

# CASBEE<sup>®</sup> for Urban Development

Comprehensive Assessment System for Built Environment Efficiency

●Technical Manual (2014 Edition)



Editorial Assistance : JSBC 一般社団法人  
日本サステナブル建築協会  
Japan Sustainable Building Consortium

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\* The subscript "UD" represents "Urban Development".

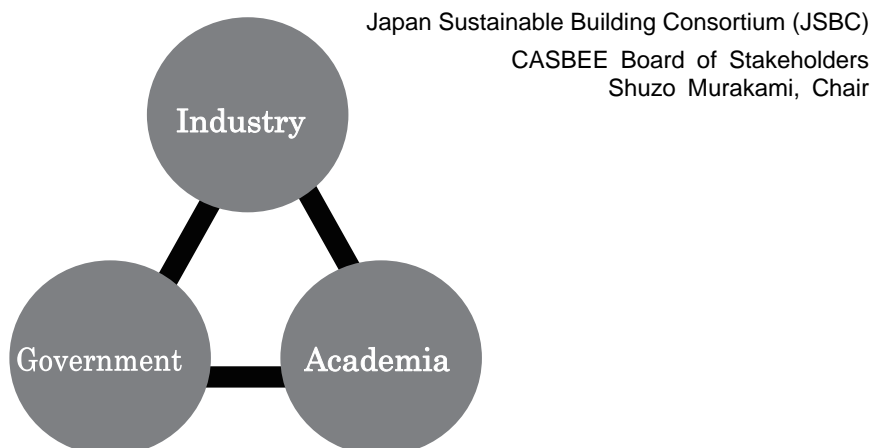
## Introduction

The promotion of sustainability is a big issue for mankind. In the construction field, there has been a growing movement towards sustainable construction since the second half of the 1980s, leading to the development of various methods for evaluating the environmental performance of buildings such as BREEAM (Building Research Establishment Environmental Assessment Method) in the UK and LEED™ (Leadership in Energy & Environmental Design) in North America. These methods have attracted interest around the world. In Japan, with the support of the Housing Bureau, a branch of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), the Research Committee for the Comprehensive Assessment System for Built Environment Efficiency was established in April 2001, and has been working on development of the Comprehensive Assessment System for Built Environment Efficiency (CASBEE).

Development of a method to evaluate environmental performance of not only a single building but also a group of buildings through utilization of the philosophy and methodology of CASBEE had been considered important since the beginning of its development. Under such circumstances, the Development of Measures against Global Warming and Heat Islands through Urban Renaissance Businesses, drawn up on December 10, 2004 by the Urban Renaissance Headquarters, called for the need to rate urban renaissance businesses, and therefore, the development of a tool that can deal with the evaluation of area projects or urban-planning projects was required. Responding to this, we conducted research for the practical application of CASBEE on a block/zone scale and released a new tool, CASBEE for Urban Development, in July 2006 as a result of the research. In November of the following year, we additionally published the 2007 revised edition, which includes the development of a simplified version for easy application to the early stage of a plan and clarification of evaluation related to global warming countermeasures.

After that, when we considered a revision of CASBEE for Urban Development in response to demand for regional safety performance and stabilization of the energy environment that has been growing since the Great East Japan Earthquake, the Low Carbon City Promotion Act (dubbed Eco-City Act; co-managed by MLIT, the Ministry of the Environment (MOE), and the Ministry of Economy, Trade and Industry (METI), was established and accordingly it became necessary to provide an evaluation tool that can organically coordinate with the act. Around the same time, CASBEE for Cities, for the comprehensive evaluation of the environmental performance of each municipality, was completed, and knowledge needed to understand and evaluate environmental performance of a large area developed significantly. We started examinations again under a new system while taking advantage of such knowledge and asking for participation of the City Bureau, a branch of MLIT, in order to respond to enhancing and diversifying demands in block/zone arrangement. Through this examination, CASBEE for Urban Development 2014 edition, which contains a fundamentally revised evaluation while inheriting the basic principles of CASBEE for Urban Development 2007 Edition, was published.

It is our hope that CASBEE will be widely used for the planning, scheduling, designing, executing, and operating fields for block/zone-scale projects and would greatly contribute to the promotion of sustainable urban development, in addition to conventional CASBEE tools targeted at a single building and CASBEE for Cities for evaluation of bigger municipalities.





## PART I. General Description of CASBEE for Urban Development

### 1. Outline of CASBEE for Urban Development

#### 1.1 What is CASBEE?

##### 1.1.1 Method to promote sustainability

In the construction field, where a large amount of resources and energy is consumed and discarded, the promotion of sustainability is an important issue. As a solution to the issue, the introduction of a market mechanism based on an evaluation system is said to be the most effective. In fact, various methods for evaluating the environmental performance of buildings such as BREEAM (Building Research Establishment Environmental Assessment Method) and LEED™ (Leadership in Energy & Environmental Design) have attracted interest around the world since the second half of the 1980s. In such a situation, the development of CASBEE started in Japan with the following basic policy:

1. A system having a structure where superior environmental design is evaluated highly and designers are motivated further
2. An evaluation system simplified as much as possible
3. A system applicable to buildings for a wide range of applications
4. A system taking into account problems unique to Japanese and Asian areas

##### 1.1.2 Life cycle of a building and four basic tools

CASBEE was developed along the process flow of building design including pre-design, design, and post-design. Accordingly, CASBEE consists of four evaluation tools corresponding to the life cycle of a building: CASBEE for Pre-Design, CASBEE for Construction (New Construction), CASBEE for Construction (Existing Building), and CASBEE for Construction (Renovation). The tools are utilized at each stage of a design process (Figure I.1.1).

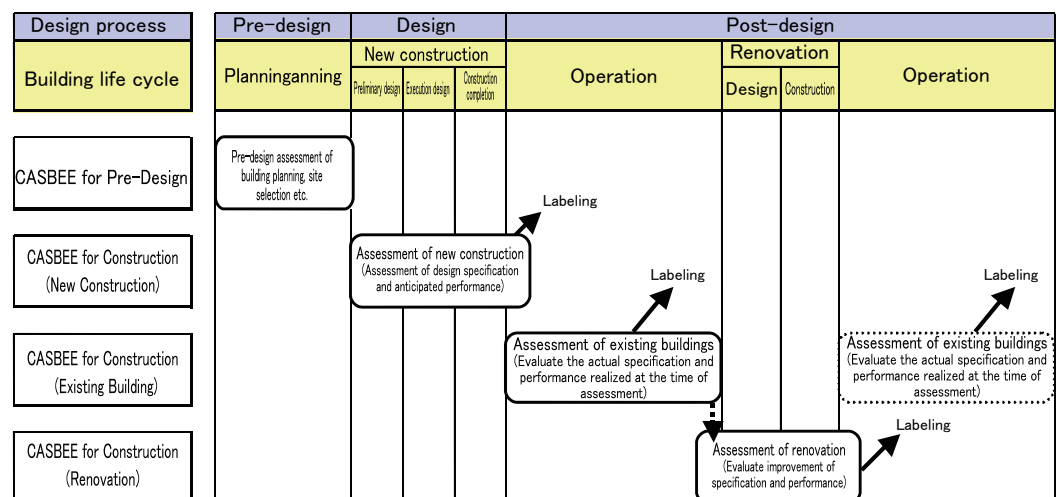
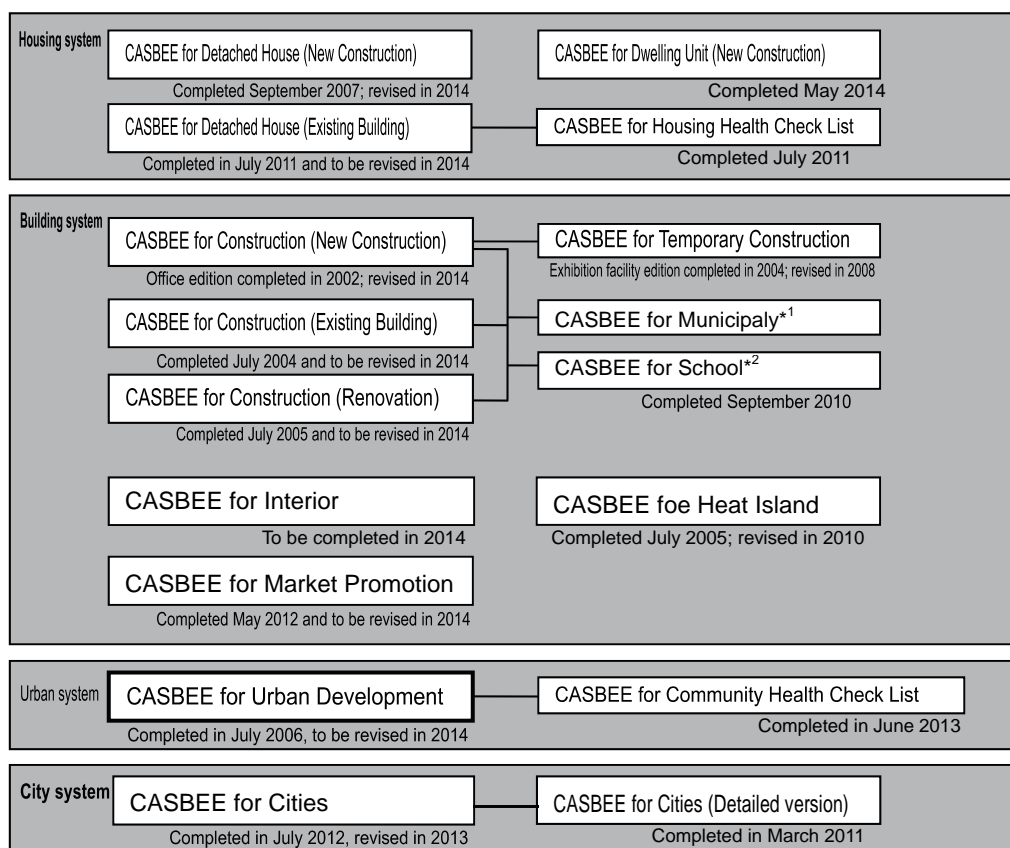


Figure I.1.1 Life cycle of a building and four basic CASBEE tools

### 1.1.3 CASBEE Family

In addition to the four basic CASBEE tools described above, tools for expansion to individual targets were developed sequentially. The general term representing basic tools and various expansion tools is "CASBEE family". Tools have their purposes and target users, respectively, and are designed so they can deal with the applications of various buildings to be evaluated such as an office, school, and housing complex. Initially, CASBEE consisted of tools only for evaluation of a single building, but today, CASBEE for Urban Development for evaluation of a group of buildings and CASBEE for Cities for evaluation of the building environment in terms of an area with the scale of a city have been developed.



\*1) Being developed in various local government in Japan including CASBEE-Nagoya (implemented in April 2004), CASBEE-Osaka (implemented in October 2004), and CASBEE-Yokohama (implemented in July 2005).

\*2) CASBEE for School is a tool designed and developed by the Ministry of Education, Culture, Sports, Science and Technology, the users of which are mainly officers in charge of facility management in elementary, junior high, and high schools.

**Figure I.1.2 Structure of CASBEE Family**

### 1.1.4 Historical view of environmental performance assessment

#### (1) First stage of environmental performance assessment

The earliest environmental performance assessment of buildings mainly evaluated the indoor environment performance with the aim of basically improving everyday amenities and convenience for building users. This is called the first stage of the environmental performance assessment of buildings. In this stage, the regional environment and global environment were thought as an open system, and environmental load on external elements was not much considered.

#### (2) Second stage of environmental performance assessment

In the 1960s, responses to atmospheric pollution and building-induced wind in urban areas such

as Tokyo were established in society in the form of evaluation of the effect on the environment. At this time, a viewpoint of environmental load was employed in environmental performance assessment. This can be considered as the second stage of environmental performance assessment. In such evaluation, only negative aspects that affected the periphery of a building (so called urban pollution) were evaluated as environmental effects (i.e., environmental load). In other words, the second stage of evaluation intended mainly to evaluate the environment as public property (or non-private property), while the first stage of evaluation intended to evaluate the environment as private property.

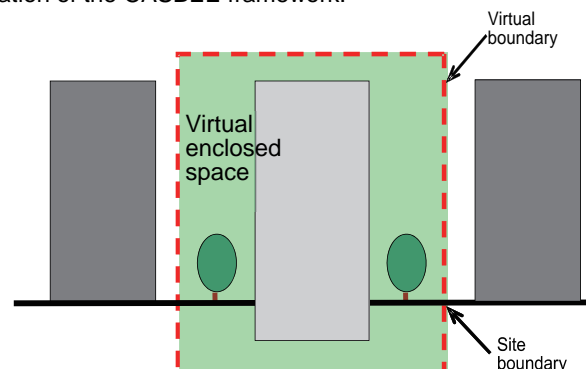
### (3) Third stage of environmental performance assessment

At the next third stage, the assessment of environmental performance of buildings, which became topical as a global environmental issue in the 1990s, was carried out by such methods as BREEAM and LEED<sup>TM</sup> for Design for Environment (DfE) and environment labeling (rating) around the world. An important point of this third stage assessment was that the negative aspect of construction, in other words the aspect of load on the environment caused by a building throughout its life cycle, i.e., LCA, was considered. On the other hand, this assessment also intended to evaluate the conventional environmental performance of buildings in the same way as the first stage. It is worth mentioning that the different characteristics between the two objects of the first and second stages were not identified clearly by any assessment tool. Therefore, assessment items having different concepts existed in parallel and even the range (boundary) of assessment objects was not clearly specified. In this respect, while the assessment methods of the third stage had a wider range of assessment objects than the first stage and second stage, the framework as a premise of assessment became unclear.

