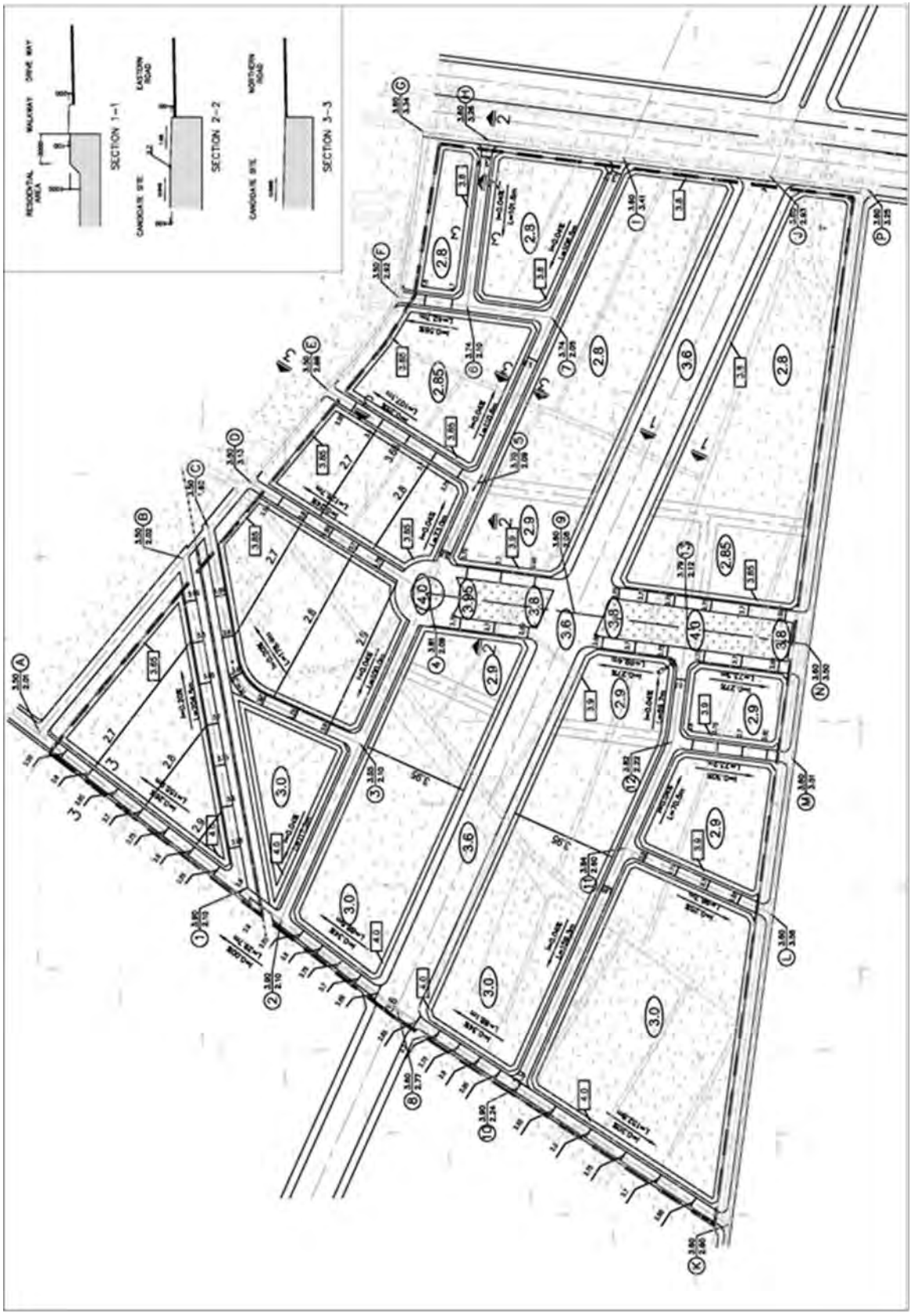
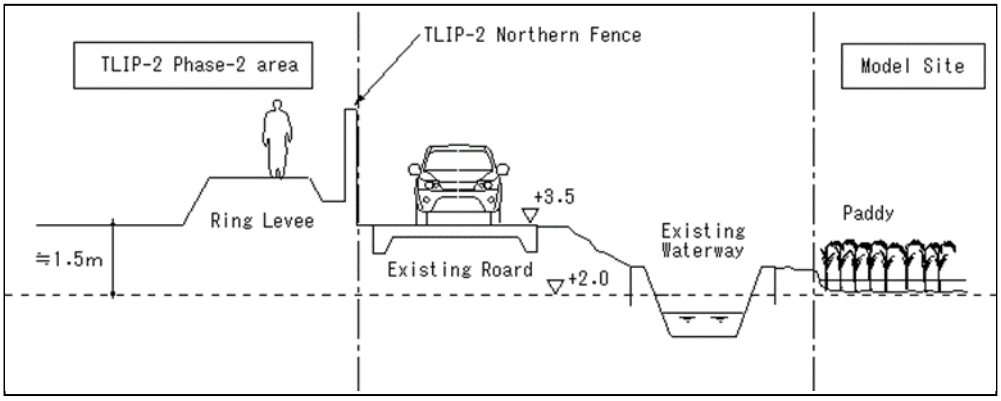


Figure 7-43 Land Preparation Drawing

The following is a summary of the surrounding area of the model site.

- Inside the model site; there is paved road and waterway stretching from southwest to northeast, and a communication cabling pipe from the radio station in the north.
- Northern site boundary: 3 m-wide waterway, 3 m-wide gravel pavement
- Eastern site boundary: a 4 m-wide pavement with a 20 m canal on its east side.
- Southern site boundary: 3 m-wide waterway, 3.5 m-wide gravel pavement and Thang Long-II
- Western site boundary: the boundary line becomes a walking path for paddy



Source: JST

Figure 7-44 Assumed Site Section (TLIP-2 – Model Site)

(1) **Related Laws and Regulations, Specifications and Standards**

In Vietnam, in addition to the change of land use purpose, change of the section and shape, user, land use, duration of use, rights and obligations are also managed. For the realization of the plan, consideration on application of land-use change from agricultural to non-agricultural and change of shape due to filling will be required. It is also important to get confirmation consistent with the plan for detailed regulation.

Based on the Urban Planning Law of Vietnam and Hung Yen, this project is required to use 1/2000 scale with an accuracy of 1/500 for the schematic drawings, existing condition drawings (floor plan and section), and the land preparation plan drawing (plan and section). The drawing of the land preparation plan must show the site's slopes using contour lines as well as partial sections in 1/100 scale in order to present the outline of the plan in an easier way to understand. Moreover, it is necessary to verify other drawings that may be required.

(2) **Related Plans**

The landing examples are shown below, and they represent the cases around Hanoi including the model site.

a. TLIP-II / Construction Phase-2

This IP is located south of this project's site and will be next to a residential development area in the future. The construction was completed in 2015 and some part of the factory construction has commenced.

This site is constructed in the shape of a ring levee in accordance to the 100-year probability flood design, with compartment's height of +1.5 m from the original ground and the levee's height of +2.4 m. In addition, waterways are built within the site for flood control. It is important to carry out sufficient planning in order to prevent flooding, given the specific characteristic of the factories. It is noted that there is no need to prepare excessive embankment since the buildings in this plan are residential units and assumed to have the first floor level raised.

b. TLIP-I / Adjacent Housing Development

This housing area (approximately 15 ha) and apartments (5-storey, 12 buildings) were constructed in the past. However, 2 of the existing residential buildings were demolished, and high-rise apartment buildings (15-storey, 4 buildings) have been completed. People have started moving in. This area ground level was raised 20-30 cm from the surrounding roads and the 1st floor level was raised approximately 1 m. The new high-rise residential buildings are being relocated and reconstructed in the low-rise residential building areas.

c. Green City

Located on the south side of Thang Long II, 20 % of the land of this residential development area (approx. 110 ha) has been allocated, but construction has currently halted. There were about 20-30 detached houses arrayed, but the construction has been suspended and abandoned.

d. Pho Noi A IP

There is extension work at the west side of this factory located close to the national highway No. 5 and a balancing reservoir in the area. Thus, just like in Thang Long II, this site is constructed in the shape of a ring levee, with the ground level +1.2 m higher than the roads within the park.

e. Dang Xa Urban Area

Dang Xa Urban Area (65 ha approx.) is a residential development area located about 15 km east of Hanoi, also located along the national highway no. 5. The construction is divided into several phases and it seems to be progressing well. The residential land development and its infrastructure are complete. Low-rise (3-4 storey), mid-rise (6-7 storey) and high-rise (12 storey) housing apartments have also been constructed. The occupancy rate is relatively good.

f. Construction of Foreign Company "S" Factory Area

There are eight 6-storey apartment buildings inside the Foreign Company "S" factory used for staff housing currently located at corner of the site, separated from the factory. In addition, there is on-going construction in the area adjacent to the north side, with underground rainwater piping and canals being installed.

g. Residential Land Development for Dai Dong IP- Hoan Son Factory

There is a land development area across the street of the IP in Tu Son area, with a plan to develop housing areas for the factory workers. Currently, the land development is 80 % completed and construction of 30 detached houses started. Installation of power and water supply are progressing well. The land development area is adjacent to a small town.

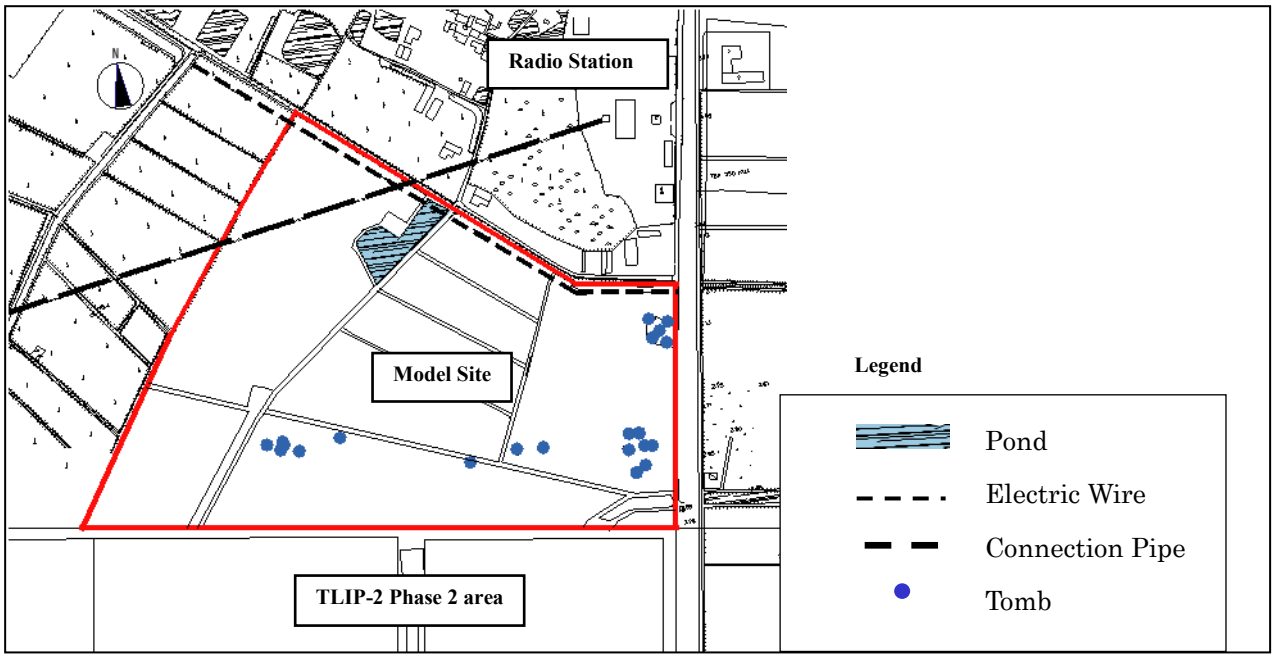
Table 7-27 Condition of Land Preparation for the Similar Cases

Reference Cases	Construction Area (approx.)	Note
TLIP-II/ phase-2 construction area	126 ha	Consider counter measures such as ring levee, adjustment waterway, or balancing reservoir to prevent on-site flooding in a 100-year probability period.
TLIP-I/adjacent housing development	15 ha	Consider the appropriate 1F level in order to prevent flooding. Note that the land development height is +300 higher than the road.
Green city/ residential land development	110 ha	Adjacent to Thang Long-II, the development has stagnated. Though there are no features in the land development height, make consideration for inundation from the balancing reservoir
Pho Noi A IP/ construction area	27 ha	Develop the surrounding waterway, ring levee, and balancing reservoir.
Dang Xa urban area/ housing development	65 ha	Favourable development of low to high-rise apartments. Develop waterway around the site.

(3) The Model Site and its Surrounding Condition

This model site has been developed as paddy and thus the terrain is flat. There is a waterway for paddy use on the north and south border of the site, currently used for agriculture. From the north border 5 m inside, there is a utility pole and overhead conductor which require relocation. In addition, there are graves scattered on the site that require consultation with the related ministries, district office, as well as community for them to be relocated.

There are waterways in the center-west area and concrete pavements that cut the model site longitudinally. Moreover, because there is a 50 m x 100 m pond on the north side of the site, a plan that utilizes this pond shall be considered. In addition, there is a public radio station on the north side with a communication wiring pipe 3 m from the ground crossing the site. Because it is difficult to move the pipes, the current state will be maintained.



Source: JST

Figure 7-45 Drawing of Current Condition of the Model Site

Table 7-28 Obstacles on the Planned Site

	Obstacles	Countermeasure
Model Site (18.2 ha)	Utility pole, overhead conductor Graves (in 20-30 spots) Cutting pavement, waterway Pond (3,000 m² approx.) Communication wiring pipe	Relocate to the vicinity of the site border line Relocate after consulting with the city office Construct after removing and cleaning the site Use as pond in the park Keep the current condition.

(4) Outlook and Consideration on Housing Development

1) Consideration on Natural Environment

When carrying out residential land development, there are possibilities of change to natural environment (ozone, water, soil, afforestation, living organism, etc.). Impact from existing work pieces on the site (utility pole, grave, overhead conductor, etc.) as well as excavation of archaeological ruins from the ground is noted. The site in this study was lent by the country as paddy, thus it is flat. It is possible to proceed with land development without significantly changing the site shape because of its flat topography. However, it is still necessary to change the land-use from paddy to residential and to consider thoroughly the impact that may be caused to the environment such as building rainwater treatment.

2) Consideration on Urban Planning

Sufficient verification on future urban planning of the surrounding area is necessary when planning a residential development. Though the site was chosen by Vietnam's representatives; in the future there is a plan for a 24 m wide urban road to cross the site. The plan for location of the future road and for gravel pavement, have been put into consideration in the construction cost.

7.3.12. Construction Plan

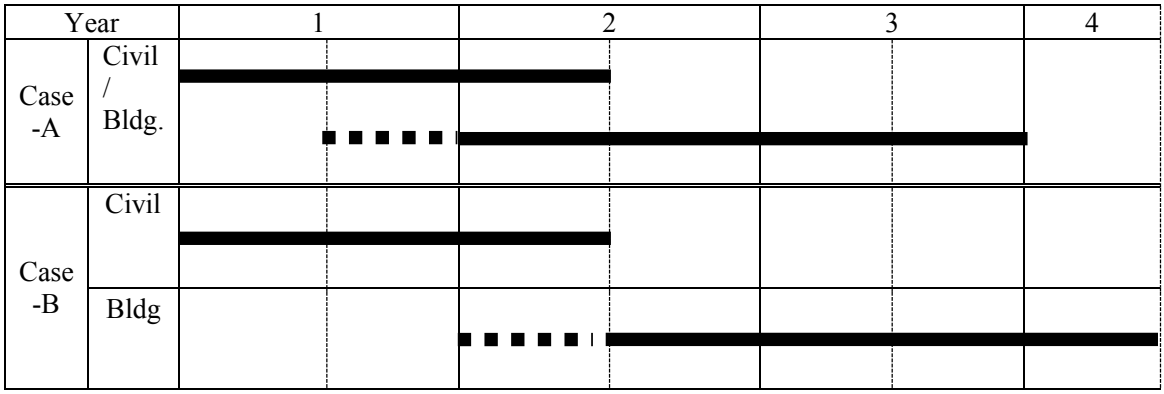
(1) Construction Period Based on the Difference of Construction Request Form

Since the contract form of construction company remains unclear now, the construction plan of this project is assumed as in the following 2 cases:

Case-A: Both civil + building works to be conducted by 1 construction company

Case-B: Civil, building work to be conducted by different construction companies

Table 7-29 Construction Schedule Outline



In Case-A, civil and building works are conducted by the same construction company, since infrastructure related work and interface parts can be managed as a whole. Working procedure for building construction can be conducted smoothly even during civil works. On the other hand, there is not only the rise in cost but also the need to find a large general contractor that can handle both civil works and building works. In addition, in this case, it is expected that the overall cost would rise.

In Case-B where civil and building works are conducted by different construction company, a more reasonable cost can be expected. This is because not only is there a contractor specialized in civil but also there is another specialized in building. There would be a plethora of construction companies that would bid. However, in this case, it is ideal to start the building works after the infrastructure work are completed and the interface parts are confirmed. Therefore, because the period when civil and building works are conducted simultaneously is very short, this case requires more time in total, for the construction.

(2) Construction Schedule (Civil and Building)

The schedule begins with land preparation, infrastructure related work e.g. electricity, water &sewerage, road and finally move to building construction.

Based on contract requirements, the capability of construction companies, budget, workers numbers and the availability of construction equipment, the construction schedule will adjust accordingly. Considering the construction state in Vietnam, it is expected to span at least 3 years. Moreover, based on the plan of construction sections and construction schedule division, it is possible to start the construction work from the district where the schedule is completed.

The residential construction area is divided into 3 areas. In Area-1, in addition to infrastructure construction such as the facilities for water, power supply and drainage, construction of 20 buildings of low-rise housing and 5 buildings of mid-rise housing are planned. In Area-2, 7 buildings of mid-rise housing are planned to be constructed, whereas in Area-3, 12 buildings of low-rise housing and 8 buildings of mid-rise housing are planned.

The access road of the Area-1 is planned by using constructed access road in the site with surrounding roads already constructed on north, south and east sides of the villages.

Water will be supplied from the 2 newly-constructed wells and power supply will be connected the existing NPC 22 kV wiring in the north of the site.

Source: JST

Figure 7-46 Construction Division Plan

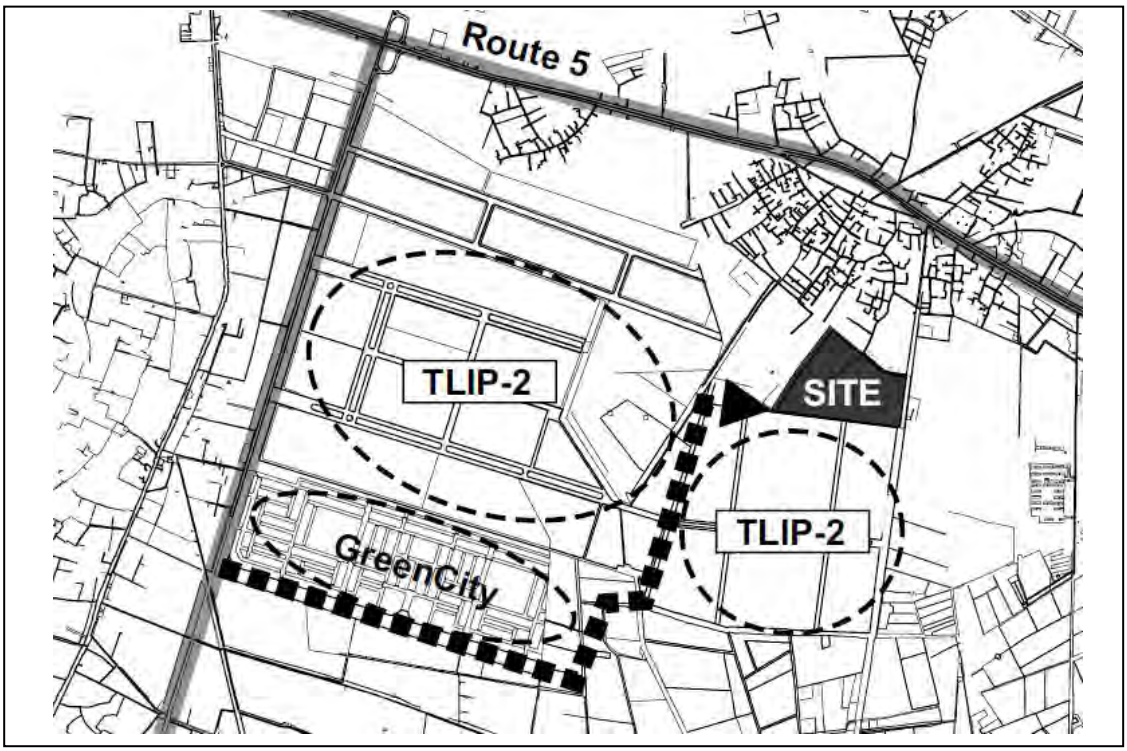
Table 7-30 Construction Division Plan & Outline

	Facilities	Floor Area
Area-1	Infrastructure: water & electric supply, sewerage etc. Low-rise housing facility (20 buildings) Mid-rise housing facility (5 buildings)	±86,300 m²
Area-2	Mid-rise housing facility (7 buildings)	±35,100 m²
Area-3	Low-rise housing facility (12 buildings) Mid-rise housing facility (8 buildings)	±60,300 m²

This area division and construction schedule depends on the budget and management policy, thus further evaluation is necessary at the implementation stage.

(3) **Installation Plan**

Regarding access to the site, since the road that goes to the north is narrow (4-6 m), the road on the south shall be used. There is a 15 m road under construction on the south side of Green City which is located south of Thang Long IP-2. It will be used as an access road to the site. However, part of the access road needs to be developed as a temporary road.



Source: JST

Figure 7-47 Construction Installation Access

Table 7-31 Case-A Construction Schedule (36 Months)