### (4) Fourth stage of environmental performance assessment: Comprehensive environmental performance assessment of buildings based on a new concept

Against this background, CASBEE was developed based on the recognition that it was necessary to reestablish a framework of environmental performance assessment as a clearer system from the viewpoint of sustainability. The development of the third stage of environmental performance assessment originally started when regional and global environmental capacities reached their limits, and therefore, presenting the concept of a closed system that allowed for determination of environmental capacity was indispensable for environmental performance assessment of buildings. For that reason, a virtual enclosed space that was sectioned by the boundary or the maximum height of the building site, as shown in the figure, was presented as a closed system for environmental assessment in CASBEE. Space on site bordered by this virtual boundary can be controlled by persons concerned with the relevant building, while space outside of the site is public (non-private) space and can seldom be controlled.

Under this concept, environmental load is a factor that is defined as a negative aspect of the environmental effect that reaches the outside (public environment) of the virtual enclosed space boundary. Improvement of environmental quality and functions inside the virtual closed space is defined as improvement of everyday amenities of the building users. The fourth stage of environmental performance assessment deals with both factors and produces a clear definition and discrimination to assess them. This enhances the clarity of the assessment philosophy. This new idea is a foundation of the CASBEE framework.



**Figure I.1.3 Virtual enclosed space divided by the site boundary**

### 1.1.5 From Eco-efficiency (environmental efficiency) to BEE (Built Environment Efficiency)

CASBEE introduced the Eco-efficiency (environmental efficiency) concept in order to perform an assessment integrating the two factors of the outside and the inside of the building site. Eco-efficiency is typically defined as value of a product or service per unit of environmental load. In many cases efficiency is defined by the relation between input and output. Therefore, the definition of Eco-efficiency can be expanded and a model "productive output divided by [input plus non-productive output]" can be proposed. As shown in Figure I.1.4, BEE (Built Environment Efficiency) is defined based on this new environmental efficiency model and used as an assessment index of CASBEE.

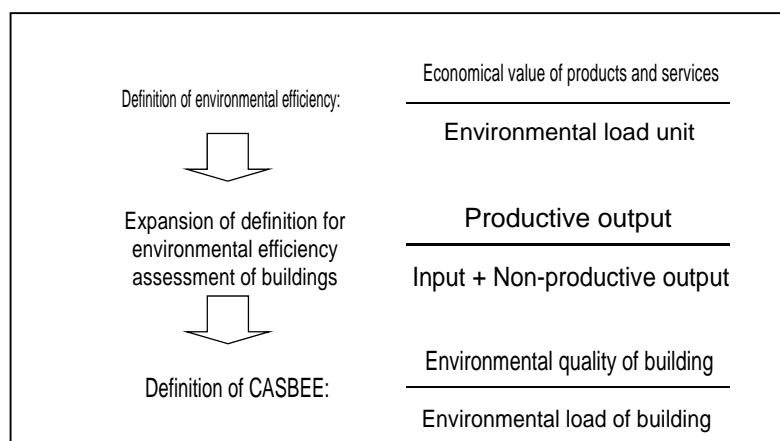


Figure I.1.4 Development from the Eco-efficiency concept to BEE

### 1.1.6 Two Categories of Assessment: Q and L

Under CASBEE there are two spaces, internal and external, divided by the virtual boundary, which is defined by the site boundary and other elements, with two factors related to the two spaces. Thus we have put forward CASBEE in which the "negative aspects of environmental impact which go beyond the virtual enclosed space to the outside (the public property)" and "improving everyday amenity for the building users" are considered side by side. Under CASBEE, these two factors are defined below as Q and L, the main assessment categories, and evaluated separately.

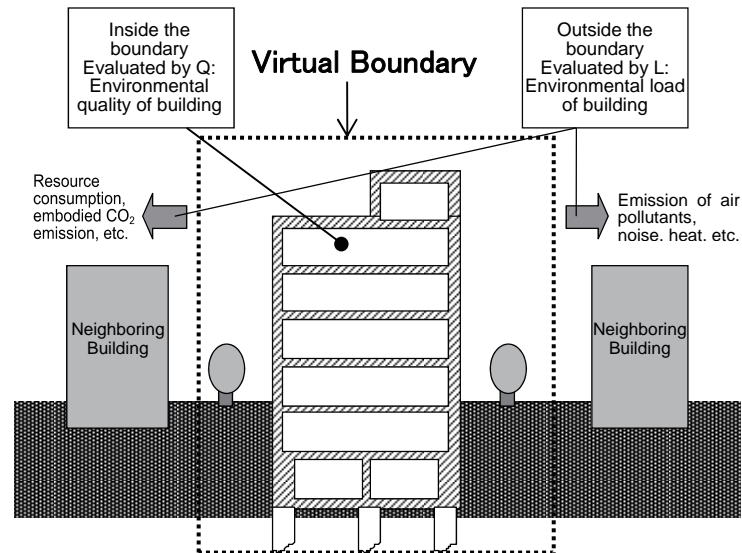
**- Q (Quality): Environmental quality of building:**

Evaluates "improvement in everyday amenities for the building users, within the virtual enclosed space boundary."

**- L (Load): Environmental load of building:**

Evaluates "negative aspects of environmental impact that go beyond the virtual enclosed space boundary to the outside (the public environment)."

Typically, Q is easier to understand when it is evaluated based on the cumulative result of efforts to improve everyday amenities inside the assessment object. Therefore, Q may be represented as a stock-like index. On the other hand, L is the load on the outside caused by construction, arrangement, and operation of the assessment object. Therefore, it has a flow-like characteristic that should be improved continually with sustained efforts.



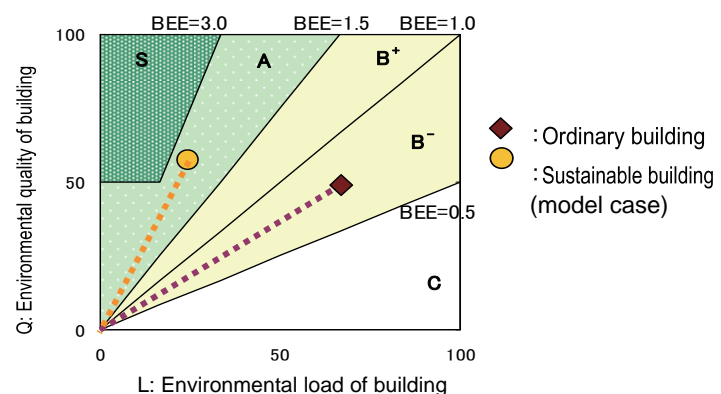
**Figure I.1.5 Division of the assessment categories for Q: Environmental quality of building and L: Environmental load of building based on the virtual boundary**

### 1.1.7 Environmental Labeling Using Built Environment Efficiency (BEE)

As explained above, BEE (Built Environment Efficiency), using Q and L as the two assessment categories, is the core concept of CASBEE. BEE, as used here, is an indicator calculated from Q (environmental quality of building) as the numerator and L (environmental load of building) as the denominator.

$$\text{Built Environment Efficiency (BEE)} = \frac{Q \text{ (Environmental quality of building)}}{L \text{ (Environmental load of building)}}$$

The use of BEE enabled simpler and clearer presentation of building environmental performance assessment results. BEE values are represented on the graph by plotting L on the X axis and Q on the Y axis. The BEE value assessment result is expressed as the gradient of the straight line passing through the origin (0,0). The higher the Q value and the lower the L value, the steeper the gradient and the more sustainable the building is. Using this approach, it becomes possible to graphically present the results of built environment assessments using areas bounded by these gradients. The figure shows how the assessment results for buildings can be ranked on a diagram as class C (poor), class B<sup>-</sup>, class B<sup>+</sup>, class A, and class S (excellent), in order of increasing BEE value.



**Figure I.1.6 Environmental labelling based on BEE**

## 1.2 Purpose of CASBEE for Urban Development development

While many of the CASBEE tools (housing system and building system) evaluate individual buildings or a part of them, CASBEE for Urban Development is a tool for assessment of comprehensive area development project including a group of buildings. CASBEE for Urban Development has the following purposes:

- Comprehensive assessment of environmental performance of a construction project planned and conducted under the unified intention of development for a relatively large group of land sections such as a whole block or a district consisting of blocks
- In particular, focused assessment of introduction and implementation of methods to lower carbon emissions in buildings and urban/local areas
- Clarification of the execution effect of not only methods of environmental consideration appropriate for individual buildings constituting the relevant project but also methods of environmental consideration that can be developed newly or further by becoming a group of buildings (including area development)
- And then, contribution to improvement of comprehensive environmental performance of urban or regional redevelopment through projects of block/district scale

This time, significant revisions have been performed focusing on enforcement of the comprehensiveness and improvement in concreteness of assessment for methods to lower carbon emissions, in addition to corrections along with the passage of time.

## 1.3 Positioning of CASBEE for Urban Development among CASBEE family

CASBEE for Urban Development takes over the philosophy of the previously developed CASBEE for Construction (formerly Building). Development of the CASBEE for Urban Development tool started from consideration for refinement of assessment items in CASBEE for Construction Q-3 (outdoor environment (on-site)) and LR-3 (off-site environment) for reference. In this revision, additionally, the structure of the assessment system has been significantly changed with the support of knowledge obtained through recent development of the CASBEE for Cities tool. In this way, although CASBEE for Urban Development is one of the expansion tools in the family, it is an independent system for assessment of environmental performance of a comprehensive group of buildings (block/district scale) unlike conventional CASBEE on the building scale and CASBEE for Cities.

For this reason, it is possible to use simultaneously (1) CASBEE for Urban Development for assessment of a whole area development and (2) CASBEE for Construction for assessment of specific environmental performance of an individual building in the target area. Of course, additionally, simultaneous use of (3) CASBEE for Cities for identification of environmental performance of the city including the block/district as a whole is possible.

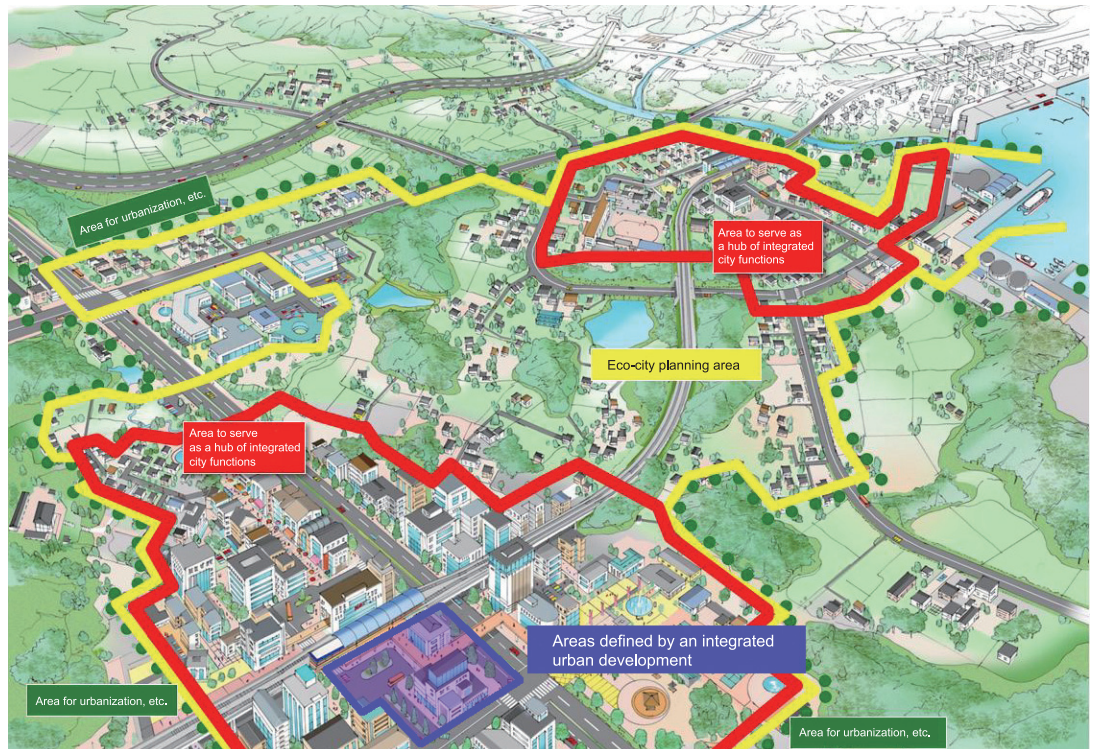
CASBEE tools for housing and building systems deal with the life cycle of buildings basically using the three attributes of new construction, existing building, and renovation. But CASBEE for Urban Development will exist as one single tool for a while and accordingly deal with the life cycle in related individual assessment items.

## 1.4 Relation with various systems related to block development (area development)

One of the main aims of CASBEE for Urban Development is to contribute to the improvement in ensuring the sustainability of urban planning of municipalities. In particular, responding to the Low Carbon City Promotion Act (Eco-City Act), CASBEE for Urban Development tools are constituted in consideration of easiness of coordination with the act and its related manuals so that CASBEE for Urban Development can be used easily for establishment of an integrated urban development project defined by the act and assessment for application certification of the project. In addition, it is expected that rules that are in line with the management of related statute systems including various district plans and comprehensive designs for a group of sites, not limited to the Eco-City Act, will be developed according to the characteristics and situation of municipalities.

Although a large-scale development project often requires environmental assessment, application of CASBEE does not premise the conducting of environmental assessment. Typically, an environmental assessment method deals with issues similar to some environment-related items of Q in assessment items of CASBEE for Urban Development as a countermeasure to environmental inhibition factors affecting the periphery of the relevant project. Therefore, results of environmental assessment can be used for practical projects of the CASBEE assessment operation, and this is not interfered with. However, it is necessary to note that CASBEE has a different philosophy and roles in comparison to an environmental assessment in that CASBEE comprehensively evaluates the environmental merit and demerit of the relevant project with a view to the importance of dealing with global environmental problems.