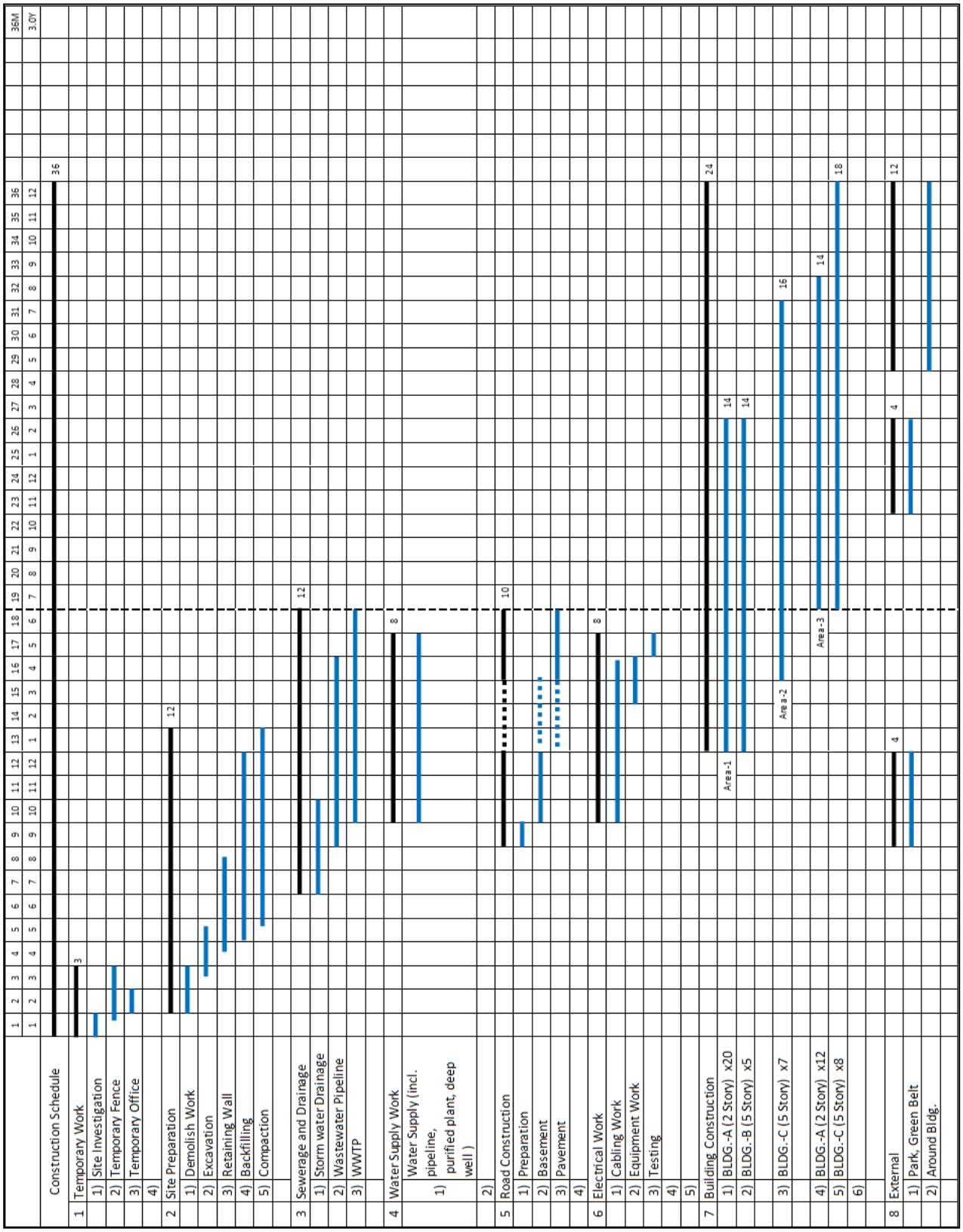
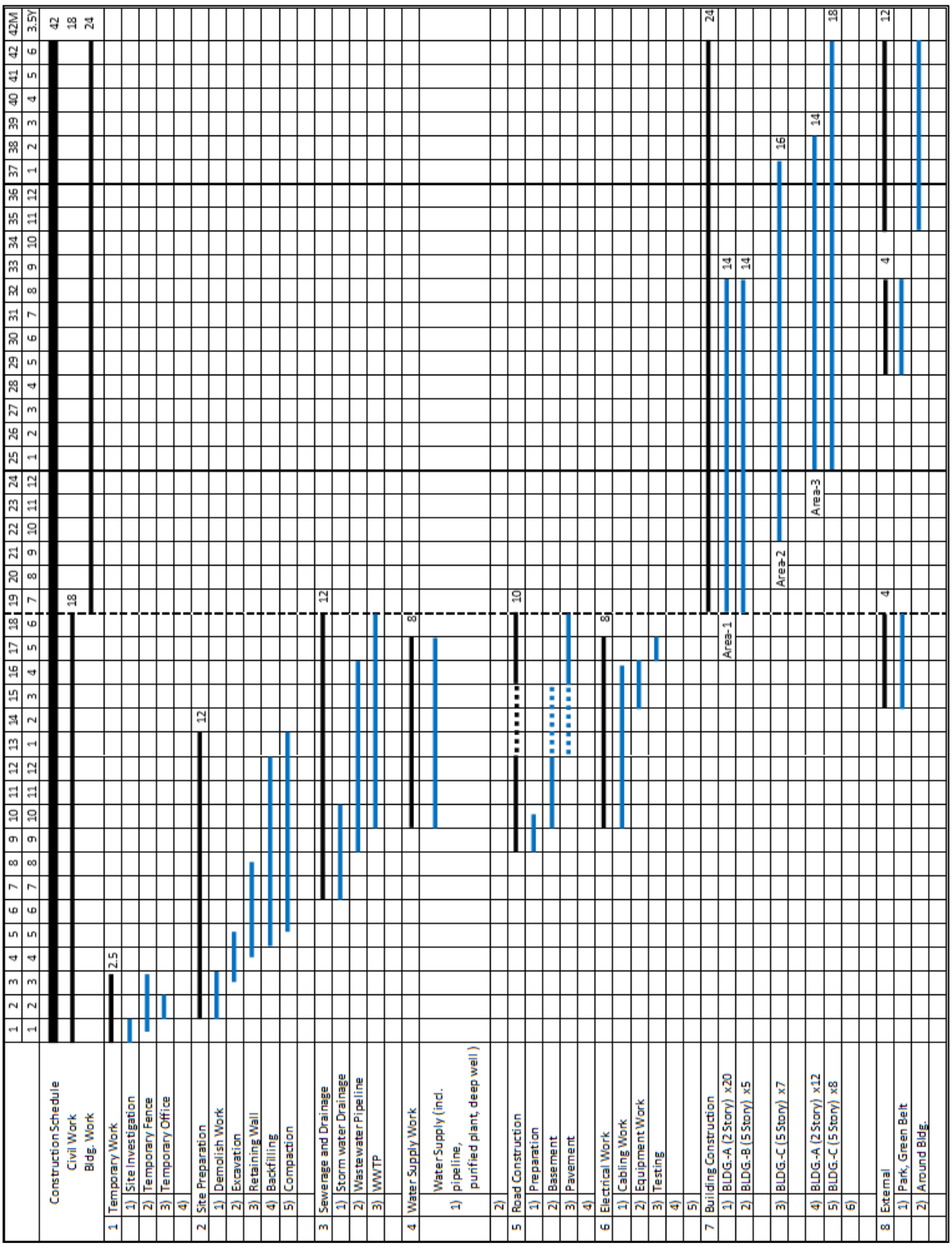


Table 7-32 Case-B Construction Schedule (42 Months)



8. COST ESTIMATION

8.1. Accuracy of Cost Estimation

Due to this project being in the feasibility study phase, the cost estimation is calculated based on the unit price commonly used in Vietnam. The accuracy of the unit price is adjusted by 10 % to the grade/quality of each construction work. Although the economy was fluctuating between plus or minus, inflation rates were soaring from the WTO assessment in 2007. Vietnam's monetary policy and the Lehman shock, made prices drop by approximately 7 % and rise again to 18.6 % due to the 2011 inflation. It has hovered between 9 % to 3 % ever since, therefore the accuracy of cost estimation will be based on consideration that the recent construction inflation rate is around 5 %.

The exchange rate used is VND 21,623.13/USD, based on the IMF rate of and the State Bank of Vietnam from December 2014 to November 2015 (12 months).

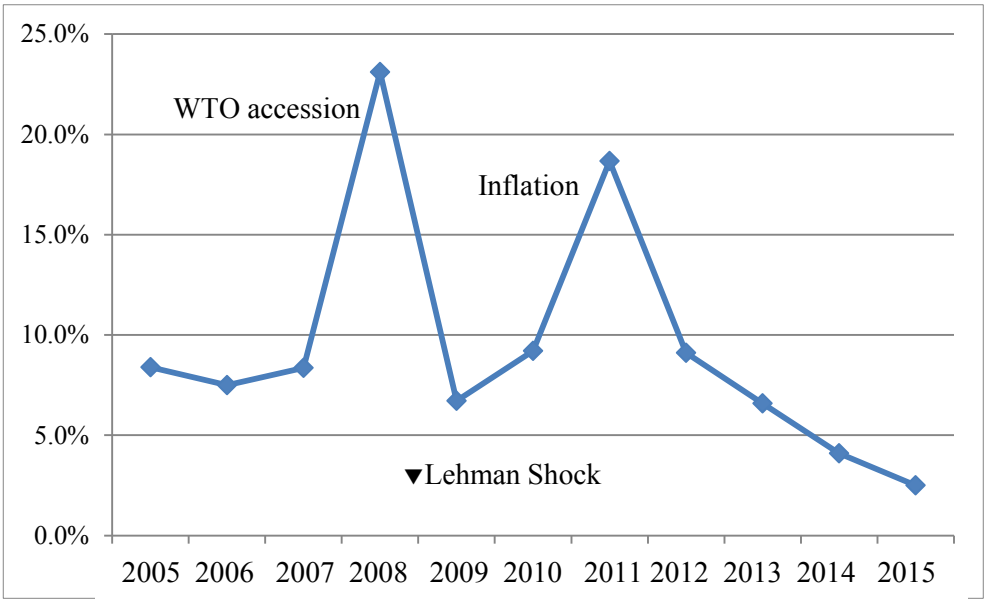


Figure 8-1 Consumer Price Index Change

8.2. Cost Estimation and Unit Price Basis

The unit price used in the civil work above is based on the Unit Price for 2015 issued by Vietnam's Ministry of Construction (hereinafter referred to as "MOC"), which was verified and agreed upon by the local contractors. Whenever the unit price seems to be abnormal, adopt the unit price that is considered correct after confirming the specification. Note that the cost estimation does not take into account the inflation rate, with the 10 % of VAT calculated.

1) **Site Preparation Work**

This includes works of removal of the existing obstructions, relocation, excavation, and backfilling, therefore the cost estimation is based on the calculated quantities and costs necessary for each work item. Note that the earth works quantities used in the calculation for a paddy field surface and value of excavation is based on the average construction depths in Vietnam.

2) **Road Work**

This includes works on district roads, sidewalks, and street light installations. The cost estimation is based on the necessary calculated amount and costs necessary for each work phase. The Vietnam's Road Specification will inform the design.

3) **Electric Work**

This includes setting up of substation facilities, transformers, wiring, and other auxiliary installations. These costs account for 30 % of the total electrical work cost, which is considered a reasonable approximate cost estimation.

The electrical equipment required as a minimum for this case would have to consider a 6000 kW maximum power demand, 22 kV receiving voltage, 5 part transformer installation, and 400 V cable electricity distribution to 30 institutions. The Vietnam power distribution system is set up in such a way that an efficient high-voltage distribution cannot be adopted therefore a 400 V low-voltage cable whose size is big must be used. As a result, the costs increase.

4) **Water and Sewage Works**

This is divided into 3 main elements of water which are supply, sewage, and rainwater drainage. The cost estimation is based on the verified scale and necessary amount for each work as is shown below.

- Water supply: Consists of setting up a water purification facility, pumping station, well construction, and plumbing
- Sewage: Purification facility and plumbing
- Rainwater drainage: open or underground drain system

a. Water Supply

Since the public water supply is unreliable, it is imperative to construct 2 new wells. Noteworthy is that there is high iron concentration at the water source, a therefore a water purifying facility is required so as to meet the water quality stated in "QCVN 01 2009/BYT National technical regulation on drinking water quality". Furthermore, because of the height of the building, which is comparatively high, a pump is required to ensure that the appropriate water pressure is obtained. Consequently, in order to realize all of the above, the cost for a water supply facility will increase as compared to that of using the current public water supply.

b. Sewage Water

Regarding the discharged sewage in this project, it is necessary to build a wastewater treatment facility (septic tank type) in order to meet the effluent quality standard as defined in "QCVN 14 2008/BTNMT National technical regulation on domestic wastewater" Domestic wastewater from general activities do not require specialised treatment. The capacity required will be 1,700 m^3/day and this has been calculated from the number of residents. The aforementioned additions imply an increase in capital costs.

c. Water Supply and Sewage Water (Common Factor)

When assuming the development scale of this project, it was desirable to utilize the public facilities to reduce the cost. However, since it takes time to develop public facilities in Hung Yen City, the use of public services will not be expected. Since it is necessary to build a small water treatment processing facility that corresponds to the quantity of the targeted population, the cost of construction becomes higher compared to that of using the public water and sewage service.

d. Rainwater (Site Preparation)

The rainwater drainage cost in this project overlaying 18ha , where the amount of rainfall is high and the rainfall intensity is strong, is anticipated to be high because the amount of embankment will tend to increase due to plans of increasing the ground levels back-filling. In contrast to an embankment construction approach, force drainage by pumping will be essential, which will further raise the initial investment and maintenance cost, thereby reinstating the initial proposal.

Although because the current site land parcel is that of a rice-paddy, the back-fill quantity will increase, it`s necessary for the Site Preparation. (In the surrounding development area, land-levelling of up to a certain height are implemented).

5) **Housing Construction**

This includes works for low-rise buildings (2 stories) and mid-rise buildings (5 stories). The cost estimation is calculated by multiplying construction cost per square meter to the total floor area of each building. The adopted construction cost per square meter is sourced from MOC's Unit Price in similar projects in Hanoi in 2013, with approximately 10 % allowance for inflation rate in 2 years calculated.

The items and quantities of the construction on this Project are the following.

Table 8-1 Main Construction Items and Quantity

Item	Unit	Q'ty	Remarks
1. Site Preparation Work			
1) Demolition Work (Ex.=Existing)			
Ex. Tree	Ea	16	H=5m
High Voltage Line	Ea/m	5/700	
Ex. Housing	m²	700	1 Story
Ex. Grave	ea	54	
e) Ex. Pavement	m²	1,124	W=3,500 m、t=200
f) Ex. Trench	m	420	W=3,000、D=2,000
2) Civil Work (for Development)			
Excavation	m^3	112,592	Inc. Soil Demolition
Compaction	m²	17,367	Every 300
Back-fill	m^3	274,285	
Bridge	m	1,396	
3) Civil Work (for the Future Road)			
Back-fill	m^3	41,681	
Gravel	m²	3,473	
2. Electrical Work			
Sub-Station	Unit	5	22kV, Outdoor Cubicle Type
Transformer	Set	5	22/0.4kV
Disconnector	Set	1	22kV, On-Load DS 630A
Distribution Board	Set	30	400/230V
High Voltage Cable	m	1,500	
Low Voltage Cable	m	9,000	
Earth Work	m	6,000	
Cable Trench	m	4,000	
Installation Work	Lot	1	30 % of total cost
3. Water Supply, Drain			
Water Supply			
Pumping Station	ea	1	
Distribution Pipe	lot	1	D=75, 100, 150, 200, 250
Fire Hydrant	lot	12	
Deep Well	Ea	2	D=120 m, 65 m^3/h
Treatment Plant	ea	1	3,000 m^3/day, Filtering System
Sewerage Water			
Treatment Plant	lot	1	1,700 m^3/day, Septic Tank Type
Sewer Pipe	m	2,127	D=200, 300
Storm Water			
Culvert	m	4,700	D=400, 600, 800, 1000, Box1200
4. Pavement Work			
Drive Way	m²	17,296	W=7 to 16 m
Walk Way	m²	6,775	
Lighting Pole	ea	70	H=7 m
	m	3,705	

5. Landscape			
Park & Walk way	m²	78,433	Include around Residence
Tree	ea	550	H=2～3 m
Shrubs	m	10,284	H=450
Sports Field	m²	2,308	Foot Ball, Tennis
6. Building Work			
Low-Rise Residence	m²	22,250	2 Stories
Mid-Rise Residence	m²	85,111	4 Stories (2-4F)
Parking Lot (1F)	m²	17,920	For Mid-Rise Bldg.
Shop (1F)	m²	4,477	For Mid-Rise Bldg.

8.3. Evaluation of Infrastructure Construction Cost

The infrastructure unit price comparison of similar projects in Vietnam with this project is as follows.

Table 8-2 Comparison of Infrastructure Construction Cost

Project	Area (m²)	Total Project Cost (VND)	Unit Cost (VND/m²)
MODEL SITE (Land Preparation, Road, Electrical, Water Supply & Sewerage, Landscape)	182,300	273,290,657,000	1,499,125
Technical Infrastructure for Nhu Quynh Mixed Used Building of Commercial and Residential Housing, 2013.	37,027	51,910,576,000	1,401,965
Technical Infrastructure for Yen My New Residential Development Quarter (Phase II), 2015.	30,172	43,973,931,000	1,457,441
Technical Infrastructure for New Residential Development Quarter in Van Giang Township, Van Giang District, 2015.	44,288	64,913,103,000	1,465,704

The infrastructure unit costs of similar housing development are around 1.4 million to 1.46 million VND/m², and also infrastructure unit price is approximately 1.42 mill VND/m² in this project. From these results, the infrastructure cost in this project is deemed appropriate.

8.4. Construction Unit Costs per Square Meters of Industrial Worker's Housings

In this section, a summary of the adopted construction unit cost is provided. DOC in Hung yen province provided us with the following cost information. 3.8 million VND ~ 4.7 million VND/m² for 3 to 6-story buildings in 2009 ~ 2010 years and 4.5 million VND ~ 5.0 million VND/m² for 2 to 5-story buildings for the detached housings at the present time. Therefore, after discussing with local consultants while investigating the unit cost in private projects for reference again, consequently, the JST determined to use an approximate unit cost of 5.8 million VND ~ 6.1 million VND/m² (excluding TAX) for the construction cost estimate.

The minimum standard construction unit cost required for better living for industrial accommodation, will be laid out in Annex 5. It is better to consider as a reference for unit costs for housing published by the Ministry of Construction annually. The Vietnamese housing building specification and quality is reflected in the construction unit cost. It could therefore be inferred to as a standard amenity and the minimum required construction level for decent living life in social housing.

8.4.1. Construction Unit Cost

(1) **Residential Construction Investment Unit Cost for adapted unit cost in Architectural Works**

Below are the adopted unit costs with consideration of the market.

Table 8-3 Adopted Construction Unit Cost in this Project

Building types	Specification	Unit	Unit cost (Include materials/labor and overheads)	Unit cost (Include TAX)
Low-rise housing (2-story)	RC structure/include electrical and mechanical equipment	m²	5,454,545VND	6,000,000VND
Medium-rise housing (4-story)	RC structure/include electrical and mechanical equipment	m²	6,363,636VND	7,000,000VND

(2) **Residential Construction Investment Unit Cost in MOC (Reference)**

Proximate cost estimates per square meters, are informed by local consultants and are based on rough cost estimates list from the fiscal year 2013 in Annex 5 (includes price escalation).

Table 8-4 Construction Unit Price Issued by Ministry of Construction

Building types	Specification	Unit	Unit cost (Include materials/labor and overheads)
Low-rise housing (2-story)	RC structure/include electrical and mechanical equipment	m²	8,000,000 VND
Medium-rise housing (4-story)	RC structure/include electrical and mechanical equipment	m²	9,300,000 VND

(3) **Residential Construction Investment Unit Cost Issued by Privately Construction Consultants (Reference/Include Price Escalation)**

Proximate cost estimates per square meters, are informed by local consultants and are based on rough cost estimates list from the fiscal year 2013 in Annex 5 (includes price escalation).

Table 8-5 Construction Unit Price Issued by the Construction Consultant

Building types	Specification	Unit	Unit cost (Include materials/labor and overheads)
Terraced houses (Private)	RC structure/include electrical and mechanical equipment	m²	10,500,000 VND
Middle class condominium (Private)	RC structure/include electrical and mechanical equipment	m²	16,100,000 VND

Source：Davis Langdon & Seah 2013

(4) **Social Housing Sales Price on Website Published by Developers. (Reference)**

There are almost no low-rise housing sales in social housing.

Table 8-6 Social Housing Unit Sales Price Issued by the Developers

Building type	Specification	Unit	Housing unit sale price
Medium-rise social housing	RC structure/include electrical and mechanical equipment	m²	9,000,000-14,950,000 VND

Source：website Viglacera.com and Nhaoxahoihn.com

(5) **Condominium Sales Price on Website Published by Private Real Estate. (Reference)**

Table 8-7 Condominium Unit Sales Price Issued by the Real Estates

Building type	Specification	Unit	Condominium unit sales price
Low-rise terraced houses (Private)	RC structure/include electrical and mechanical equipment	m²	10,300,000-20,500,000 VND
Medium-rise Condominium (Private)	RC structure/include electrical and mechanical equipment	m²	27,200,000-36,100,000 VND

Source：website Batdongsan.com and Quarterly report residential sale price, CBRE Vietnam 2015

8.5. Result of Cost Items and Unit Price

The items and unit price for cost estimation, is selected and applied to each work element each construction area. The results of cost estimation are shown in Table 8-8. The adopted unit price is based on the construction unit price of 2014 issued by MOC of Vietnam. However, the part of unit price scrutinized to fit the current situation. The exchange rate used is VND 21,623.13/USD, and JPY120.84/USD from December 2014 to November 2015 (12 months).

The following construction cost is the budget considering the year 2015, and it does not consider the future inflation rate.

In regard with construction cost, the project areas are divided into three sub areas, as a) housing areas, b) District road area and c) the other area. The cost of a) and c) are included in the calculation of housing development project. The result is shown in the Table 8-9.

Table 8-8 Summary of Cost Estimation

1 USD= 21,623.13 VND
1 USD= 120.84 JPY

Item	Q'ty	Unit	Unit Price	Construction Price (a)	VAT (10%) (b)	Total (1,000 VND) (c)	Total (USD) (d)	Total (1,000 JPY) (e)	Remarks	
			VND	(1,000 VND)	(1,000 VND)	(a)+(b)	(c) /USD	(d) (1,000 JPY)	(%)	
Total				1,052,651,501	105,265,150	1,157,916,651	$53,549,909	¥6,470,971	100.00%	
Civil Work Sub-Total						271,860,651	$12,572,678	¥1,519,282	23.48%	
Architectural Work Sub-Total						886,056,000	$40,977,231	¥4,951,689	76.52%	
Site Preparation	18.3	ha		115,280,517	11,528,052	126,808,569	$5,864,487	¥708,665	10.95%	
Demolish & Relocate	1	set	1,058,200,000	1,058,200	105,820	1,164,020	$53,832	¥6,505		
Excavation	112,592	m^3	12,000	1,351,104	135,110	1,486,214	$68,733	¥8,306		
Backfill & Compaction	448,031	m^3	250,000	112,007,750	11,200,775	123,208,525	$5,697,997	¥688,546		
Others	1	set	863,463,400	863,463	86,346	949,810	$43,926	¥5,308		
Road Construction				24,950,526	2,495,053	27,445,579	$1,269,269	¥153,379	2.37%	
Drive Way	17,296	m^2	1,260,000	21,792,960	2,179,296	23,972,256	$1,108,639	¥133,968		
Walk Way	6,639	m^2	168,000	1,115,352	111,535	1,226,887	$56,740	¥6,856		
Gutter	3,705	m^2	360,000	1,333,800	133,380	1,467,180	$67,852	¥8,199		
Lighting Pole	70	ea	7,500,000	525,000	52,500	577,500	$26,708	¥3,227		
Others	1	set	183,414,000	183,414	18,341	201,755	$9,331	¥1,128		
Power Supply & Electrical				37,541,725	3,754,173	41,295,898	$1,909,802	¥230,780	3.57%	
Substation	5	unit	318,000,000	1,590,000	159,000	1,749,000	$80,886	¥9,774		
Transformer	5	set	1,185,000,000	5,925,000	592,500	6,517,500	$301,413	¥36,423		
Cable-1	1,500	m	1,640,000	2,460,000	246,000	2,706,000	$125,144	¥15,122		23.48%
Cable-2	900	m	1,650,000	1,485,000	148,500	1,633,500	$75,544	¥9,129		
Installation	1	lot	8,963,475,000	8,963,475	896,348	9,859,823	$455,985	¥55,101		
Others	1	set	17,118,250,000	17,118,250	1,711,825	18,830,075	$870,830	¥105,231		
Water Supply & Drainage				37,381,328	3,738,133	41,119,461	$1,901,642	¥229,794	3.55%	
Water Supply	1	set	7,355,558,000	7,355,558	735,556	8,091,114	$374,188	¥45,217		
Sewerage Water	1	set	21,314,800,000	21,314,800	2,131,480	23,446,280	$1,084,315	¥131,029		
Storm Water Drainage	1	set	8,710,970,000	8,710,970	871,097	9,582,067	$443,140	¥53,549		
Landscape				31,991,950	3,199,195	35,191,145	$1,627,477	¥196,664	3.04%	
Park and Garden Area	66,977	m^2	250,000	16,744,250	1,674,425	18,418,675	$851,804	¥102,932		
Garden & Walk Way	11,436	m^2	500,000	5,718,000	571,800	6,289,800	$290,883	¥35,150		
Tree	550	ea	5,000,000	2,750,000	275,000	3,025,000	$139,896	¥16,905		
Sports Field	2,308	m^2	2,750,000	6,347,000	634,700	6,981,700	$322,881	¥39,017		
Others	1	set	432,700,000	432,700	43,270	475,970	$22,012	¥2,660		
Architectural Work				805,505,455	80,550,545	886,056,000	$40,977,231	¥4,951,689	76.52%	
Low-rise Bldg.	22,250	m^2	5,454,545	121,363,636	12,136,364	133,500,000	$6,173,944	¥746,059		
Medium-rise Bldg.-1	89,600	m^2	6,363,636	570,181,818	57,018,182	627,200,000	$29,005,976	¥3,505,082		76.52%
Medium-rise Bldg.-2	17,908	m^2	6,363,636	113,960,000	11,396,000	125,356,000	$5,797,311	¥700,547		
Tentative Development Cost				1,052,652	105,265,150	1,157,916,651	53,549,909			

Table 8-9 Cost Estimation by Area

Cost			Cost								Housing Business Cost		Note
Item	Detail	Unit	All Areas		Cost by Area						Cost	Breakdown	
			All Areas	(%)	a: Housing Area	(%)	b. Inter District Road	(%)	c. Others (VOV Land)	(%)			
Area		ha	18.23	100.0%	16.11	88.4%	1.88	10.3%	0.24	1.3%		a: Housing Area 16.11ha b. Inter District Road 1.88ha c. Others 0.24ha	
Land Acquisition , Compensation	Land cost	mill. VND	29,341	100.0%	25,929	88.4%	3,026	10.3%	386	1.3%	25,929	a	
	Compensation	mill. VND	34,146	100.0%	30,175	88.4%	3,521	10.3%	450	1.3%	30,175	a	
	Subtotal (1)		63,487	100.0%	56,104	88.4%	6,547	10.3%	836	1.3%	56,104	a	Not including the monitoring fees etc
Land Preparation	Landing	mill. VND	126,809	100.0%	112,290	88.6%	14,519	11.4%	0	0.0%	112,290	a	Considering the construction type
	Subtotal (2)		126,809	100.0%	112,290	88.6%	14,519	11.4%	0	0.0%	112,290		
Infrastructure Construction	Road Construction	mill. VND	27,445	100.0%	27,319	99.5%	0	0.0%	0	0.0%	27,319	a	
	Power Supply & Electrical	mill. VND	42,726	100.0%	42,726	100.0%	0	0.0%	0	0.0%	42,726	a	
	Water Supply & Drainage	mill. VND	41,119	100.0%	41,119	100.0%	0	0.0%	0	0.0%	41,119	a	
	Landscape	mill. VND	35,191	100.0%	35,191	100.0%	0	0.0%	0	0.0%	35,191	a	
	Subtotal (3)		146,481	100.0%	146,355	99.9%	0	0.0%	0	0.0%	146,355		
Building Construction Work	Low-Rise Bldg.	mill. VND	133,500	100.0%	133,500	100.0%	0	0.0%	0	0.0%	133,500	a	Construction cost 6 mil/sqm
	Medium-Rise Bldg.-1	mill. VND	627,200	100.0%	627,200	100.0%	0	0.0%	0	0.0%	627,200	a	Construction cost 7 mil/sqm
	Medium-Rise Bldg.-2	mill. VND	125,356	100.0%	125,356	100.0%	0	0.0%	0	0.0%	125,356		
	(Housing Part)	mill. VND			99,583						99,583	a	
	(Commercial Part)	mill. VND			25,761						25,761		
	Subtotal (4)		886,056	100.0%	886,056	100.0%	0	0.0%	0	0.0%	886,056		

8.6. Construction Cost Comparison by Housing Type

In this section, the construction cost per a unit population is compared by housing type in the model site planning.