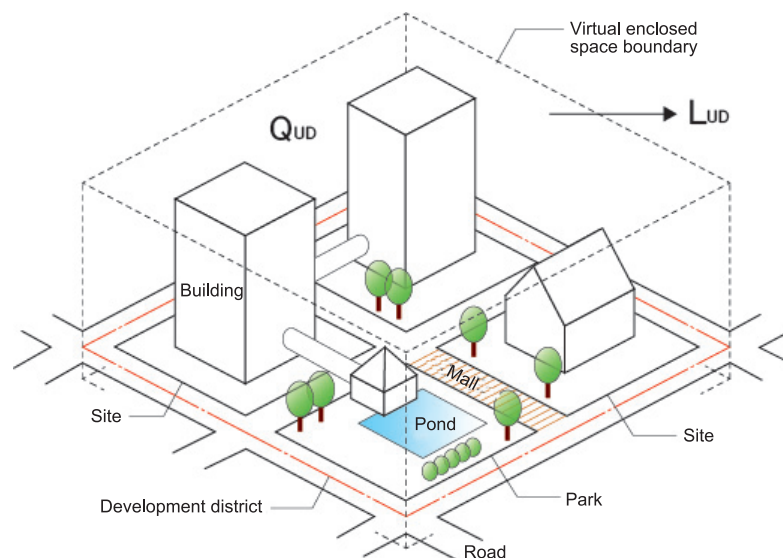


Original source: Website of MLIT (Chart added for "Integrated urban development project area")

**Figure I.1.7 Illustration of the concept of areas defined by the Eco-City Act**

### 1.5 Basic concept of virtual boundary

CASBEE for Urban Development also takes over the conventional concept of the methodology and framework of assessment in CASBEE for Construction. Therefore, a virtual boundary is set to an area development project to be evaluated, and the project is evaluated from both aspects of environmental quality inside the virtual boundary ( $Q_{UD}$ ) and environmental load outside the boundary ( $L_{UD}$ ).



**Figure I.1.8 Assessment object of CASBEE for Urban Development**

## 1.6 Concept for defining object area for evaluation

### 1.6.1 Basic principle

The representation "object area" means spread of collective space (or boundary) that is the basis of the definition of a virtual boundary. It is simply recognizable that an object area of CASBEE for Construction is equal to the building site (site boundary) of the relevant project. On the other hand, because an object area in the case of a block/district scale may include multiple building sites and sites not for buildings, the objectively recognizable principle of the object area definition that reflects most plainly the unified intention of development described in the above 1.2 is set as the following.

1. An area of a project to be evaluated in CASBEE for Urban Development shall be defined as the same area as the planning area or project area defined by various acts, systems, and methods applicable to planning and development of the relevant project in general.
2. Systems and methods applicable here include urban redevelopment projects, land readjustment projects, special urban renaissance districts, various district plans, integrated urban development projects of the Eco-City Act, comprehensive designs for a group of sites, and design system for collective buildings.
3. However, adjacent portions outside of the area described above can be incorporated into the assessment object scope or a part of the area described above can be excluded from the assessment object scope when such an exception is determined adequate in terms of comprehensive environmental performance assessment on a block/district scale. When this exception is applied, the person in charge of the assessment must clearly indicate the reason.

### 1.6.2 Background of concept

- 1) In the case of an individual building, the site boundary is equal to the virtual boundary. Therefore, the methodology of CASBEE under which an assessment object is evaluated from both aspects of the environmental quality inside the virtual boundary (Q) and the environmental load on the outside of the boundary (L) links directly to the two separated ideas. One is that the space inside of the site is the environment of a private property, which can be controlled by the involved parties of the relevant building such as the building owner and designer and the other is that the space outside of the site is the environment of public property (public environment), which cannot be controlled but should be cared for by the building owner. Therefore, the philosophy of CASBEE that evaluates the effort to enhance the value of private property including the viewpoint of the global environment while trying as much as possible to suppress any negative effects on public property (public environment) is consistent.
- 2) In the case of block/district scale, typically, a project to be evaluated contains multiple building sites and there is a public environment between the sites such as a road. For this reason, when the area definition concept on the building scale (building site = object area) is applied directly, it is hardly in accordance with the purpose that evaluates the urban environment on a group sites and the regional environment.
- 3) Instead, adoption of an area that is determined through the designated procedures based on grounds laws and ordinances of the relevant project will be clearly understandable from the viewpoint of the general public because the determination of the area is based on agreement between the administrative party concerned and the party concerned in the construction.
- 4) Therefore, item 1 of the above basic principle is set. However, this causes the public environment to be contained in the assessment object area and then clear handling, such as 1) tends to be unaccepted. (For example, typically, an urban planning is determined so that the project area of an urban redevelopment project based on the Urban Renewal Act includes not only the facility building site but also a part of the peripheral roads. However, various systems presented as examples in item 2 of the above basic principle contain mixed systems that include sites not for buildings, such as roads, as its object area and that include exclusively the building sites as its object area.)
- 5) But, if the public environment contained in the object area in this way is considered as semiprivate or semipublic space and the relevant party concerned in the project directs their efforts toward improvement of environmental quality with a sense of ownership, an



unprecedented level of effects on and contribution to the improvement of the comprehensive environmental quality and performance of the whole area, including its periphery, are promising in comparison to the previous method at an individual building level.

- 6) The disclaimer in item 3 of the basic principle allows even adjacent portions outside of the area defined by the acts or the like shown in item 1 to be incorporated in the assessment object scope if the portion is considered to be geographically and socially continued from the relevant area in terms of the plan theory or if it is appropriate that the portion be handled in an integrated manner in positioning of the upper level plan. For example, if the new urban development project area to be evaluated is close to a river and the development project and a high-standard levee development project are conducted simultaneously, the areas of the two projects would be evaluated as an integrated object area. On the other hand, if a land readjustment project area or a district planning area is so large that its nonconformity with the scope that the party concerned in the project actually becomes involved in is significant, an assessment object area may be set regardless of the area defined by the acts or the like shown in item 1 of the basic principle.

### 1.6.3 Predicted scale (area spread) of object area

As is clear from the basic principle and the concept described above, a possible object area of CASBEE for Urban Development typically includes the following:

- A single block consisting of multiple building sites and public space adjacent to the block such as a road
- Multiple collective blocks and public space existing integrally with them such as roads

The selection of assessment items constituting this tool and establishment of the assessment standards are considered based on an image of such typical space, which is an area development project having a district area of approximately several to several tens of hectares, in terms of easiness and adequateness of realistic understanding and practicality.

However, because case studies performed in this tool development process used also a project having a larger district area, application to a larger-scaled area project is possible provided that information and material for assessment are prepared.

## 1.7 Effective period of assessment

Conventional CASBEE tools have respective structures according to the life cycle of the building as a rule, and then an effective period is set for each tool because the environmental performance and assessment standards change along with the lapse of time. For example, an assessment result of CASBEE for Construction (New Construction) is effective for three years from completion. After that, assessment is performed using CASBEE for Construction (Existing Building) and the result is effective for five years from the assessment.

The effective period of CASBEE for Urban Development is set to five years from the assessment according to the tool "Existing Building" of the building scale because the project proceeds over a relatively long time period and the development is often performed in steps.

## 1.8 Utilization method

Examples of utilization methods of CASBEE for Urban Development include the following four:

- 1) Utilization as an environmental consideration planning tool in an area development project
- 2) Utilization as an environmental labeling tool
- 3) Utilization as a planning and assessment tool for energy-saving renovation on the block/district scale

These are expected to be incentives for environmental consideration in an area development project in general.

- 4) Utilization as a tool that reinforces urban planning from the point of view of sustainable urban development

- (1) The individual purpose is to lead the improvement in the comprehensive environmental performance of each of the projects that are objects of various systems such as urban redevelopment projects, special urban renaissance districts, various district plans, comprehensive designs for a group of sites, design system for collective buildings, and integrated urban development projects of the Eco-City Act.
- (2) The comprehensive purpose is to lead the planned improvement in the sustainability of the whole city based on the preceding area development project that ensures a certain level of environmental performance due to (1).

## 2. Assessment method

### 2.1 Assessment item and environmental efficiency

Similarly to many other CASBEE tools, Q (environmental quality) and L (environmental load on the outside) are evaluated and scored separately.  $Q_{UD}$  (environmental quality of urban development) consists of three major classification items ( $Q_{UD1}$  to  $Q_{UD3}$ ) corresponding to the triple bottom lines of environment, society, and economy.  $L_{UD}$  (environmental load of urban development on the outside) is represented as the effort level of reduction of carbon emissions. Assessment results of the object area are represented as the score of each field shown multilaterally on a bar chart and a radar chart. In addition, all items are consolidated as the following formula to obtain an index of environmental efficiency of urban development ( $BEE_{UD}$ ).

$$\text{Environmental efficiency of urban development (BEE}_{UD}\text{)} = \frac{\text{Environmental quality of urban development (Q}_{UD}\text{)}}{\text{Environmental load of the urban development (L}_{UD}\text{)}}$$

First, L is evaluated as LR (environmental load reduction) similarly to conventional CASBEE tools. Assessment of  $LR_{UD}$  in CASBEE for Urban Development is based on a post-execution reduction rate that compares the calculated amount of greenhouse gas (GHG) emissions caused by the relevant project with the BAU (Business As Usual) value that represents the trend value without the execution of any method.

Each of the major items  $Q_{UD1}$  to  $Q_{UD3}$  consists of three middle items, and each of the middle items consists of one or two small items. In addition, the small item contains minor items as required. Each minor item is evaluated and scored in five ranks based on the predetermined criteria.

The numerator  $Q_{UD}$  is evaluated based on the cumulative result of improvement efforts of the wide range of triple bottom lines accumulated inside and outside of the object block/district. Therefore, it is represented as a rather stock-like absolute value. On the other hand, the denominator  $L_{UD}$  is evaluated based on the level of reduction of annual  $CO_2$  emissions caused by development and operation of the object project. Therefore, it has a flow-like characteristic that should be improved continually by constant efforts. In this way, the calculation formula of  $BEE_{UD}$  has both a stock-like element and a flow-like element, but the comprehensive assessment result can be indicated simply by scoring (as 1 to 100) the numerator and the denominator.

### 2.2 Approaches to Scoring Criteria

The scoring criteria for assessment items of  $Q_{UD}$  are determined according to the following concept.

- (1) As a rule, each item is evaluated and scored in five ranks from level 1 to level 5. The standard score is level 3.

In terms of practicality of measurement, however, some items are evaluated and scored in three ranks (level 1/3/5 or level 2/3/4), four ranks, or two exceptional ranks (level 4/5).

- (2) Basically, the meaning of each level is as the following according to the characteristics of each small item.

Level 1: The item meets the minimum necessary conditions required by related laws and regulations.

Level 3: The item corresponds to a standard technological or social level at the time point of the assessment.

Level 5: The item corresponds to a highest technological or social level in general at the time point of the assessment.

Levels 2 and 4 mean an intermediate level between levels 1 and 3 and levels 3 and 5, respectively. When necessary conditions required by laws and regulations are equal to a standard technological or social level, the item is scored as level 3.

- (3) The social level is determined in consideration of the level of social contribution to the peripheral areas provided by the relevant project regardless of the existence of regulations in the related laws.

For assessment of  $L_{UD}$  and  $LR_{UD}$ , the BAU value for the amount of GHG emissions from the assessment object project and the post-execution value are calculated as described above.  $L_{UD}$  and  $LR_{UD}$  are evaluated with the score obtained by the conversion formula that is established so that the calculated post-execution value is 5% smaller than the calculated BAU value results in level 3 and the calculated post-execution value is 18% smaller than the calculated BAU value results in level 4.

## 2.3 Assessment timing

Development of a block/district is often performed over a long time period. In addition, this tool includes items that evaluate a utilization level of unused land property by comparing it with the past state or the BAU value in terms of contributing to the compacting of a city. For such assessment, the time passage shall be dealt with, in general, based on the following concept.

- 1) A staged development project is basically evaluated based on assessment of the final completed state, but it is recommended to additionally perform assessment at an intermediate stage (partial completion or partial operation start).
- 2) In any cases, the past state of an object project means the state at a point of time going back five years from the start of the development.
- 3) For assessment of L, if the estimation period of the given BAU exceeds ten years, the value of the tenth year is set through proportional distribution.

## 2.4 Estimation of population in object block

This tool uses population as an index of economic potential of a block/district in Q3. In addition, assessment of L uses the per capita index values to maintain neutrality regardless of the scale of an object block/district. The amount of GHG emission in a block/district is represented as the product of the activity amount in the relevant block/district and the basic unit per activity amount. The activity amount and the basic unit depend on the population, number of households, shipment value of manufacturing goods, gross floor area, activity time, etc., for each object field. A possible method to perform assessment as exactly as possible is to use a different index for every field and add each calculated activity amount in consideration of the weighting coefficient. However, this tool uses population as a representative value of activity amount in terms of practicality.

### 2.4.1 Staying population

If a total population obtained from the demographic statistics (nighttime population or inhabitant population) is used as an index, it is necessary to pay attention to the rise of a per capita value in a block consisting mainly of business/commercial facilities and public facilities that have a higher ratio of daytime population to nighttime population. On the other hand, activities of a block/district are the sum of the economic activities performed mainly in daytime and the everyday activities performed mainly in nighttime.