The cost comparison is shown below, and it represents the costs for construction and infrastructure per 1,000 residents. From this result, the construction cost for low-rise housing is about 20 % cheaper per the unit population than that of medium-rise buildings.

In this estimation, a low-rise housing is better from the cost perspective while a medium-rise housing costs only about 50 % of the low-rise housing costs for land acquisition, land preparation and infrastructure construction.

Table 8-10 Comparison Construction Cost by Housing Type (for 1,000 Residents)

	Land	Building		Related Costs					
	ha	Total Floor Space m²	Number of Housings	Land Acquisition & Insurance	Land Preparation	Road & Landscape	Water/Sewage & Electricity	Construction	Total
				(per ha)	(per ha)	(per ha)	(per 1000 people)	Bldg Construction Unit	
				3,483	6,956	3,436	10,592	Low-Rise : 6mil/sqm Medium-Rise : 7mil/sqm	
				mill VND	mill VND	mill VND	mill VND	mil VND	mil VND
Low-Rise Housing	2.26	12,145	500	7,870	15,719	7,764	10,592	72,871	114,817
Medium-Rise Housing	1.08	17,364	250	3,755	7,500	3,705	10,592	121,550	147,102

9. BUSINESS PLANNING

9.1. Business Scheme

In this section, candidate business stakeholders for the model site business are specified and their roles in business are examined.

9.1.1. Business Stakeholders and Role Sharing

The table below shows the business stakeholders, who are likely to participate in developing business for workers' housing, and their assumed roles in the initial development stage (land acquisition, infrastructure development, design), the management development stage (director of management and development, building construction, operation and maintenance), and offer business support.

Table 9-1 Business Stakeholders and Role Sharing

		Assumed role and feature	Initial construction			Building and management			Business support
			1.Land acquisition	2. Land preparation and infrastructure	3. Designing	General management	4. Housing construction	5.Operation and maintenance	
Public organization	Central Government	- No direct involvement in the development. -Supporting by execution of the relating measure such as introduction of preferential interest rate etc. -Execution of business promotion measure such as the subsidies etc.						✓	✓
	Local Government	- Possible business owner for the whole development business. - For the facilities management, executions by outsourcing (external order) to related business organization (public corporation etc.) are suitable. - Provision of business promotion measures like the subsidy etc.	✓	✓	✓	(✓)	(✓)	(✓)	✓
	Public Housing Entity	- Possible business provider to the whole development business and its management (future measures).	✓	✓	✓	✓	✓	✓	
Private entities	Industrial Park Operator	- Possible business owner for the whole development business. - After 2009, it is one of the responsible project owners for construction of workers' housings. - Bear the main load of the project expense difference between the cost of construction and the house rent income depending on the situation.	✓	✓	✓	✓	✓	✓	✓
	Owner of Tenant (Large Scale)	- Possible business owner for the whole development business. - After 2009, it is one of the responsible project owners for construction of workers' housings. - Obligation to prepare for the cost for the workers' housings (determined in Decree No. 100). - Bear the main load of the project expense difference between the cost of construction and the house rent income depending on the situation.	✓	✓	✓	✓	✓	✓	✓
	Owner of Tenant (Small Scale)	- Difficult to become a business owner for the whole development business. - Required to prepare for the cost for the workers' housings (determined in the Decree No.100). - Potentially bear the main load of the project expense difference between the cost of construction and the house rent income					✓	✓	✓

		according depending on the situation.							
	Real Estate Company (Developer)	- Seldom participate in business without profitability (unprofitable business). - Possible executor of construction and management business by the outsourcing order of the industrial parks and it tenants,	(✓)	(✓)	✓	✓	✓	✓	
	Individual Owner	- No participation in the business without the profitability.					✓	✓	
	Facility Management Company	- Execution of construction and management business by outsourcing the industrial parks and its tenants. (consignment of business activities by "Cost and Fee Scheme")						✓	

Note : ✓ is decided their roll of stakeholders by the Decree No.100.

Source: JST

The model site business scheme needs to consider the stakeholders and the roles above.

9.1.2. Possibilities and Measures as Coordinated Business with Public- Private Collaboration

The current Decree No.100 regard SH business development as a form of business where public and private entities cooperate. In general, public-private collaboration is considered as business promotion merging profitable and non-profit business. In this case, the government needs to encourage the involvement of the private sector in the social housing business by undertaking non-profitable businesses and guaranteeing the business risks. The private sector can bear the cost of the business.

It is difficult to have enough profit from the principle construction expenditure (land acquisition, land preparation, infrastructure and designing). Additionally, it is difficult to gain profit from the housing construction and operation.

However, the role of social housing management and operation is undertaken by private companies frequently through the "cost and fee scheme" that is a form of outsourcing.

In addition, consideration should be made of the business form with shared business implementation cost and business implementation support including subsidies from the government side as a means to reduce the cost burden, and its application to this model site business.

The content of the following table shows the assumed role sharing of the public and private sector in the improvement of housing business for workers as a collaborating business form.

Table 9-2 Roll Sharing of Stakeholders in the Public-Private Collaboration Business Form

	Initial Construction			Building and Management			Evaluation, Examples etc.
	1. Land Acquisition	2. Land Preparation and Infrastructure	3. Designing	General Management (Business Operator)	4. Housing Construction	5. Operation and Maintenance	
Plan 1	Public/Private	Private	Private	Private	Private	Private	When corresponding to the measures and policies after 2009, the large-scale factories and IP developer prepare the lands and not ask the factory owners to prepare. Without completing land preparations, the building constructions do not processed in many cases.
Plan 2	Public	Public	Private	Public/Private	Private	Private	Same with above
Plan 3	Public	Public	Public	Public	Public	Private	There are realized examples in projects. There is an example of housing business operator's participation by Cost and Fee scheme.

Public: government or public organizations. Private: IP developers, factory owners, real-estate developers or housing management operators

It is supposed that the plan 1 will be a practical business form of the model site from the intentions of the current business stakeholders.

Although plan 2 and plan 3 acquire business stability, it is thought to be difficult to execute because of the financial situation in the province of the model site.

On the other hand, there are no entities that organize business facilities and construction management at present, therefore, PPC is expected to take an initiative for the coordination of the project and provide support to small and mid-size investors presumably.

9.1.3. Coordinated Business Scheme among Private Entities (Scheme with Master Developer)

(1) Summary of Business Scheme

Within and outside Vietnam, in the business scheme, the large-scale housing developers construct the residential, and other medium and small scaled real-estate developers and operators run the housing business in the area by buying or borrowing individual housing land and providing residential facilities for the workers.

This is frequently observed, and each entity's advantage in this business scheme is as following.

(2) Benefits of Related Entities

For large-scale real-estate developers：

- The possibility of limiting their business investment to land preparations protects them from an unclear rental housing market environment.
- Possibility of focusing on their core business field.

- Possibility of getting a return on their investment in the shorter term by risk diversification to other related entities.

For medium and small scale real-estate developers：

- Participation in business is only in investment of construction and management of facilities.
- Participation with low investment cost.
- Possibility of management of rental housing with other building use such as commercial facilities and their own housing.

The expected roles in the business are shown below.

Table 9-3 Roles of Entities in Coordinated Business Scheme among Real-Estate Entities

Large-Scale Developer	• Promotion of development, Coordination of development with Public organizations and management of required approval • Land acquisition of overall development area, Land preparation and construction of Infrastructure. • Housing land sales and rent to medium and small scale investors / operators
Medium and Small-Scale Developer	• Construction and management of rental housing for worker in housing site • Management of relating business (shops, cafeterias etc.).

(3) **Issues of the Business Forum**

In this business system, a master developer will take the role to coordination between individual developer and operator. The following issues need to be paid attentions for providing the adequate supports and business promotions to enhance the participation of real-estate developers.

- The close coordination between the master developer and governments is essential in order to establish a sustainable development business of social housing.
- The incentive and promotion systems of social housings are not suited to the business system that is managed by several developers and operators. Current supporting systems need to be improved to accommodate this business form.

9.1.4. Public Housing Entities

The private companies are not involved in social housing business; because the profitability and business viability of housing business for low-income earners are relatively low. To address this situation, the government should establish a public housing entity in order to attempt the housing supply through this organization. This approach is taken in other countries (Refer to Chapter 4.1(4)).

In other countries, the central government has established such an organization through the local government. In Vietnam, the problem of housing for the workers tends to be remarkable around the industrial parks in the region where the local government lacks sufficient funds. Therefore, as the solution to housing issues in such areas, it is practical to receive support from the central government, to establish public housing entities, and to attempt the implementation of the housing business.

In the model site case, the public housing entity would be expected to bear part of the local government role, master the developer's role in housing development and to support its business promotion.

The following contents are the ideal functions for the public housing entity.

- Planning Formulation: Designing the spatial layout including infrastructure planning, adjusting the plan with the district scale infrastructure network and supporting business establishment.

- Business Coordination: Business management planning, business support for medium/small size real-estate developers, and construction of infrastructure service.
- Implementation of Development: Development implementation based on government funds, business execution by outsourcing to private operators.
- Housing Finance: Coordination of the long-term financial support (low interest rate loans, incentive loans, and loan guarantee for real-estate developers, operators and residents).

The current law and decree defines the investor/operator of industrial park and tenant as the responsible entity for preparation of social housings for workers. Therefore, these private investors need to carry out their roles in implementation of housing according to the public-private collaboration even if the public housing entity assists in the implementation of social housing development.

9.1.5. Examination of Business Scheme

(1) Condition of the Cost Burden in the Model Site Business

With regard to the cost burden and role sharing of SH project for workers, the table below shows general cases in Vietnam and the assumed conditions in this model site project, with consideration of the situation of related entities.

Table 9-4 Shares of Expenses and Expected Roles in Workers' Housing Business

Related Entity	General Case in Vietnam	Expected Requirements in this Model Site
Master Developer (Project Owner)	・ To invest and to recover the cost by selling and leasing their properties	(same as the left)
IP Operator	・ To bear the cost as business executor and master developer after 2009	・ Not assumed to share the cost
Factory Owner (Tenants)	・ To prepare workers' housings on their own in some cases ・ To provide housing for free and/or low-price rent for workers ・ To provide housing allowances up to about 200,000 to 500,000 VND/ month	・ To contribute part of development cost within the construction cost of their own residential facilities ・ Provide housing allowances up to about 300,000 to 500,000 VND
Resident	・ To bear the cost by their payment of rents	・ To bear the cost through rents by means of affordable housing costs. ・ Single Worker : Expected are the quintile 1 (lower 0 to 20 %) of the income group with approx. 447,000 VND/per month for rent payment. As adding the housing allowance of factory owners, the housing cost in total becomes approx. 747,000 to 947,000 VND[26]. Family Housing Purchase : the quintile 2 are (the lower 20 to 40 %) of the income group whose purchasing power is expected approx. 1,066,713 VND.
Local Government	・ To bear the cost of land acquisition, land preparation and infrastructure construction.	・ To bear the land acquisition cost.

Source : JST

(2) Stakeholder's Situation regarding Business Schemes

In order to examine the business scheme in the model site, it is necessary to assume housing facility users in model site, development entities and operators of residential facilities. The current situation of these stakeholders is as follows.

[26] Compared to the survey result for workers in model site, this price is higher than the rent basis that usually workers can afford, but the difference is not too big..

Table 9-5 Situation of Stakeholders for Business Schemes

Stakeholder	Situation in the Model Site Area	Concerned Matters for the Business Schemes
Main Users for the Workers Housing (Residents & Tenants)	・ There are not large-scale factory owners that could be a main user of housing. ・ The use by factory owners is uncertain.	・ It is necessary to grasp the situation of advanced factories and coordinate the individual workers as candidate residents.
Project Owner	・ Low possibility that the operator of IP and the tenant's owners become a project owner of social housing construction. ・ The participation of real estate developer depends on the future situation. ・ The participation of medium and small scale real-estate developer is expected.	・ Business scheme of the master developer system is assumed. ・ The participation of individual real-estate developers is expected.
Housing Entities of Construction and Management	・ The participation of individual real-estate operators is expected. ・ It needs the management organization to correspond to the necessity.	・ The master developer system with the participation of many real-estate owners is assumed.