Therefore, this tool focuses on the average number of staying persons of each building application as an activity amount that briefly indicates the daytime activity and the nighttime activity, defines the total number per day for the whole of the block/district as the staying population, and uses the staying population together with the inhabitant population. The population used for "per capita" in calculation of L is the staying population.

$$\begin{aligned}
 & \text{[Staying population (persons/year)]} \\
 &= \sum (\text{for each building application}) \\
 &\quad \{ [\text{Gross floor area (m}^2\text{)}] \times [\text{Ratio of room to gross floor area (=0.7)}] \\
 &\quad \times [\text{Basic unit of average staying population for the relevant application (persons/m}^2\text{-day)}] \\
 &\quad \times [\text{Rate of number of annual working days for the relevant application}] \}
 \end{aligned}$$

Building applications used in this tool are based on the building application described in "Integrated urban development project plan certification application manual".

The average staying population for a building application used in this tool is based on the following statistics and literature.

(Residential) Number of Tatami Mats per Person in Habitable Room, Housing and Land Survey (Whole of Japan), Statistics Bureau, Ministry of Internal Affairs and Communications  
 (Non-residential) Energy Efficiency Standards of Building and Calculation Guide, Institute for Building Environment and Energy Conservation

The rate of the number of annual working days for a building application used in this tool is based on the following concept.

(Residential) Number of annual working days for gross floor area of building shall be considered as 365.

(Non-residential) Number of annual working days shall be considered as 260 (only weekdays).

There are cases where the release years of the latest edition of the above statistics and literature are not consistent. However, priority is given to the practical simplicity of work operation and the following latest values shall be used.

**Table I.2.1 Estimated value for each building application**

Building application	Average staying population basic unit (persons/m <sup>2</sup> -year)	Rate of number of annual working days
Residential	0.0472	1.0
Business	0.0770	0.71
Commercial	0.0896	0.71
Medical	0.1000	0.71

Residential: house, dormitory

Business: office, company, bank, civil service (government office), hall (educational or religious facility)

Commercial: supermarket, department store, warehouse, market, others

Medical: medical facility, welfare facility

\* Applications other than the above are out of the calculation object.

## 2.4.2 Unique calculation of population

If the actual values of the current average staying population in the relevant block/district is available or the municipalities having jurisdiction over the relevant block/district publishes its own future population target for future assessment, a unique basic unit can be used for calculation according to the calculation formula of the staying population shown in 2.4.1.

## 2.5 Structure of assessment items

### 2.5.1 Q<sub>UD</sub>: Environmental quality of urban development

Based on the triple bottom lines concept, which is one of the important frameworks for assessment and identification of sustainability, this tool adopts the three classifications of environment, society, and economy as major items of Q. Overviews of the assessment items are described below. Their structure is shown in a separate table.

#### 1) Environment

Environmental quality of the assessment object is evaluated with the three middle items of resource, nature, and artifact. The first middle item, "resource," contains an actual assessment of efforts for lowering of environmental load L rather than efforts for environmental quality Q. Despite the above, this item is positioned on the Q side because its aspect of "improvement in environmental quality" resulted from efforts, such as water source preservation and establishment of sound recycling-oriented society, being focused on. The next item, "nature," evaluates abundance of the natural environment and space in the block/district through matters related to greenery and biodiversity. The last item, "artifact," uses the environmental performance of buildings in the block as a representative index. Specifically, assessment is performed based on the application level of building/ real estate system of CASBEE tools and their assessment results.

#### 2) Society

Simultaneously, with the assessment of social performance of the object block/district, the level of contribution to the improvement in social quality of the peripheral area due to execution or existence of the relevant project is evaluated. This classification consists of three middle items. The first middle item, "impartiality/fairness," evaluates fulfillment of management that covers not only legal suitability related to development of the block/district but also harmonization with a peripheral local society. The next middle item, "security/safety," evaluates disaster and crime prevention performance of the block/district that is directly connected to a sense of safety for residents and visitors, and strength and robustness that support sustainability of the local society. The last middle item, "amenity," evaluates accessibility to various service facilities that contribute to improvement in convenience, and also evaluates utilization and creation of cultural and historical assets and consideration for formation of an improved landscape in terms of enhancing the value of the area.

**Table I.2.2 Q<sub>UD</sub> assessment items**

Major item	Middle item	Small item	Minor item
1 Environment	1.1 Resource	1.1.1 Water resource	1.1.1.1 Waterworks
			1.1.1.2 Sewerage
		1.1.2 Resources recycling	1.1.2.1 Construction
			1.1.2.2 Operation
	1.2 Nature (greenery and biodiversity)	1.2.1 Greenery	1.2.1.1 Ground greening
			1.2.1.2 Building top greening
		1.2.2 Biodiversity	1.2.2.1 Preservation
			1.2.2.2 Regeneration and creation
	1.3 Artifact (building)	1.3.1 Environmentally friendly buildings	
2 Society	2.1 Impartiality/Fairness	2.1.1 Compliance	
		2.1.2 Area management	
	2.2 Safety/Security	2.2.1 Disaster prevention	2.2.1.1 Basic disaster prevention performance
			2.2.1.2 Disaster response ability
		2.2.2 Traffic safety	
		2.2.3 Crime prevention	
	2.3 Amenity	2.3.1 Convenience/welfare	2.3.1.1 Convenience
			2.3.1.2 Health and welfare, education
		2.3.2 Culture	2.3.2.1 History and culture
			2.3.2.2 View
3 Economy	3.1 Traffic/Urban structure	3.1.1 Traffic	3.1.1.1 Development of traffic facilities
			3.1.1.2 Logistics management
		3.1.2 Urban structure	3.1.2.1 Consistency with and complementing of upper level planning
			3.1.2.2 Land use
	3.2 Growth potential	3.2.1 Population	3.2.1.1 Inhabitant population
			3.2.1.2 Staying population
	3.3 Efficiency/Rationality	3.3.1 Information system	3.2.2.1 Revitalization activity
			3.3.1.1 Information service performance
		3.3.2 Energy system	3.3.1.2 Block management
			3.3.2.1 Possibility to make demand/supply system smart

### 3) Economy

Simultaneously, with assessment of economic potential of the assessment object itself, the possibility of contributing to the improvement in economic value and functions of the peripheral area and the whole city resulting from the relevant project is evaluated. This classification consists of three middle items similar to the classifications of environment and society. The first middle item, "traffic/urban structure," evaluates fulfillment of traffic systems that support economic activities and the utilization level of location and site potential in terms of urban planning. The next middle item, "growth potential," evaluates the population as a basis for the economic capabilities of the project, and fulfillment of mechanisms aiming at revitalization of economic activities. The last middle item, "efficiency/rationality," evaluates fulfillment of services for block users and management related to information and energy.

## 2.5.2 $L_{UD}$ : Environmental load of Urban Development

### 1) Basic concept

This tool performs assessment of environmental load  $L_{UD}$  that is limited to the volume of GHG emissions. All of the GHG emissions are converted into equivalent  $CO_2$  volumes. Assessment is performed based on the annual per capita GHG emissions volume in order to maintain the neutrality of the index regardless of the scale of population in the assessment object. The population used here is the "staying population" described in 2.4.

$CO_2$  emissions volume and the reduction effect in the relevant project planning area are evaluated according to the standard method examples (1) to (7) described in the Manual for Low Carbon City Development (MLIT, MOE, and METI, December 2012) published simultaneously with enforcement of the Eco-City Act.

Standard method examples described in the Manual for Low Carbon City Development (MLIT, MOE, and METI)

- (1) Development of an area that is the base for concentration of urban functions and adjustment of positioning of urban functions
- (2) Utilization promotion of public transportation
- (3) Rationalization of freight traffic
- (4) Green conservation and promotion of greening
- (5) Utilization of public facilities for establishment of facilities that contribute to use of non-fossil energy and efficient use of fossil fuels
- (6) Promotion of  $CO_2$  reduction of buildings
- (7) Promotion of reduction of  $CO_2$  emissions caused by operation of automobiles

### 2) Structure of $L_{UD}$ assessment item

This tool basically adopts the assessment items shown in Table I.2.3 according to the Manual for Low Carbon City Development.

**Table I.2.3 Structure of  $L_{UD}$  assessment item**

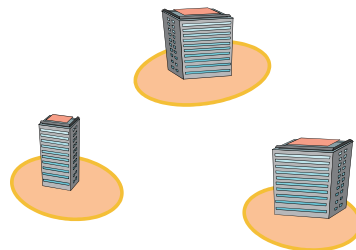
Major item	Middle item	Small item	Reference Corresponding to standard method examples (1) to (7) described in the Manual for Low Carbon City Development
$L_{UD1}$ $CO_2$ emissions from traffic sector	—	—	(1), (2), (3), (7)
$L_{UD2}$ $CO_2$ emissions from building sector	—	—	(5), (6)
$L_{UD3}$ $CO_2$ absorption in green sector	—	—	(4)

### 3) Comparative evaluation between BAU (business as usual) case and measure/method case

This tool performs assessment based on the reduction rate of the post-measure case where a measure or method for lowering of CO<sub>2</sub> was executed in the assessment object block/district against the BAU (business as usual) case where no specific measure or method was executed.

#### BAU (business as usual) case

Supposing, virtually, that urban functions are located in isolation. The buildings have a conventional level of energy saving performance.



#### Measure/method case

Concentration of urban functions, energy saving of buildings, extended use of energy, etc.

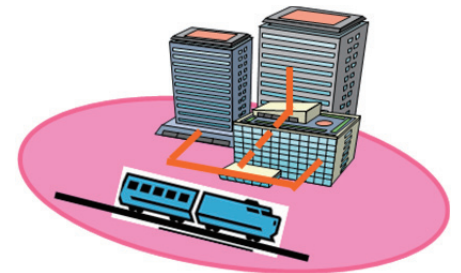

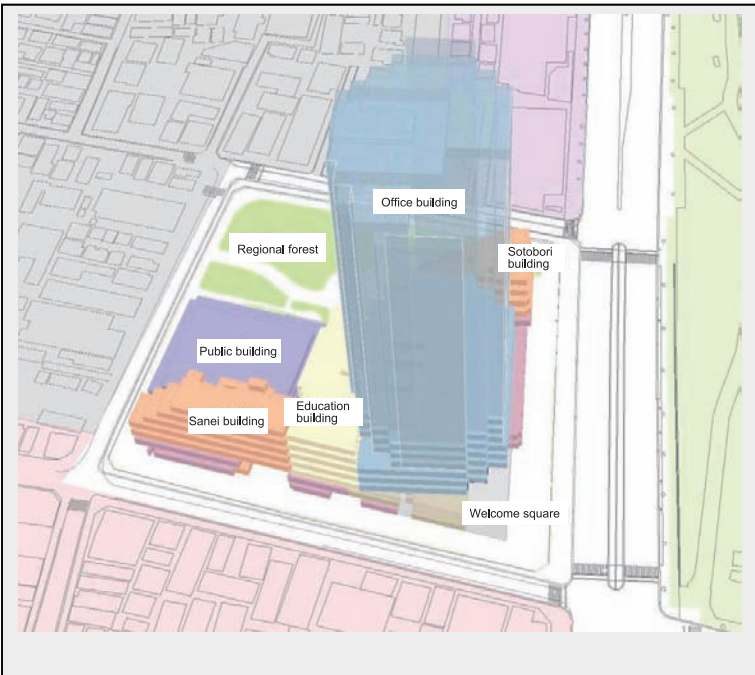


Figure I.2.1 Concept of BAU (business as usual) case and measure/method case

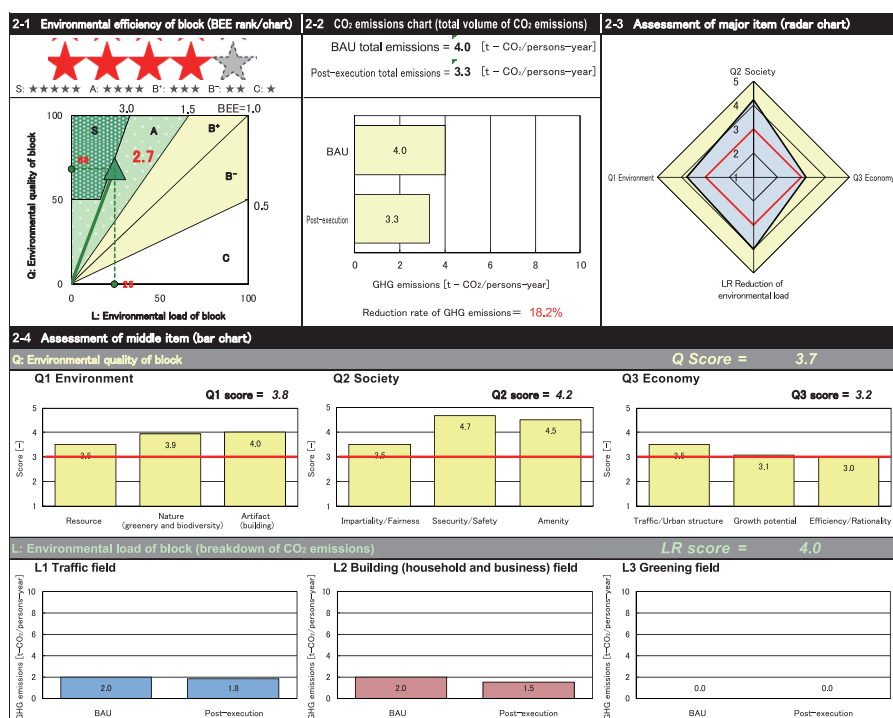
(Note) Numbers (1) to (7) in description of environmental load reduction performance ( $LR_{UD}$ ) of each case correspond to the number of standard method examples in the Manual for Low Carbon City Development on the previous page.

### 3. Case study

Many of the case studies presented here are assessment examples in which efforts for environmental consideration are made proactively. Therefore, note that the assessment results of these case studies are relatively high.