In the model site business, it is difficult to expect promotion of housing development by the large scale real estate company which constructs housing sites and residential buildings at the same time. On the other hand, there are small real-estate developers and operators who construct workers' housing in surrounding areas and operate room businesses.

The business scheme that assumes a master developer's involvement in the housing site preparation and individual small real-estate developers and operators' involvement in housing construction and operation is considered as practical.

(3) **Basic Business Scheme**

Considering the situation of business stakeholders assumed in this project, the business scheme in the figure below is shown as elementary. In this project, the scheme expects i) the government to expropriate the land, ii) real-estate developer (master developer) to organize comprehensively, coordinate entire projects, to adjust between public and private roles, and to develop infrastructure, and iii) a number of private operators to participate in the project.

At present, a master developer, that is to be responsible for project implementation and an advanced factory, which could employ the residents of social housing, is uncertain. Therefore, it is necessary for PPC to cooperate with IP operators in the area and to make an effort to organize systems for implementation of the living environment improvement projects. Also, the continuous involvement and support of PPC for business coordination and promotion of housing development is indispensable at each business stage.

As practical example of this coordination, take CODI in Thailand and its organizational structure could be a reference.

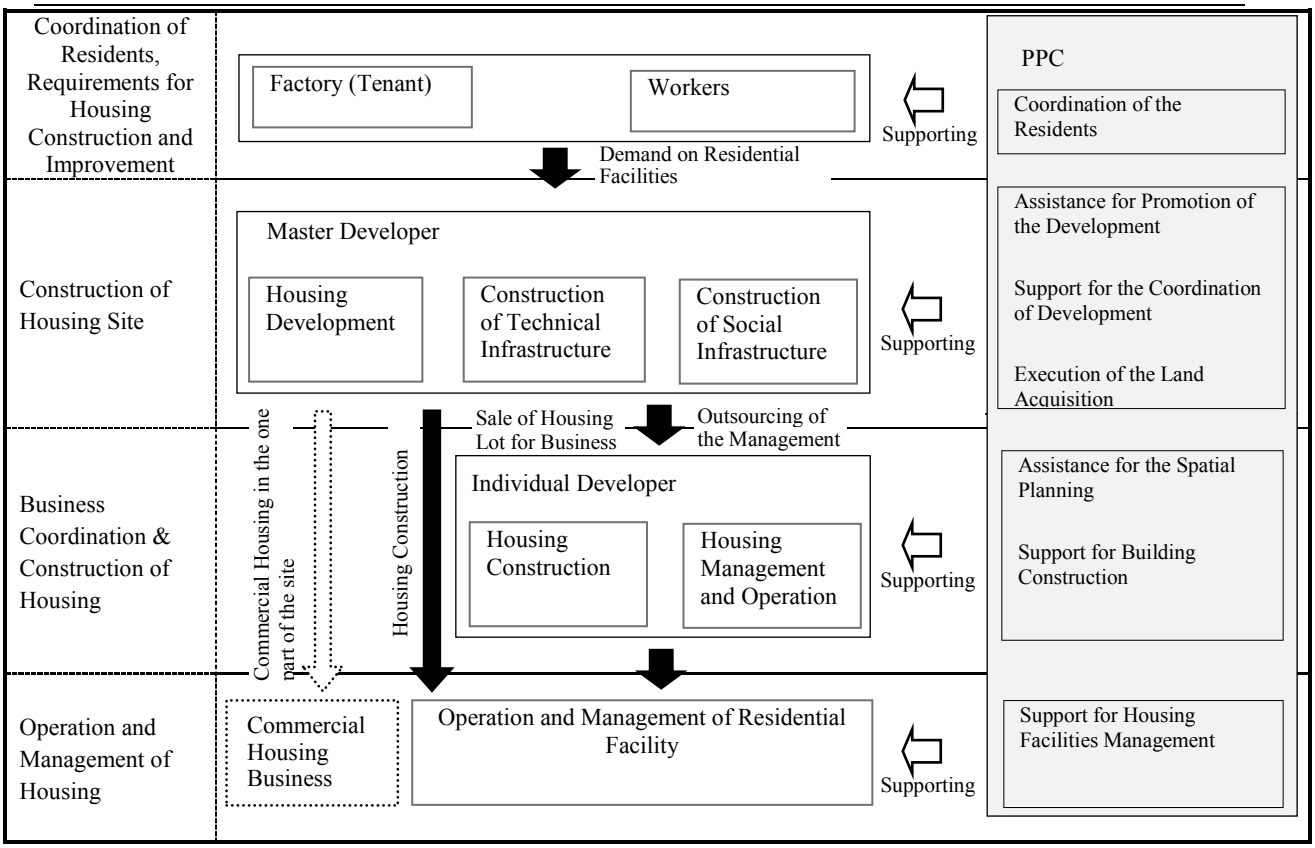


Figure 9-1 Supposed Project Schemes in Model Site

(4) **Other Business Schemes**

Considering the balance of the affordable housing cost of workers (income) and business cost for the housing development, the profitability of the housing business in the model site is thought to be low. So it is necessary to introduce approaches to improve profitability of the business.

Business schemes incorporating the following 2 business options are examined in the model site under the financing plan.

- The initial project cost born by factory owners: Contribution of housing development assistance cost as the Decree No.100 Article 31 stipulates.
- General profit business activities by sale of land and buildings: Land or housing sales corresponding to 20 % of land or floor area for profitable business as Decree No.100/2015/ND-CP Article 9 states are permitted.

9.2. Precondition of Business Plan

The SH project needs to set up a business model for industrial workers basing on the rent as well as considering the workers' affordability of these prices. In this study, a comparison is made between the 'payment power for the residential facilities of industrial workers' and 'business costs' in rental housing model[27].

[27]The comparison between business cost and housing cost affordability for rent will be examined in business model which assumed that all housing models are rental. Annex11 will show the examination result for basic price in sales price setting corresponding to the building cost not including land cost in the selling price.

9.2.1. Examination of the Affordable Housing Cost of Workers

The affordable payment amount of the industrial workers around IP are represented by capabilities of income quintile 1st and 2nd for residential facility, which is lower 40 % income group as mentioned in 3.9.2, for dwelling expenditures and the corresponding amounts of potential housing loan with preferential terms and conditions. Specific conditions are as followings:

i) Single income earners are assumed to be 2 persons (low-rise housing), 4 persons' (mid-rise housing) cost burden. The cost burden is 446,699 VND/month per person. Households' income earners are assumed to be 2 persons' cost burden. . The cost burden is 1,066,713 VND/month per person

ii) Affordable rent ranges are assumed 15 % in income quintile 1, and 20 % in the quintile 2 respectively as affordable housing expenditure. According to the survey, the higher income quintile allocates more for housing cost than the lower quintile.

iii) In the business cost calculation in 9.2, the occupancy rate in rental housing is set as 100 %, and the basic payment is calculated. In the financial analysis and fund planning in 9.3, the occupancy rate is set as 95 %, and the resident absentee for long-term is considered.

iv) The quintile 1 affordability is applied to industrial workers who are single and live alone.

v) The quintile 2 affordability is applied to industrial workers who live in the houses as family

Based on above mentioned assumptions, the affordability of housing cost was calculated as follows.

Table 9-6 Affordability of Residents

(Unit: 1,000VND)

Building Types	Affordability	Unit Number	Rent Housing	
			Monthly Rent	20 Years Rent
20 Years Rent for Low-Rise Single	196,404,452	916	893.40	214,415.34
20 Years Rent for Medium-Rise Single	99,059,887	231	1,787.79	428,831.68
20 Years Rent for Medium-Family	660,508,869	1,290	2,133.43	512,022.38
Total Cost for Burden	955,973,208			

Notice：The calculated numbers do not match since each number lower than significant digits is rounded.

9.2.2. Commercial Facilities in Business Planning

In the model site case, the commercial facilities are planned in the medium rise building at the ground floor level, and the total floor area is approximately 3,680 m^2. The restaurants and shops are expected to be in. In the SH for workers in Kim Chun Commune where is located at periphery of Hanoi, the commercial facility is rent at 35,000 VND per month/m^2 as setting it with low price. This price setting does not cover the construction cost in 20 years of rental. Based on this case, the rent for commercial facility in the model site is set as same as the construction cost.

These commercial facilities are considered separately from the profitable business for social housing construction and land explained in 9.1 (4).

9.2.3. Affordability and Cost Comparison in the Model Site

The correspondence of affordable cost of residents and business cost in business balance in the model site is shown as below (Any costs related to investment funding allowance are not included in the business cost).

In calculating the costs, in addition to the construction expenses calculated from the study regarding Chapter 8 (Cost estimation), and the land acquisition and compensation expenses from Annex 10 (Environmental and social considerations for model site), the following 2 costs are considered.

i) Allocating the planning and design costs, which corresponds to 3% of construction costs,

ii) Allocating the annual operation and maintenance costs, which corresponds to 1% of construction costs、

The relationships among these costs, revenue calculated from (1), and balance of both is shown in Table 9-7.

Expected amount of the affordability by the beneficiaries in terms of rents and purchasing, which is 955,973 million VND is only a little more than the scheme's cost for building construction, design and operation and maintenance with others amounting to VND 970,908 million. It must be less than the business cost and due profit for the housing, while the scheme's total cost is VND 1,311,418 million considering the basic costs for land acquisition, land preparation and infrastructure development which are necessary before construction of building. Also, the interest rate burden of the loan is necessary to be prepared.

Table 9-7 Balance of Housing Project Cost and Expected Income by Rent and Sales

Cost

	Cost (mill. VND)	Note
O&M and Others	58,271	Annual Operation Maintenance 1%/per year、Renovation Cost 5%
Design	26,582	3% of Housing Construction Cost
Housing Construction	886,056	
(Subtotal(1))	970,908	
Commercial Building	25,761	
（Subtotal(2)）	25,761	
Infrastructure	146,355	
Compensation	30,175	
（Subtotal (3)）	176,530	
Land Preparation	112,290	
Land Acquisition	25,929	Burdened by HY Province
(Subtotal(4))	138,219	
Total Cost	1,311,418	

Income (20 years)

	Income (mill. VND)
Rent for L-R Single	196,404
Rent for M-R Single	99,060
Sales of M-R Family	660,509
Housing Income Subtotal	955,973
Commercial Facility Income	25,761
Total Income	981,734

Income & Cost Balance

	Missing Amount (mill VND)
Total Cost-Total Income	329,685
(Except Land Acquisition)	(303,756)
Construction Cost Balance (Subtotal (1)+Subtotal(2)-Income Total)	14,936

Notice：The calculated numbers do not match since each number lower than significant digits is rounded.

9.3. Financing Plan

9.3.1. Financing Sources (Business Cost Allocation)

(1) Conditions for Consideration

For implementing the study scheme, total cost for implementation of the scheme amounting to VND 1,311.4 billion has to be financed. Unfortunately, this amount is too large for the government budget. Issuance of construction bonds and/or borrowing money is indispensable. Accountable incomes are imperative for the issuing of bonds and for borrowing money.

For the case of renting, the business cost is studied as assuming to borrow the fund resources. It tends to involve long-term debt, the scheme's possible sources of income to be acquired are rent

paid by the dwelling workers and the supporting expenses afforded by their employers (refer to Annex 11).

As subtracting the loan interest from the cost to be afforded by workers and each business operators (rent and housing allowance money), the left amount will be the allocated business cost.

(Business Cost) = (Amount Afforded by Workers & Each Business Operators) – (Loan Interest) Amount)

The hypothetical requirements are:

- Business and Financial Schemes
  - Conditions for using insurance of bonds and/or borrowing from credit institution: annual interest rate of 5 %, over a 20 year repayment period and assurance from the government.
  - Occupancy rate: 95 %
- Assumed Bearer and Expenses
  - Residents: the amount of rent is based on current affordable price
  - Corporation (tenant) : assumed as factory owners and other entities and bears following expenses,
    - Housing cost allowance for the workers: in case they offer the workers' dormitories up to about 500,000 VND/ per month.
    - Allotted charges for investment at the beginning of the business: These are defined by the Decree No.100 and form part of employee recruitment. In the foreign cases the business cost contribution is necessary and 10 % or more of their development land, needs to be allocated[28].
  - Government: assumed as the central and local governments, and bear the following expenses,
    - The cost burden of land preparation and infrastructure development defined by decree: it determines the liability of local government.
- Other Business
  - Commercial Facilities : the expected income needs to be same as construction cost (referred to 9.2.2).
  - General profit business : the requirements shown in 9.3.2(1).

(2) **Results of Allocation of Fund for the Basic Scheme**

The calculation process and detailed results are described in the Annex 11.

The 957,437 million VND, which is slightly more than a half of the total cost, is the maximum amount that can be procured under the described conditions. Among them 573,831 million VND corresponds to the dwellers' rent payments amounting to 3,786 million VND/month and the

[28] 4.3 Rule No.10 in India

remaining 384,056 million VND is based on the firms' supporting payments amounting to 2,535 million VND/month. [29]

The loan needs to consider enabling to be availed both through issuing bonds and/ or borrowing money from the credit institutions which may require government guarantee when the operator's financial credit is not enough since SH business is unprofitable.

Based on the above assumption for the bond issuing/fund borrowing, trial allocation of procurement of funds is shown in the Table 9-8.

The results of basic funds allocation assuming a housing allowance of 500,000 VND/month-person covered by the company, as shown in the following table indicates a shortage of the 3,023 billion VND.

Table 9-8 Result of Investment Fund Allowance

(Unit: 1,000,000 VND)

Item		Total Cost	Cost by the Roles					
		Cost	Resident	Company	Government	Other Operators (Commercial Facility Operator and General Profit Business)	Shortage	Initial Loan Amount
Total Business Cost	a	1,311,418	573,381	384,056	25,929	25,761	302,291	
(Ratio)			43.7%	29.3%	2.0%	2.0%	23.1%	
Commercial Facility Business Income	b	25,761				25,761		
General Profit Business	c							
Total Business Cost for Worker Housings	d=a-b-c	1,385,657	573,381	384,056	25,929		302,291	
(Ratio)			44.6%	29.9%	2.0%		23.5%	
Rent & Housing Allowance (Sum Repayable of Initial Loan)	e	957,437	573,381	384,056				957,437
Land Acquisition Cost	f	25,929			25,929			
Land Preparation Cost	g				0			
Contribution of Development Cost	h	0		0				
Shortage	d-(e~h)	302,291						

Source: JST

[29] Examples of borrowing affordability was calculated by PV function.

PV function: the function to calculate the loan amount when the interest rate is stable. The amount can be calculated with an interest rate, a period of length and an annuity rate.

In addition, Table 9-9 shows the results of a case of changed business conditions. The results of basic fund allocation assumed the housing allowance shouldered by companies is 300,000 VND per month-person as insufficient to amount to 4,559 billion VND.

These business income balance and the shortage of cost need to be solved, and will be examined the next section discusses the issue.

9.3.2. Sensibility Analysis

As solutions for financial shortage and business expenditure balance, finance balances have been studied for the following different business conditions and business schemes

- Housing allowance by factory owners: 300,000 or 500,000 VND/per month

a) Use of project site for general profit business: general profit housing business should account for 20% of the site or unit

b) Initial business contribution by factory owner: 0~70 million VND/person

c) Interest rate of loan for the project: Annual interest 5% or 1%

The calculation result of finance is shown below (see Table 6-12).

(1) Case that 20 % of Housing Land or Residential Unit is Allocated to General Profit Business

The calculation result of the case that 20 % of housing site or residential unit is allocated to general profit business housing use according to the stipulations of decree is as follows. It is expected to turn over a profit which is equal to 10 % of construction cost in each case

- In the case that 20 % of housing land is allocated for general profit business housing use, it is expected to improve 3.1 % of business costs but it leads to a shortfall of 261.9 billion VND.
- In the case that 20 % of family units (400 units) are allocated for general profit business housing use, it is expected to improve 2.6% of business cost, but leads to a shortfall of 268.7 billion VND.

These results show that while introduction of commercial housing leads to financial improvement, its effect is extremely limited.

From these results, the improvement of fund planning as a combination between housing allowance and general profit business, which are assumed as business support mechanisms in the current SH business frameworks, is not enough to improve the social housing business and affordability of workers. Based on these circumstances, this study examines the business scheme shown below.

(2) The Contribution of Initial Project Cost by Factory Owners

In a scenario that factory owners pay 55 million VND per resident as development contributions, the business cost shortage would be solved. In this case, the amount contributed is almost equal to the construction cost for workers' housing by a factory owner. It is commensurate to the high labor demand that companies construct workers housing to bear the shortage.

If local governments bear the land preparation cost, the initial cost allocation of the factory owner would be 35 million VND per person.

However, it should be noted that although the tenant companies are obliged to support the SH business for industrial workers by Decree No.100, since the condition and degree of support is ambiguous, companies are unlikely to accept additional financial liability.

(3) **Case of Decreasing Interest Rate (Applying Preferential Interest Rate)**

In the case of application of a preferential interest rate (from 5% to 1%), borrowing accessibility increases and the finance balance results in the following:

- In case the housing allowance of companies adds up to 400,000 VND per month, business finance would be balanced.
- Taking a 300,000 VND per month housing allowance from companies, initial cost contribution by factory owners would cost 20 million VND per person.

This result shows that the introduction of preferential interest rate is quite effective.

(4) **Conclusion**

From the result of study on improvement of business expenditures and cost shortages, the impact of general profit business implementation becomes clarified. It does not significantly improve the business expenditure, but positively impacts by lowering the interest rate. Therefore, in addition of current social housing business implementation, it is necessary to reconsider the financial scheme requirements and the financial responsibility among business entities on cost shortage.

The related studies will be continued in 9.4 and 9.5.

Table 9-9 Result of Provisional Allocation of Investment Funds (Sensibility Analysis)

Expected Business Case	Contribution of Initial Business, Expenses of Stakeholders and Ratio to Total Cost																	
	Interest Rate	Resident		Company				Local Government				Other Operators (Commercial Facility Operators, General Profit Business Operators)		Total sum		Shortage Cost Amount	
		Allocated Amount		Housing Allowance	Contribution Cost	Allocated Amount		Land Acquisition Cost	Land Preparation Cost	Allocated Amount		Allocated Amount					
		a				b		C	d	e = c + d		f		a+b+e+f			
	%	(mill VND, %)		(Thou VND/Man Month)	(mill VND/Man)	(mill VND, %)		(mill VND, %)	(mill VND)	(mill VND)		(mill VND, %)		(mill VND, %)		(mill VND, %)	
1a Housing Allowance 500,000 VND/per month	5%	573,381	43.7%	500	0	384,056	29.3%	25,929	0	25,929	2.0%	25,761	2.0%	1,009,127	76.9%	302,291	23.1%
1a Housing Allowance 300,000 VND/per month	5%	573,381	43.7%	300	0	230,434	17.6%	25,929	0	25,929	2.0%	25,761	2.0%	855,504	65.2%	455,914	34.8%
2a-1 20% of Site for Sale	5%	481,815	36.7%	500	0	281,564	21.5%	25,929	0	25,929	2.0%	**260,181**	19.8%	1,049,489	80.0%	261,929	20.0%
2a-2 20% of Family Housing for sale	5%	450,539	34.4%	500	0	326,476	24.9%	25,929	0	25,929	2.0%	239,737	18.3%	1,042,681	79.5%	268,737	20.5%
2b-1 Contribution Cost for Company 55mil VND/per person	5%	573,381	43.7%	500	**55**	677,536	52.7%	25,929	0	25,929	2.0%	25,761	2.0%	1,302,607	99.3%	8,811	0.7%
2b-2 Land Preparation Cost born by Local Government	5%	573,381	43.7%	500	**35**	570,816	43.5%	25,929	**112,290**	**138,219**	10.5%	25,761	2.0%	1,308,177	99.8%	3,241	0.2%
2c-1 Interest Rate 1%、Housing Allowance 400,000VND/month	**1%**	822.811	62.7%	400	0	440,901	33.6%	25,929	0	25,929	2.0%	25,761	2.0%	1,315,402	100.3%	–	–
2c-2 Interest Rate 1%, Housing Allowance 300,000VND/month	**1%**	822.811	62.7%	**300**	**20**	437,396	33.4%	25,929	0	25,929	2.0%	25,761	2.0%	1,311,896	100.0%	–	–

9.4. Examination on Funding Resources

As a result of financial analysis, this business promotion needs funding sources with advantageous interest rates. The following account for possible funding sources.

As shown in Chapter 4, the residential implementation case for workers in IP, the fundamental point of business promotion is to support integration with the business community financially. In Vietnam, an examination to establish the financial organizations and institutions likely to fund social housing will have to be reflected upon.

On the other hand, the social housing business is basically unprofitable business, and establishing bank loan or investment trust at current moment is complicated and faces a difficulty under assumed business condition. For implementing a bank loan, a public entity such as a government need to provide an assurance for the loan. Also, funding by investment trust is recommended to be discussed when the sufficient business profitability is expected with the increase of housing demand and the economic growth.

Table 9-10 Funding Sources for Initial Business Cost

		Land acquisition	Land preparation & infrastructure	Housing construction	Operation and maintenance
Bond	- It is possible to allot the industrial bond and the construction bond that a central government and the local government issue to the cost of procurement. - In an overseas case, the funding source comes from pensions and managed by the development bond for a strategic housing supply (Singapore).	(✓)	✓	✓	
Bank Financing	- Financing for construction of buildings and management by private companies. - The business profit of the development is valued for financing. It should be a business with profitability, and related entities' defrayal is indispensable. Moreover, the state's guarantee of the financing is necessary for this case.			✓	✓
Investment Trust	- Accumulates a fund from a lot of investors by Real Estate Investment Trusts and contributing it to business for development projects. - The business profit of the development is valued for the investment scheme. It should be a business with profitability potential and related entities' defrayal is indispensable. - Overseas, there are cases where sale by investment trusts covers construction of infrastructure facilities in urban development project. - This method will be taken when the housing business become profitable by price rise of housing rent and housing price renting and fulfilling the price requirements with the housing with increase of housing demand and the Vietnamese economic growth.		✓	✓	✓

9.5. Feasibility of Social Housing Business in Model Site

The result of social housing business planning in the model site and the main issues for the feasibility of business examined in this chapter are shown and summarized below. Along with the issues it is necessary to introduce organizational support and financial assistance related to business promotion.

Table 9-11 Feasibility of Social Housing Business in Model Site

Business Planning Framework	Situation and Issues Related to Business Feasibility
Construction Cost and Worker's Affordability	・The amount of worker 's affordability for housing cost does not match the construction costs of living facilities. It is difficult to sustain profitability. ・Additional subsidies are needed in addition to the worker's housing affordability.
Business Scheme and Business Entities	・ The master developer needs to arrange development expenses and coordinate contribution of factory owners and housing allowance for the development cost. ・The housing developer and large sized factory owners with high residential demand are uncertain in some cases. The small development framework for medium and small sized investors should be considered since they are enabling to execute the moderate capacity development.
Financial Planning	・The financial plan can be balanced by implementing the low interest rate investment and introducing the subsidy and contributions of development cost by factory owners. ・The introduction of commercial housing business for social housing development does not improve greatly the profitability of social housing business.

10. Recommendations to the Implementation of Development

10.1. Recommendations for Implementation of Development of the Model Site

For improvement of the living conditions for the IP workers in the model site, Hung Yen province has to grapple with supporting and coordinating implementation of development according to the progress of the project. Based on the basic contents of the business scheme in section 9.2.4, the following measures are recommended for implementation by Hung Yen PPC. These measures follow the current legal system.

Table 10-1 Recommended Policies for Housing Development in Model Site

Framework of Measures	Content of Measures	Related Entities
1) Support for Coordination of Candidate Residents	・ Promotion at support desk for IP operators ・ Arrange support to residents for worker housings including surrounding IPs	DPI, EPZA, DOC
2) Support for Development Promotion	・ Execution of land acquisition	DPI, DOC, District Office
	・ Marketing the plan to the candidate operators, and inviting development operators (information share and one-stop services)	DPI, EPZA
	・ Secure financial capital －Request the planned factories to defray a part of the business cost －Coordinate allocation of the social housing cost	DPI, EPZA
	・ Application of business operation incentives －Tax reduction －Exclusion from land use fees	DPI, EPZA
3) Support for Development Coordination	・ Housing supply promotion for medium and small sized investors －Organization support for housing related operators －Information sharing support between the master developer and individual operator	DPI, DOC, EPZA, District Office (Professional organizations)
4) Support for Spatial Development Coordination	・ Coordination support between medium and small sized investors (community development support)	DOC (Supported by MOC)
5) Support for Construction of Building	・ Advising on construction regulations for current villages	DOC (Supported by MOC)
	・ Tight enforcement of construction approvals and regulation	DOC, District Office (Supported by MOC)
	・ Support in cost reduction of construction through group purchasing and by promoting subsidized construction materials	(Supported by MOC)
6) Support for Residential Facility Management	・ Residential facility management support － Rental housing management and operation support for medium and small housing operators (including loan facilitation) －Promotion support for decent quality housing	

Source: JST

10.1.1. Support for Coordination of Candidate Residents

(1) Promotion at Support Desk for IP Operators

For stabilizing and promoting the worker housing provision model as a business, it is important to promote the supply of decent housing corresponding to the demand for workers who will rent the houses. The participation in the construction business by new factory investors needs to be encouraged. Therefore, the coordination and co-working between IP operators are recommended

and the support desks for IP investors could underpin these activities. The DPI is expected to extend support in cooperation with EPZA and DOC.