Case A	Assessment result Rank A ( $BEE_{UD} = 2.7$ )
 <p style="text-align: center;"><b>Overview of assessment object</b></p> <p>Location: Shinjuku-ku, Tokyo            Scheduled completion: FY 2019            District and zone: Commercial district, Category I residential district            Standard building coverage ratio / Floor area ratio: 70% / 670%            Applicable system or project: Urban redevelopment project</p> <p>Allowable building coverage ratio / Floor area ratio: 47% / 670%            Object zone area: 2.4 ha            Site area: 1.7 ha            Building area: 8,450 m<sup>2</sup>            Gross floor area: 138,740 m<sup>2</sup></p> <p>* The fundamental design is now in progress. The plan is subject to change.</p>	 <p>Office building            Regional forest            Sotobori building            Public building            Sanei building            Education building            Welcome square</p>

## 1. CASBEE Assessment Results





## 2. Approach to scoring Characteristics related to environmental quality and environmental load reduction

### Characteristics related to environmental quality

#### Q<sub>UD</sub>1 Environment:

##### 1.2 Nature (greenery and biodiversity)

By creating a comfortable pedestrian space that faces Sotobori-dori Street and has a width of about 16 m, an integrated green space is formed with the outer moat of the former Edo Castle. The location is surrounded by abundant natural and historical resources such as the verdant Sotobori Park and Akasaka Detached Palace. This project includes a landscape plan in consideration of connections with the periphery. In addition, the flavor of the Edo era is created by restoration of waterway, etc. (Figures 1, 2)

#### Q<sub>UD</sub>2 Society:

##### 2.2 Ssecurity/Safety

In response to the hazard map (seismic motion), a shelter is developed with the capacity to receive commuters who are unable to return home, a plan to maintain the functionality of the whole of the block (DCP) for 72 hours is established, and braille blocks are put in place.

##### 2.3 Amenity

Based on the district plan, an urban area combining attractiveness and individuality that becomes a representative landmark of the area is formed through appropriate placement of business, commercial, residential, public, and educational functions and development of squares. (Figures 3, 4)

#### Q<sub>UD</sub>3 Economy:

##### 3.1 Traffic/Urban structure

A square that complements the functions of the station square is developed and a substitute for the station front bicycle parking lot is located in the district to contribute to measures against illegal parking of bicycles in the area.

##### 3.3 Heat efficiency/Rationality

A plan is established that ensures future updatability and expandability with adoption of utility corridors and the SI method.

### Characteristics related to environmental load reduction

#### LR<sub>UD</sub>1 CO<sub>2</sub> emissions from traffic sector:

(1) Development of an area that is the base for concentration of urban functions and adjustment of positioning of urban functions

For the relevant district, a policy to form an attractive and individual complex urban area through the appropriate placement of residential, public, and educational functions, as well as business and commercial functions, is indicated in the district planning. Through the class I urban redevelopment project, land use conversion and integratedly advanced use of underutilized or unutilized land are sought after.

(2) Promotion of utilization of public transportation

This block is near a station. The CO<sub>2</sub> emissions from the traffic sector are trial-calculated based on the distance to the nearest railway station, which is about 75 m.

#### LR<sub>UD</sub>2 CO<sub>2</sub> emissions from building sector:

(6) Promotion of CO<sub>2</sub> reduction of buildings

The CO<sub>2</sub> emissions reduction rate is set to 24.8%.

#### LR<sub>UD</sub>3 CO<sub>2</sub> emissions of green sector:

(4) Green conservation and promotion of greening

For the creation of a comfortable green urban environmental space harmonizing with the Sotobori Green Zone, the greening of squares and buildings is performed proactively to achieve an in-block green zone of about 0.3 ha. (Figures 1, 2)

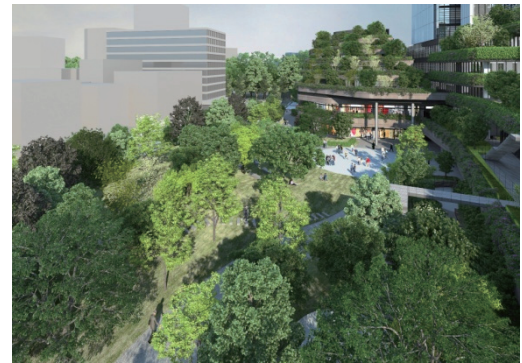


Figure 1 Creation of three-dimensional green

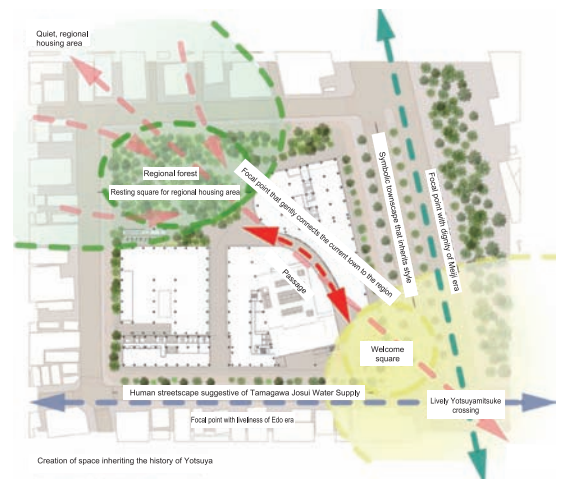


Figure 2 Creation of space inheriting history of the area



Figure 3 Welcome square



Figure 4 View from the street

## Case B

Assessment result Rank A ( $BEE_{UD} = 2.8$ )

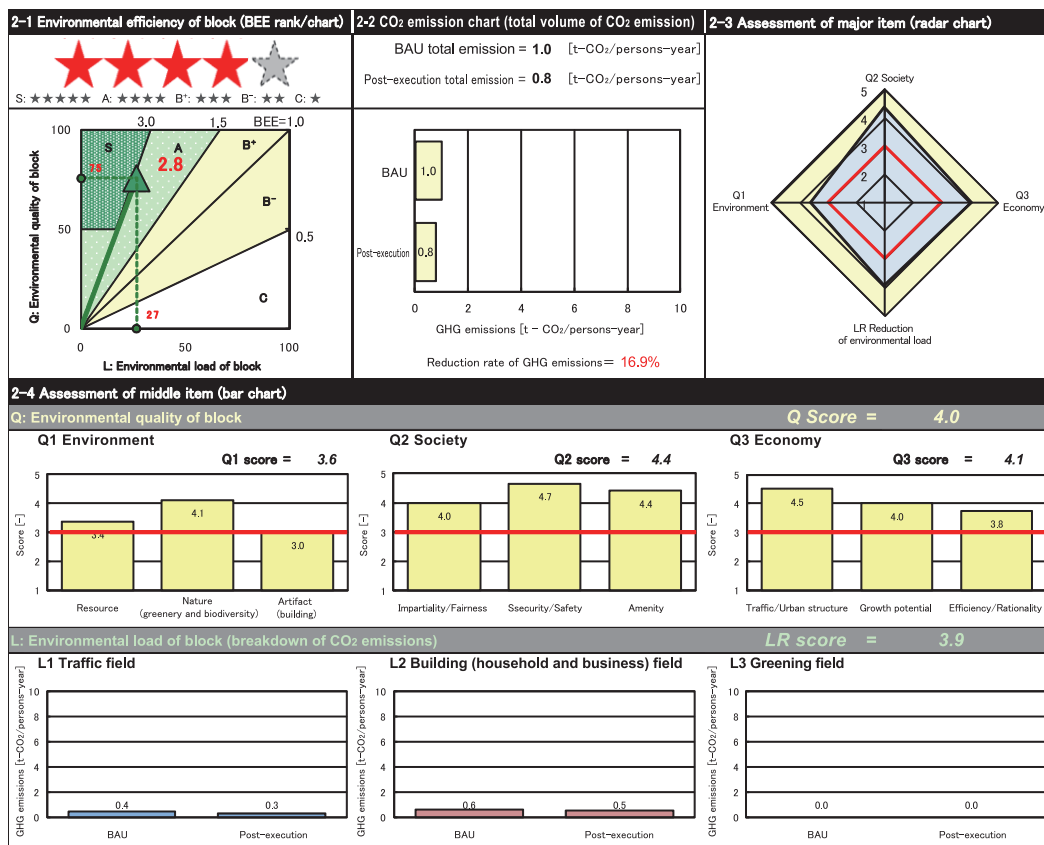
## Overview of assessment object

Location: Koto-ku, Tokyo  
 Scheduled completion:  
 (B2 Block) October 2016  
 (B3 Block) February 2014  
 District and zone: Industrial district, Fire prevention district  
 Standard building coverage ratio / Floor area ratio: 60% / 200%  
 Applicable system or project: Land readjustment project  
 District plan defining redevelopment promotion areas

Allowable building coverage ratio / Floor area ratio: 60% / 400%, 450%  
 Object zone area: approximately 3.2 ha  
 Site area: approximately 3.2 ha  
 Building area: approximately 9,000 m<sup>2</sup>  
 Gross floor area: approximately 207,000 m<sup>2</sup>



## 1. CASBEE Assessment Results





## 2. Approach of scoring Characteristics related to environmental quality and environmental load reduction

### Characteristics related to environmental quality

#### Q<sub>UD</sub>1 Environment:

##### 1.1 Resource

In this project, a rain water storage tank with a capacity of about 400 m<sup>3</sup> is installed for conservation of water resources. The scheduled rain water usage rate is 80% or higher. In addition, authenticated wood will be used in terms of resource circulation.

##### 1.2 Nature

In this project, 46% of the ground in the block is scheduled to be greened in terms of suppression of the heat island phenomenon and conservation of biodiversity. Greening to help restore the regional ecosystem including development of a biotope, rooftop greening, and wall greening is conducted based on field surveys of biology and the ecosystem in consideration of the establishment of a habitat space for various species and formation of a network with a peripheral nature space. (Figure 1)

##### 1.3 Artifact

In this project, CASBEE tools is utilized proactively in terms of improvement in environmental performance of buildings, and self-assessment is performed using the CASBEE for Construction (New Construction).

#### Q<sub>UD</sub> 2 Society:

##### 2.1 Impartiality/Fairness

The area where this project is located hosts a town development liaison conference. Therefore, a collaboration system with peripheral area community organizations is established in terms of area management.

##### 2.2 Ssecurity/Safety

In this project, disaster prevention focusing on a variety of infrastructure is worked on in reference to various disaster hazard maps.

A footpath-like space and pedestrian decks are developed and a plan for the safe and easy mobility of people, including mobility-impaired persons such as wheelchair users, is established in consideration of ensuring the safety of pedestrians and universal design.

As security measures in the block, night lighting of the facilities along a street is introduced, and apartment building security systems consisting of security systems and surveillance cameras in common areas, exterior structures, and elevators with 24-hour monitoring are employed.

##### 2.3 Amenity

A school is scheduled to be established in a block adjacent to the object block of this project. In addition, there is a library located less than 30 minutes northeast on foot. In this way, the relevant block has high convenience regarding educational and cultural facilities.

From the viewpoint of inheriting history and culture, the history of the object block is shown on a website the residents can browse. In addition, events where the participants can experience traditional crafts are held in the culture room of the common building.

In this project, specific rules are defined by a district plan, a district design guideline, etc., in order to consider the formation of the townscape and view in the block and pay attention to harmonizing with the periphery.

#### Q<sub>UD</sub> 3 Economy:

##### 3.1 Traffic/Urban structure

In this project, EV car sharing (Figure 2), EV charge compatible parking pallets, and rental electric bicycles are introduced in accord with TDM Tokyo plan (Tokyo, February 2011), and traffic facilities in the block take into account the arrangement, form, comfort, etc.

Regarding consistency with and utilization level of the urban infrastructure, a certified children center is scheduled to be established in the object block and public open space is scheduled to be developed in each block. In addition, based on a pedestrian network concept of the whole area, a pedestrian deck that connects the block to another block and the nearest station is developed for improving convenience.

##### 3.2 Growth potential

In this project, the high-level use of land is aimed at through the establishment of a housing complex at the site of a former factory in accord with the Toyosu and Harumi redevelopment improvement plan. Contributing to the growth potential of the area through an increase in the population is planned.

##### 3.3 Efficiency/Rationality

In this project, improvement in flexibility and usability of the block information environment through preparing the Internet usage environment is planned.

### Characteristics related to environmental load reduction

#### LR<sub>UD</sub>1 CO<sub>2</sub> emission from traffic sector:

The object block exists in the metropolitan district (23 wards of Tokyo) and the application of the buildings is for a housing complex. The distance to the nearest station is about 300 m.

#### LR<sub>UD</sub>2 CO<sub>2</sub> emission from building sector:

All houses are originally equipped with an all-electric system and the EcoCute system. Also, an energy visualization system and 10 kW solar power generation panels (Figure 3) are installed.

#### LR<sub>UD</sub>3 CO<sub>2</sub> emission of green sector:

For the development of green zones that absorb GHG, 46% of the ground in the block is greened.

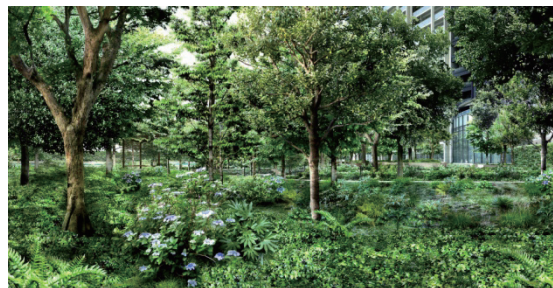


Figure 1 Landscape in consideration of continuous green zone



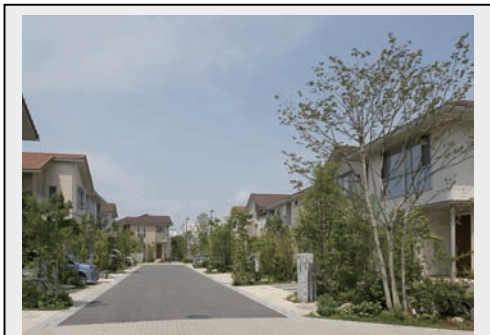
Figure 2 EV car sharing system



Figure 3 Solar power generation panel

## Case C

**Assessment result Rank S ( $BEE_{UD} = 4.5$ )**

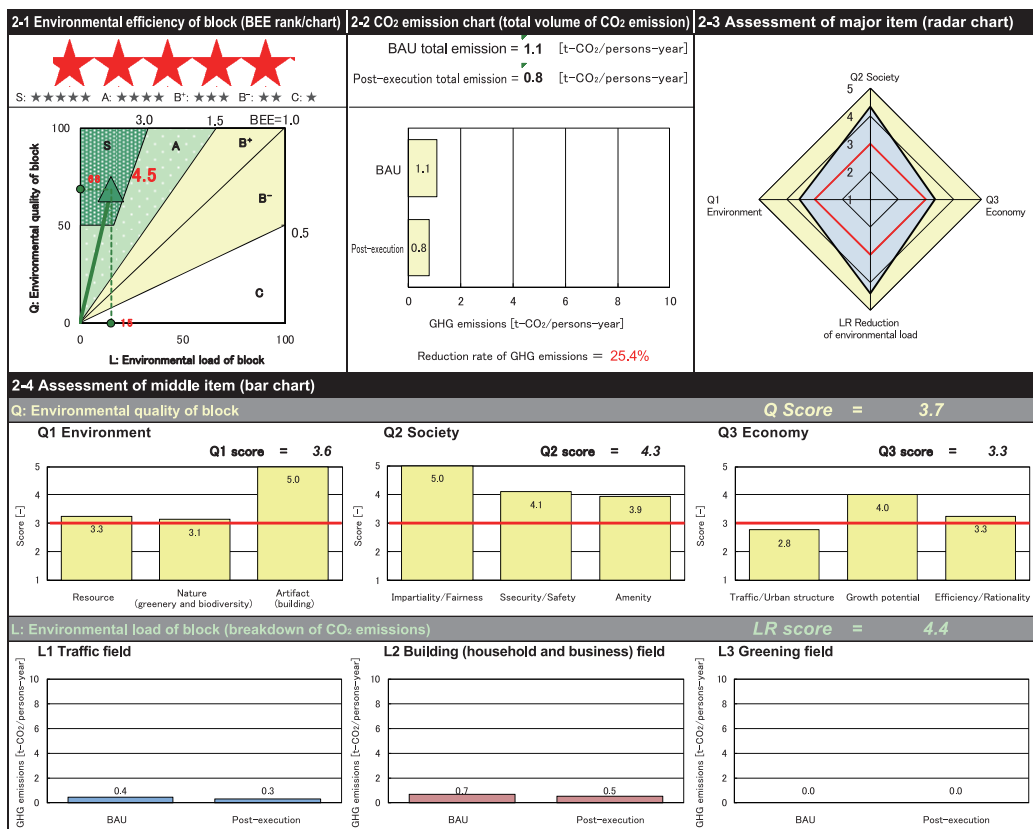


## Overview of assessment object

Location:Koshigaya City, Saitama Prefecture	Allowable building coverage ratio / Floor area
Completion:March 2011	ratio:43.77% / 112.79%
District and zone:	Object zone area:6.56 ha
Category I exclusive residential district	Site area:4.44 ha
Category I residential district	Building area:21,836.41 m <sup>2</sup>
Detention pond	Gross floor area:7,215.22 m <sup>2</sup>
Commercial and fire prevention district:0%	
Standard building coverage ratio / Floor area	
ratio:43.77% / 112.79%	
Applicable system or project: Specified land	
readjustment project	



## 1. CASBEE Assessment Results



## 2. Approach of scoring Characteristics related to environmental quality and environmental load reduction

### Characteristics related to environmental quality

#### Q<sub>UD</sub>1 Environment:

##### 1.1 Resource

All detached houses and common areas in the housing complex have rain water tanks and the collected rain water is used for watering garden trees. In addition, footpaths, parks, and housing sites in the detached house area uses water retentive paving as a countermeasure against the heat island phenomenon. (Figure 1)

##### 1.2 Nature (greenery and biodiversity)

Based on the results of a meteorological investigation of the area and natural environment research of the periphery, greening is performed mainly with native species that originally lived in this area. In addition, in order to encourage wild birds living in the area to the block, trees from which they can feed are planted and retaining walls made of cobble stones, with numerous gaps between the stones, are built in consideration of biodiversity. (Figures 2, 3)

#### Q<sub>UD</sub> 2 Society:

##### 2.1 Impartiality/Fairness

In the detached housing block, a management association in addition to the neighborhood association is established for maintenance of trees and plants in public parks and designated trees in a housing site constituting a landscape point using an adoption system. Initially, the developer held events in order to introduce the management associations of the detached houses and the housing complex to each other and create opportunities to develop the community.

##### 2.3 Amenity

A high hedge, which is a regional and historical windbreak in winter and represents scenery from the old town, is planted along the peripheral road at the northwest of the block to prevent winter winds from the northwest entering the block. In addition, cobble stones, which are unique to a riverside district, are used as exterior material for harmonization with peripheral areas. Furthermore, a unified earth color is used for roofs and walls in consideration of the view from a train running on the elevated railway to the south of the block. An exterior structural guideline is established for detached houses in order to form a townscape through unifying exterior structure design. (Figure 4)

#### Q<sub>UD</sub> 3 Economy:

##### 3.3 Heat efficiency/Rationality

A utility corridor for electric cables, which was not widely introduced in detached house blocks, is established in order to develop a supply facility in preparation for future increase in demand.

### Characteristics related to environmental load reduction

#### LR<sub>UD</sub>1 CO<sub>2</sub> emission from traffic sector:

##### (2) Utilization promotion of public transportation

The terrain of the area including the periphery of the block is flat and suitable for bicycles. The block has a bicycle parking space 200% the area required or larger in order to promote the use of bicycles.

#### LR<sub>UD</sub>2 CO<sub>2</sub> emission from building sector:

##### (6) Promotion of CO<sub>2</sub> reduction of buildings

CO<sub>2</sub> emissions from the whole block are reduced by 429 tons annually through the introduction of residential building central solar energy systems in the housing complex block, and construction of high heat insulation houses as well as installation of high-efficiency water heaters in the detached house block.

#### LR<sub>UD</sub>3 CO<sub>2</sub> emission of green sector:

##### (4) Green conservation and promotion of greening

The green townscape is created by greening 25% or more of the block with native species.

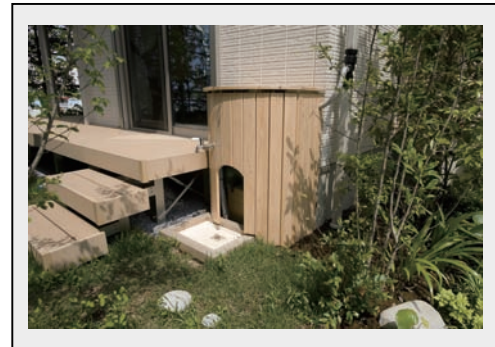


Figure 1 Rain water tank placed in a garden



Figure 2 Bird bath for wild birds



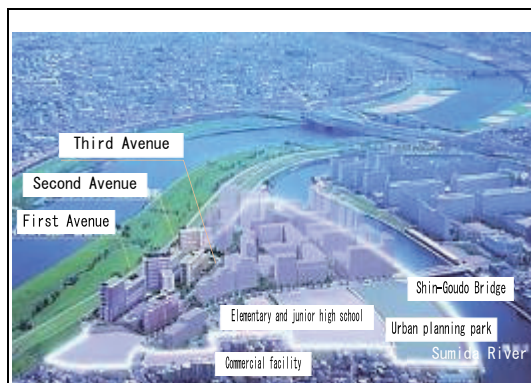
Figure 3 Cage filled with cobble stones with spaces in between



Figure 4 High hedge running along the northwest of the block



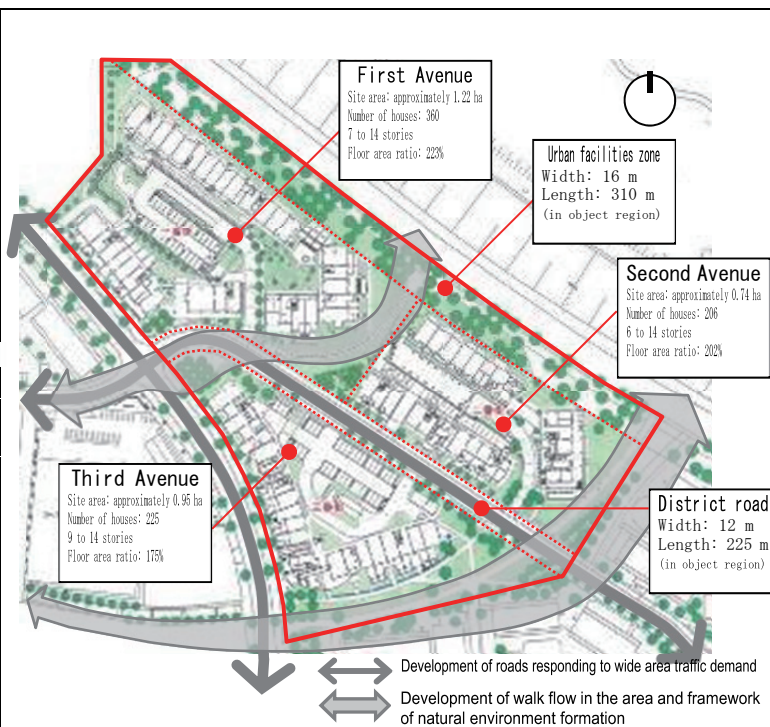
## Case D

Assessment result Rank A ( $BEE_{UD} = 1.5$ )

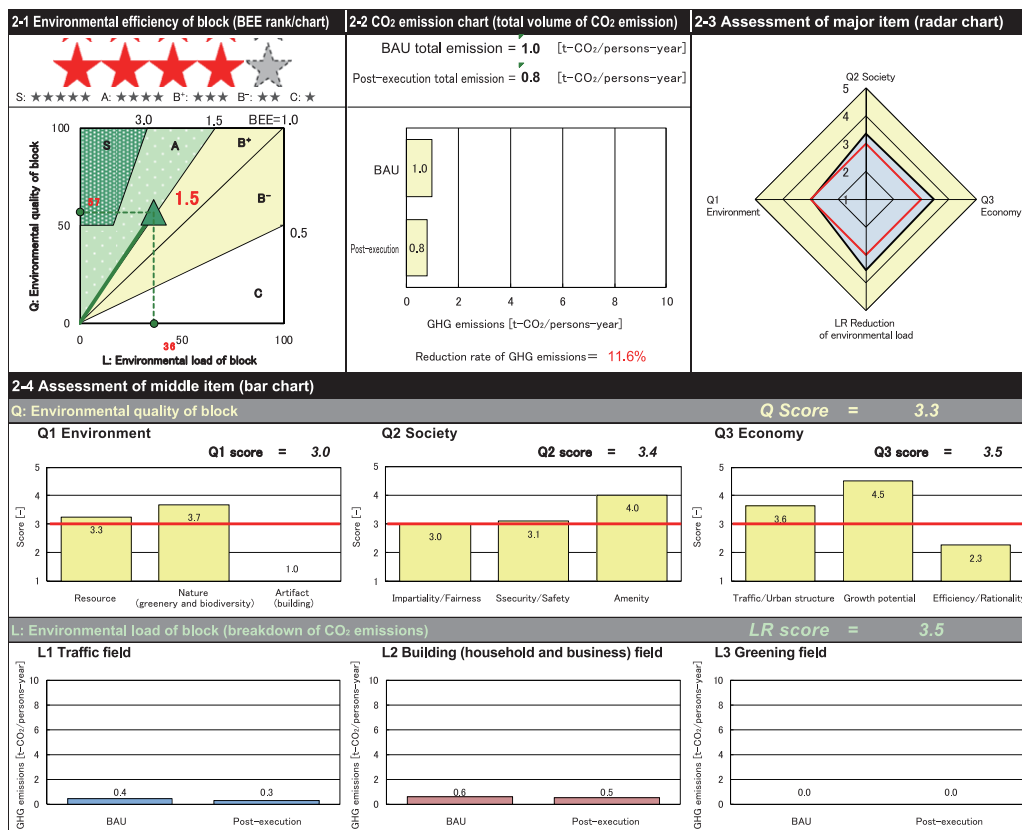
## Overview of assessment object

Location: Adachi-ku, Tokyo  
 Completion: March 2004 to December 2006  
 District and zone: Category I residential district  
 Standard building coverage ratio / Floor area ratio: 60% / 300%  
 Applicable system or project:  
 High-standard levee development project  
 Urban residential area development comprehensive support project

Allowable building coverage ratio / Floor area ratio: 60% / 300%  
 Object zone area: 3.67 ha  
 Site area: 29,091 m<sup>2</sup>  
 Building area: 12,315 m<sup>2</sup>  
 Gross floor area: 74,577 m<sup>2</sup>



## 1. CASBEE Assessment Results



## 2. Approach of scoring Characteristics related to environmental quality and environmental load reduction

### Characteristics related to environmental quality

#### Q<sub>UD</sub>1 Environment:

##### 1.1 Resource

The area ratio of the green zone and water retentive/permeable pavement to the area of all the open space in the object district is 69%.