(2) **Arrangement Support of Residents for Worker Housings Including Surrounding IPs**

The arrangement support to search for residents for worker housing is recommended to be provided not only for the IPs in the vicinity of the model site, but also for those in the surrounding areas and IP workers. It is recommended that management of the candidate residents is planned for the surrounding IPs and factories. This business information is provided under the oversight of the PPC.

10.1.2. Support for Development Promotion

(1) **Execution of Land Acquisition**

It is recommended that the model site land and its free provision are undertaken by the province in order to decrease the burden on development operators as well as to enhance the business.

The province needs to prepare the budgets and coordination among DPI, DOC and the district offices is essential for its execution.

(2) **Giving Publicity of the Plan to the Candidate Operators, and Inviting the Development Operators (Information Sharing and One-Stop Services)**

The suitable provision of business information related to the development operation will be key to encouraging the business participation by the private business operators. Only one desk should provide the various related business information such as the requirements for a development plan, the support provision for business and the trends of residential demands (one-stop services). It is recommended that DPI establishes the one-stop services and coordinates operation with EPZA. Furthermore, that information should be provided to the medium and small size investors.

(3) **Securing of Financial Capital**

The business participation by the private operators needs to be encouraged to enhance this business by lowering the land acquisition cost and supporting that of construction such as land preparation or urban infrastructure. For securing the financial capital to cover these costs, business cost allocation requests for newly expanded factories (Decree No.100 Article 31) and the coordination of social housing fund allocation (Decree No.100 Article 5) should be discussed as the current law specifies.

(4) **Application of the Business Operation Incentives**

The tax reduction and exemption from land use fees as stipulated in the Housing Law No. 58 need to be applied systematically to encourage business coordination with factory owners and business promotion by private development operators. For the wide dissemination of the incentive program, the information provisions and advisory services related to housing policy promotion ought to be reviewed at the examination level of any IP Master Plan (Referred to section 3.8).

10.1.3. Support for Development Coordination

The housing construction undertaken by medium and small sized investors is recommended as the moderate investment for housing provision. To encourage individual investment business, the following supports are proposed. It is recommended that DPI, DOC and EPZA manage this role at the beginning. Then collaboration with district and specialized offices established in the long term.

(1) **Organization Support for Housing Related Operators**

The establishment of rules and the coordination between business operators is necessary for attaining comprehensive spatial development and coordination for individual housing developments

by several small sized investors. Therefore, the examples of the community development by CODI in Thailand and the Kasiba-Lisiba system in Indonesia would be suitable references as institutional supports.（Refer to Chapter 4.）

(2) **Information Sharing Support between Master Developer and Individual Operator**

To enhance the business participation by various operators and the coordination between operators and business establishment promotions, the information exchange between development operators is essential. From the social business perspective, the systematic approaches need to be launched for business preparation of developers.

10.1.4. Support for Spatial Development Coordination

- Coordination support between medium and small sized investors (community development support)

The province needs to be the main actor in coordinating and supporting the medium and small sized investors for spatial development and they can mainly support them in spatial planning establishment, design guideline determination and business planning formation. DOC will take responsibility for the supports. Besides, the central government could be involved in standardization support.

10.1.5. Support for Construction of Building

(1) **Advising of Construction Regulations for Current Villages**

By avoiding the price competition with low-quality buildings for workers in surrounding villages, it is important to manage and advise on decent quality housing within/out of the model site. Verifying the construction basics suitability and giving appropriate permissions and lectures are essential in achieving the goal. MOC, DOC and the district offices ought to promote the supports necessary.

(2) **Assisting for Cost Down of Subsidized Construction Materials and Group Buying**

The participations by operators and investors can be promoted by reducing the construction cost. Purchasing the construction materials in groups and promoting the use of specific construction materials that are subsidized can reduce the total business costs. This implementation is neither for one project nor one province, but for across the nation widely. The manufacture of each construction material will be done by a private developer, but the planning and the research on product usage need to be taken by the public entity. As standardizing the design guideline for social housing, the supports by MOC or related entities are expected for this approach.

10.1.6. Support for Residential Facility Management

More development participation by various sized operators and overall support are proposed including business investment and management. The recommendations for organization and systems are stated in Chapter 5.

- Rental housing management and operation support for medium and small housing operators (including loan facilitation)
- Promotion of decent quality housing

In order to improve some legal regulations, MPI and MOC need to work on reviewing them.

10.2. The Introduction Orders

The introduction of support measures shown in (1) and are to be conducted in the following order.

10.2.1. Short-Term Support

It is necessary to support the business system establishment including the identification of the development business operator in the short term. The following contents should be implemented (2) Support for development promotion, (3) Support for development coordination, (4) Support for spatial development coordination among proposed measures in 10.1. The following need to be performed promptly.

- Organizing for departmental development support in the province: correspondence to support the formulation of business and to plan business execution strategies. At the outset, DPI, DOC and EPZA need to coordinate and work on the tasks together.
- Execution of government support plan: the coordination of business planning, the finance support for business establishment (business cost allocation) and the coordination with business operators
- Appeal to the potential development business operators (master developers) for business (the motivation of business stakeholders)

10.2.2. Mid and Long-Term Support

At the development stage where the framework for the development work is prepared, it is necessary to work on the support execution in the business operation and management. It is essential to follow the following measures (1) Support for coordination of candidate residents, (5) Support for construction of buildings, (6) Support for residential facility management are among the measures presented in 10.1.

It is required to focus and work on following contents from the promotional view of encouraging participation of various entrepreneurs.

- Establishment of the department of development to support in provinces: mainly coordinate and plan the social housing construction, financing and operation. It is worthwhile to mobilize specific departments towards this mission. A leaf could be borrowed from CODI in Thailand (referred to the section 4.3 in Chapter 4).
- Supplementary promotion of construction
- Offering housing facilitation service to excellent living accommodation for tenant candidates.
- Supports for the housing control and rental management to middle and small business operators.

Table 10-2 Implementation Priority of Recommended Supports for Model Site Business

	Support to Implement	Work by Public Entity
Short Term Support	(2) Support for Development Promotion ・Execution of Land Acquisition ・Giving Publicity of the Plan to the Candidate Operators, and Inviting the Development Operators (Information Sharing and One-Stop Services) ・Securing of Financial Capital ・Application of the Business Operation Incentives (3) Support for Development Coordination ・Housing Supply Promotion for Medium and Small Sized Investors (4) Support for Spatial Development Coordination ・Coordination support between medium and small sized investors (community development support)	・Organizing for Departmental Development Support in the Province ・Execution of Government Support Plan ・Appeal to the Potential Development Business Operators (Master Developers) for Business (the Motivation of Business Stakeholders)
Mid-Long Term Support	(1) Support for Coordination of Candidate Residents ・Promotion at Support Desk for IP Operators ・Arrangement Support of Residents for Worker Housings Including Surrounding IPs (5) Support for Construction of Building ・Advising of Construction Regulations for Current Villages ・Tight Enforcement of Construction Approvals and Regulations ・Assisting for Cost Down of Subsidized Construction Materials and Group Buying (6) Support for Residential Facility Management ・Residential Facility Management Support	・Establishment of the Department of Development to Support in Provinces ・Supplementary Promotion of Construction ・Offering Housing Facilitation Service to Excellent Living Accommodation for Tenant Candidates ・Supports for the Housing Control and Rental Management to Middle and Small Business Operators

11. Conclusion

11.1. Result of this Study

11.1.1. Study Summary

The following is a summary of the results from this study.

In Chapter 2, the current legal and organizational system in Vietnam, which is related to the living environment improvement of IP workers, was explained in terms of housing construction, SH business promotion, and construction standards.

In Chapter 3, the current situations of IP workers' living environment were clarified from the perspective of each of the following views: spatial planning and housing building, an organization related to housing construction, improvement and enhancement of SH business, and issues related to business profitability.

In Chapter 4, the measures of the living environment in the neighboring countries were described. The contents and summarized measures of living environment of workers was evaluated for their applicability to Vietnam.

In Chapter 5, based on the results from Chapter 2-4, the measures and recommendations for improvement of living environment were offered.

In Chapter 6, 7 and 8, the spatial development and construction plans regarding the development plan of housing for workers in the model site in Hung Yen Province were formulated with the calculation of the business costs.

In Chapter 9, the business scheme and financial plans of business were examined and their business feasibility confirmed.

In Chapter 10, based on the knowledge from the examination of the development plan, recommendations on measures for the living environment improvement of IP workers in Hung Yen Province were proposed.

11.1.2. Study Result and Analysis

The results and the analyses from this study follow as below.

As shown in Chapter 2, the construction requests for worker housing based on IP development was legally conducted in Vietnam. It resulted the proper housing supply and construction around the IPs established after 2009, and the problem solving has been progressed.

On the other hand, the housing business progresses and effects vary by a case shown in Chapter 3. One of the causes shows the low occupancy rate of housing even if the land preparation and the housing construction are proceeded. Also, the housing cost gap between the worker's affordability and the costs burdened by IP operators, factory owners and real-estate developers needs to be taken as an issue to be solved.

Chapter 4 states that the housing construction business for low-income group is basically unprofitable although in the surrounding countries close to Vietnam, and the countries work on regulating construction responsibilities and establishing financial supports. The current Vietnamese social housing system does not perfectly match with the reality of low-income group lives. The housing provision system needs to shift to providing low price housings outside of urban cities.

As analyzing the results above, the policies for over Vietnam are presented in Chapter 5.

In the model site planning discussed in Chapter 6 to 8, the improvement direction of living environment for IP workers in Vietnam. For the workers, the environments in daily lives are significantly important, and the site selection was considered on the commuting and surrounding environments. However, the housing developers and operators focus more on the participation conditions like low cost and decent investment capacity. The spatial layout and construction plans are recommended based on the conditions.

Chapter 9 shows the result of financial plan, and the housing business feasibility was proven with the financial supports from governments and factory owners. The financial burden by each related entity can impact on the possibility of the business, and the supports need to be considered in the central and local governments from the industrial promotion perspective.

In Chapter 10, the living environment to improve by local governments is stated.

11.2. Recommendation for Living Environment Improvement of IP Workers

Based on the following two frameworks, measures of living environment improvement for IP workers are recommended.

11.2.1. Measures of Living Environment Improvement of Workers Targeting to IPs throughout the Vietnam

The following policies for improvements are listed in the frameworks for the issues encountered in the study.

- Recommendations for spatial planning and construction
- Recommendations for an organization system
- Recommendations for business and financial planning

Furthermore, the matters necessary for improvements in the legal system are listed for establishing policies.

11.2.2. Measures of Living Environment Improvement of Workers Targeted to the Model Site (Hung Yen Province)

The plan of workers housing in the model site is designed and formulated, and its business plan is studied. The improvement measures for business profitability is examined and the results are proposed as recommendations for business implementation.

The measures and roles to be assumed by the province are discussed to improve the living environment of workers. They are based on the housing issues encountered in the model site and situation conditions of anticipated operators.

11.3. Urban Planning of the Zoning Plan, Detail Plan, and Draft Business Plan Regarding IP Housing Development in the Model Site

Based on the planning content in Chapter 6, urban planning books about IP housing development in model sites was created based on the Decree No.37/2010 / ND-CP.

Attached to the appendix are the drawings and planning books in accordance with the Decrees form.

11.4. Lessons for Future

In today's Vietnam, the successful cases for solving the living environment for IP workers are the cases involved by the large-scale IP operators/factory owners or the local governments that can

mainly offer the financial supports. Under the financially stable local governments or operators, the living environment for workers is getting improved. Except those cases, the living environment is unlikely to improve by IPs, factory owners or local governments with financial difficulty.

The expectation of future Vietnamese industry may face the issue to expand the cluster industries such raw materials or component products (refer to Annex 6). For supporting the industrial development and the balanced local/industrial developments over Vietnam, the initiatives by the central and local governments toward IPs and medium/small sized factory owners are essential. The supports on housing construction business and financial scheme can assist and help the IPs and the factory owners where are not able to establish worker housings or facilities.

The related issues are still remain on the coordination between the central/local governments and private companies, the promotion to increase foreign investments, the development of domestic industries and so on. Each issue needs to be discussed and considered the financial responsibility on each related entity and the method to enhance and promote the living environment improvement for workers.

Books for Reference
Chapter 4

- UN HABITAT, Volume 2 2012, Affordable Land and a Housing in Asia
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