##### 1.2 Nature (greenery and biodiversity)

All residential buildings and parking lots have rooftop greening. The greened area ratio is 67.1%.

#### Q<sub>UD</sub> 2 Society:

##### 2.2 Ssecurity/Safety

According to upper level plans, such as the comprehensive urban residential development project plan, traffic flow to the levee, which is a safety evacuation area, is ensured to contribute to improving the area's fire prevention performance by arranging district roads and promoting fireproofing of buildings in the project area in cooperation with the high-standard levee development project.

##### 2.3 Amenity

A design council to which experts were invited as design coordinators was launched while focusing on the major issue of creating Tokyo waterfront view and environment in order to formulate a design guideline for the whole district. Creation of scenery is performed based on the design guideline.

#### Q<sub>UD</sub> 3 Economy:

##### 3.3 Efficiency/Rationality

Regarding residential facilities supplied to the project area, housing construction responding to various needs is performed based on technologies such as skeleton infill. In addition, the creation of a bustling urban area is planned, e.g., a meeting place and roadside housing.

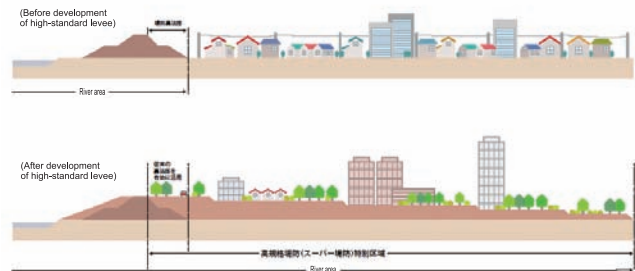


Figure 1 New terrain created by high-standard levee development project

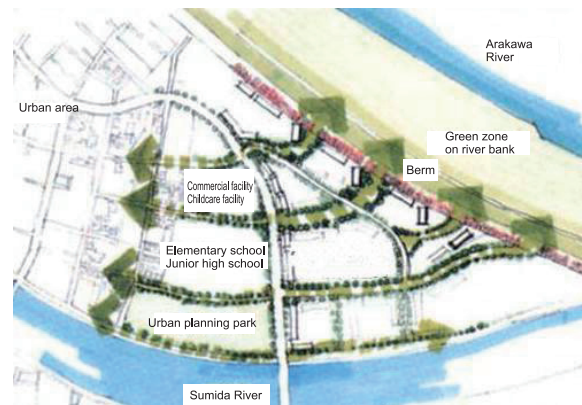


Figure 2 Conceptual diagram of "connecting the town and the river"

### Characteristics related to environmental load reduction

#### LR<sub>UD</sub>1 CO<sub>2</sub> emission from traffic sector:

##### (2) Utilization promotion of public transportation

Traffic volume is curbed in cooperation with public transportation through the introduction of a new bus line as a countermeasure against new occurrence of traffic. The CO<sub>2</sub> emissions from the traffic sector are trial-calculated based on the distance to the nearest railway station of about 1.5 km.

#### LR<sub>UD</sub>2 CO<sub>2</sub> emission from building sector:

##### (6) Promotion of CO<sub>2</sub> reduction of buildings

All the houses are subject to class 4 energy conservation measures for improvement of the building envelope function and employ a heat recovery-type water heater. The estimation is performed in consideration of the adopted energy conservation measures.

#### LR<sub>UD</sub>3 CO<sub>2</sub> emission of green sector:

##### (4) Green conservation and promotion of greening

The external structure intended for the green environment network from the bank of the Arakawa River through the object area to the existing urban area is created based on the results of biological research performed over a wide area including the object area. The green zone area in the block is about 0.8 ha.



Figure 3 View from Arakawa River with a feeling of rhythm and depth

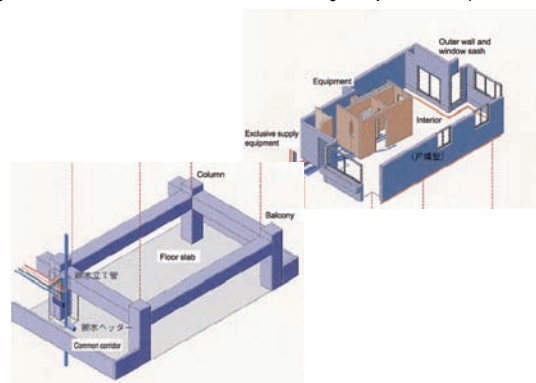


Figure 4 Residential building using SI technology to improve social durability

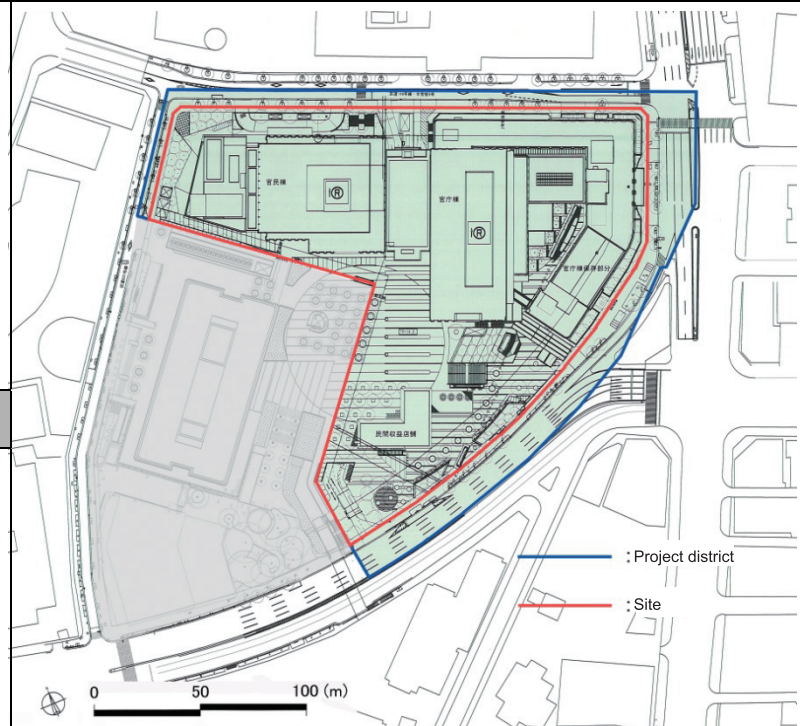
## Case E

Assessment result Rank S ( $BEE_{UD} = 3.5$ )

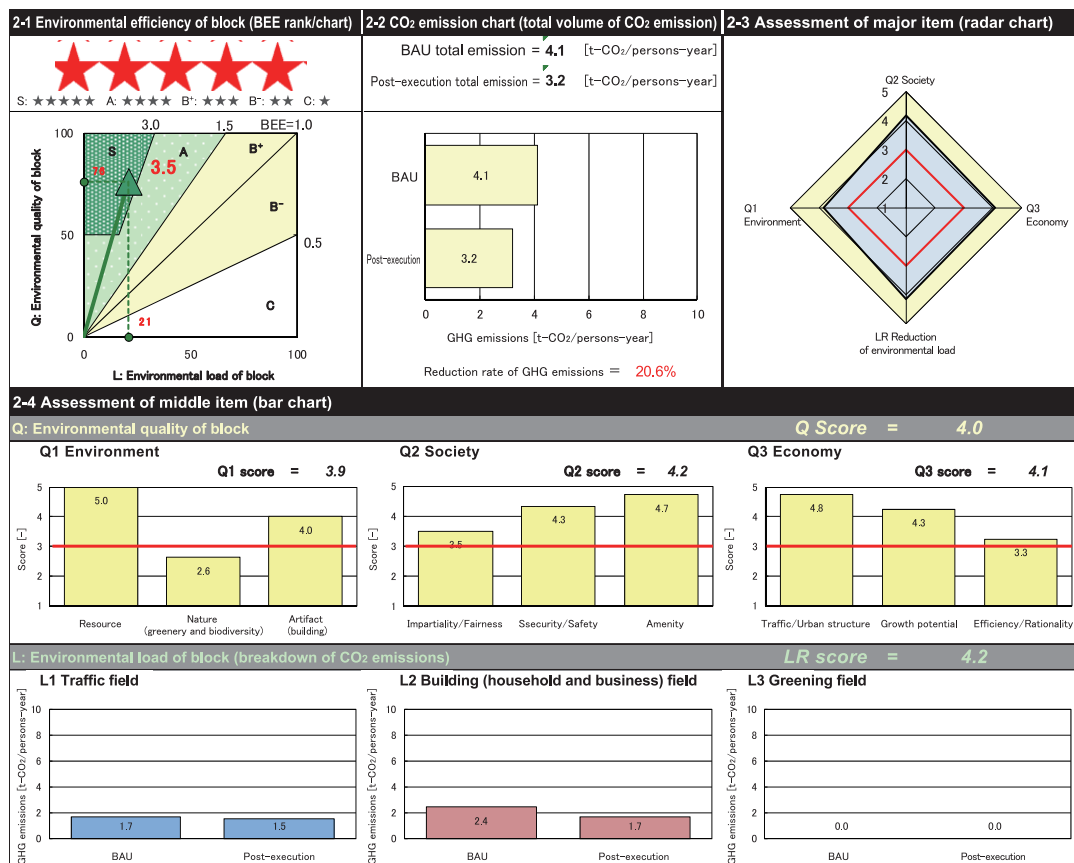
Overview of assessment object

Location: Chiyoda-ku, Tokyo  
 Completion: September 2007  
 District and zone: Commercial and fire prevention district:  
 100%/700%  
 Standard building coverage ratio / Floor area ratio: 71.38%  
 / 509.2%  
 Applicable system or project:  
 District plan (redevelopment promotion district)  
 Review of government and public office facilities on a group of sites  
 Abolition of specified blocks  
 Class I urban redevelopment project

Allowable building coverage ratio / Floor area ratio: 70% / 950%  
 Object zone area: 3,062 ha  
 Site area: 2,4232 ha  
 Building area: 13,556 m<sup>2</sup>  
 Gross floor area: 251,033 m<sup>2</sup>



## 1. CASBEE Assessment Results





## 2. Approach of scoring Characteristics related to environmental quality and environmental load reduction

### Characteristics related to environmental quality

#### Q<sub>UD</sub>1 Environment:

##### 1.2 Nature (greenery and biodiversity)

Greening is planned in consideration of harmonization with the peripheral environment and sense of unity with green zones around the adjacent skyscraper. As a result, 10.55% of the exterior structure is covered with water or greenery. In addition, rooftop greening is actively promoted using the latest technology.

#### Q<sub>UD</sub> 2 Society:

##### 2.1 Impartiality/Fairness

An urban development council consisting of the block's land owners was established at the planning stage in order to set up a plan with the proactive participation of the inhabitants.

##### 2.2 Ssecurity/Safety

Fuel for emergency power generators is stored so that electric power can be supplied to the necessary equipment even if there is a breakdown of the infrastructure network, and the functions of the disaster prevention center are secured. In case the public sewerage system breaks down, sewage water and gray water can be treated by the closed circuit in the building to provide general service water required for disaster prevention activities, and so it will not be necessary to discharge the waste.

##### 2.3 Amenity

Some parts of the old government office building, built in the early Showa period, are reproduced, preserved, and utilized. After discussion with the parties concerned and experts, the structural remains of a stone wall of the Edo Castle are integrated into the new facility using an appropriate preservation method and are open to the public. The remains are exhibited with a description. (Figure 1)

#### Q<sub>UD</sub> 3 Economy:

##### 3.1 Traffic/Urban structure

A new two-way central through pathway is developed in the center of the block based on the results of traffic volume research for the periphery of the planning site. Its operation can be changed according to the peak characteristics of peripheral intersections. This central through pathway plays the role of a network line connecting the facilities and has service areas in several places in order to maintain service vehicles, etc., within the block itself. (Figures 2, 3)



Figure 1 Exhibition of the historical remains and stone wall of Edo Castle outer moat

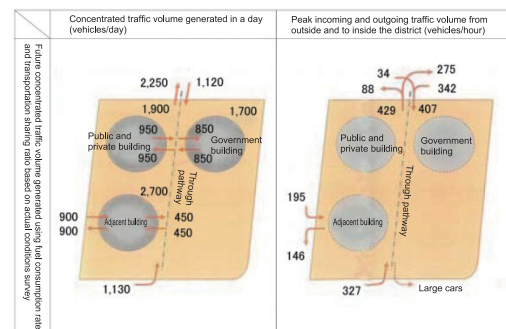


Figure 2 Through pathway and consideration of its effect on peripheral roads

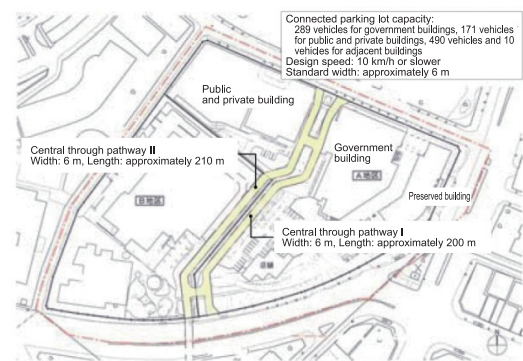


Figure 3 Underground central through pathway

### Characteristics related to environmental load reduction

#### LR<sub>UD</sub>1 CO<sub>2</sub> emission from traffic sector:

##### (2) Utilization promotion of public transportation

Reduction of the volume of automobiles around the block is planned through construction of a new walkway directly connecting the subway station and ensuring the flow of pedestrians through the central square.

#### LR<sub>UD</sub>2 CO<sub>2</sub> emission from building sector:

##### (6) Promotion of CO<sub>2</sub> reduction of buildings

Fuel cells, which generate electric power and heat using the electrochemical reaction of hydrogen in town gas and oxygen in the atmosphere, are introduced. The fuel cells have high power generation efficiency and contribute to improving energy saving performance (Figure 4). In addition, co-generation systems (CGS) using town gas are introduced. The CGS has high energy saving performance mainly using electricity and steam/high temperature water generated from waste heat as the cooling heat source. This plan aims at the efficient use of electric power and heat in a group of buildings.

#### LR<sub>UD</sub>3 CO<sub>2</sub> emission of green sector:

##### (4) Green conservation and promotion of greening

Approximately 0.3 ha, 10% or more of the block, is greened.

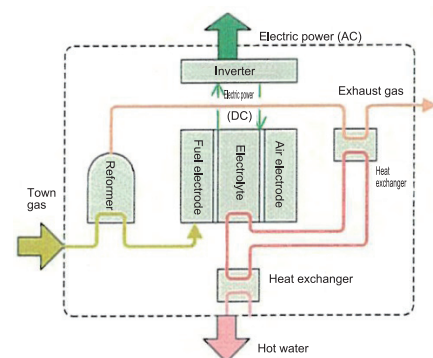


Figure 4 Schematic diagram of fuel cell

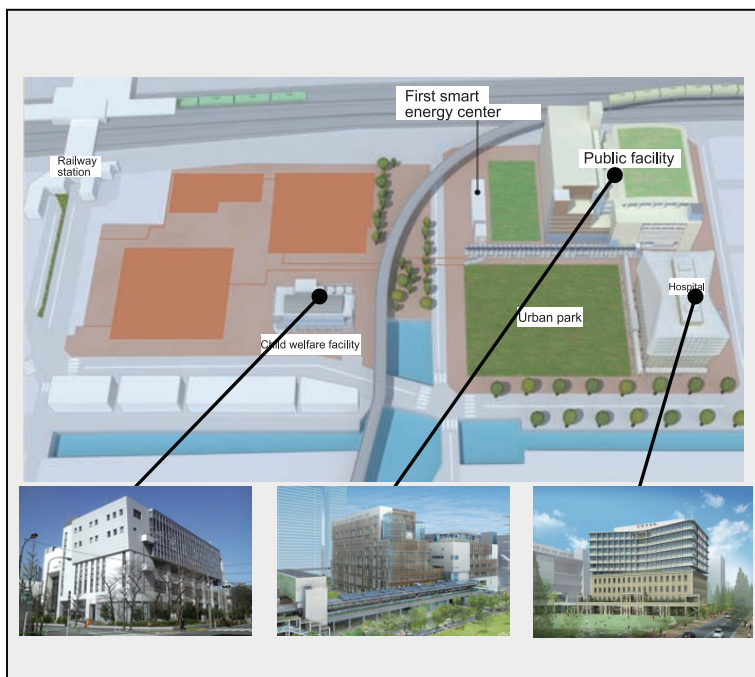
## Case F

Assessment result Rank S ( $BEE_{UD} = 3.6$ )

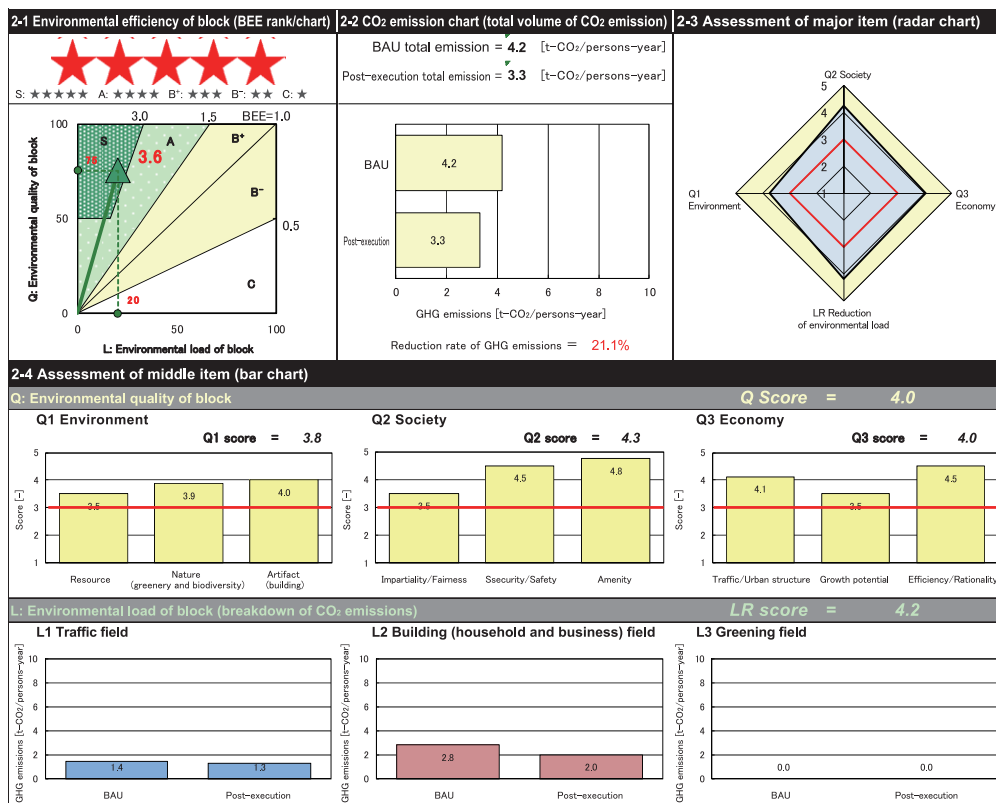
## Overview of assessment object

Location: Tokyo  
 Completion: October 2014  
 District and zone:  
 Quasi-industrial and fire prevention district  
 Standard building coverage ratio / Floor area ratio: 60% / 400%  
 Object zone area:  
 Approximately 3 ha

<Public facility>  
 Building area: 9,221.60 m<sup>2</sup>  
 Gross floor area: 50,724.90 m<sup>2</sup>  
 <Hospital>  
 Building area: 2,933.13 m<sup>2</sup>  
 Gross floor area: 17,586.05 m<sup>2</sup>  
 <Child welfare facility>  
 Building area: 1,600.35 m<sup>2</sup>  
 Gross floor area: 6,537.53 m<sup>2</sup>



## 1. CASBEE Assessment Results



## 2. Approach of scoring Characteristics related to environmental quality and environmental load reduction

### Characteristics related to environmental quality

#### Q<sub>UD</sub>1 Environment:

##### Q1.1.2 Resources recycling

Domestically produced wood is frequently used for interior and exterior material based on a system that the municipality authenticates the fixed amount of CO<sub>2</sub> corresponding to the amount of such wood used for interiors, exteriors, etc.

##### Q1.2.1 Greenery

With greening of parks, rooftops, and walls, a greening ratio of 40% is ensured to create green spaces presenting an attractive urban complex that exists in harmony with the environment.

#### Q<sub>UD</sub> 2 Society:

##### Q2.1.2 Area management

A Smart Energy Committee consisting of groups related to the local municipality government, the developer, the energy supply company, and the energy service provider is established as an operating system for low carbon urban development in order to establish energy system plans for the area, execute PDCA in its operations, and proactively disseminate information.

##### Q2.2.1.2 Disaster response ability

The first smart energy center that introduces medium pressure gas is established in the public facility. The functions of a disaster prevention center are secured due to the smart energy center that uses gas engine cogeneration to continuously supply CGS electricity not only during normal times but also during times of emergency. In addition, cold energy and heat energy can be stably supplied (100%) to the hospital for 72 hours or longer.

#### Q<sub>UD</sub> 3 Economy:

##### Q3.3.2.1 Smartness of energy demand/supply system

The smart energy center is linked to buildings in the block by the heat, electricity, and information network. The energy supply and demand in the whole area is controlled optimally and visualized.

##### Q3.3.2.2 Capability of renovation and expansion of energy system

A highly expandable system that can operate alongside the second smart energy center to be constructed simultaneously with any future development of the adjacent block is established.

### Environmental load reduction performance

#### LR<sub>UD</sub>1 CO<sub>2</sub> emission from traffic sector:

Urban functions are concentrated through the new construction of a municipal public facility having disaster prevention center functions and a hospital conducting general perinatal medical care that are built on the site with an area of approximately 3 ha located approximately 100 m from the railway station.

#### LR<sub>UD</sub>2 CO<sub>2</sub> emission from building sector:

- A best mix heat source system that uses a renewable energy heat source (solar heat energy and underground tunnel water) and utilizes heat waste of a CGS is established for the first time in Japan as an area heat supply system.
- Heat is produced and supplied efficiently by flexibly changing the temperature and pressure of the heat supply according to the use status of the building and preferentially using a low carbon heat source. Transfer power is reduced due to a supply with a large temperature difference (10°C) on both the building side and the energy center side, aiming at energy savings.
- Enhancement of various low carbon measures for new buildings

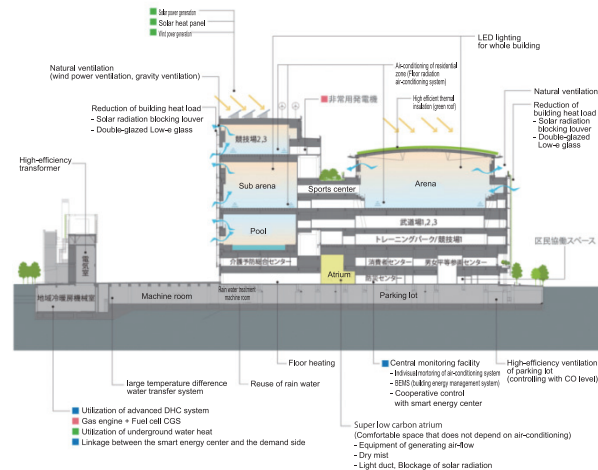


Figure 1 Public facility

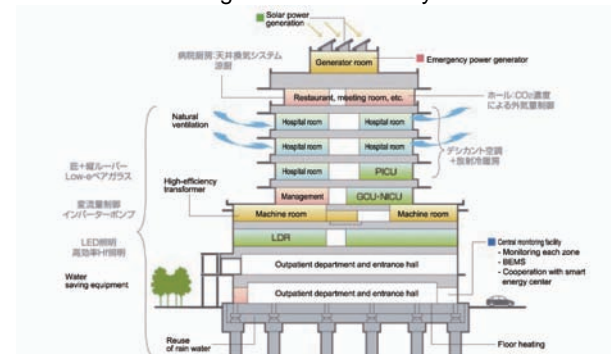
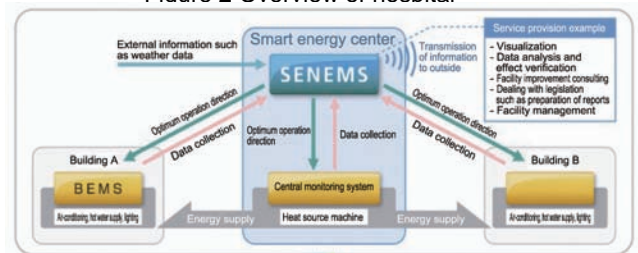


Figure 2 Overview of hospital



Optimization of demand/supply and reduction of CO<sub>2</sub> in the whole area

Figure 3 Overview of smartification of energy system

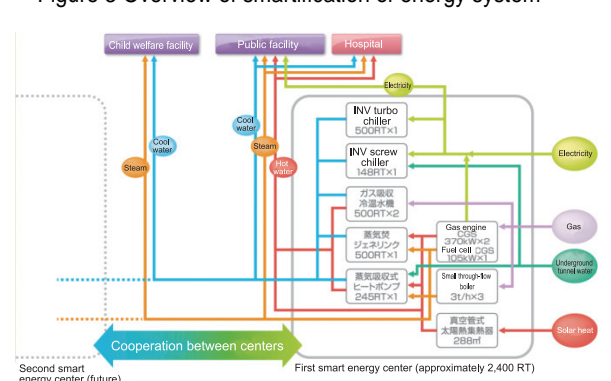


Figure 4 Equipment overview of energy center



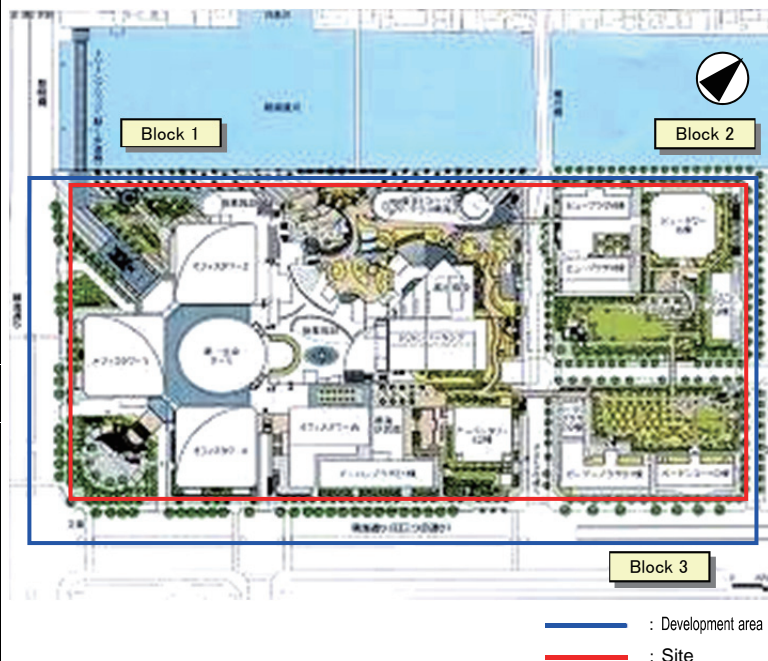
## Case G

Assessment result Rank S ( $BEE_{UD} = 3.6$ )

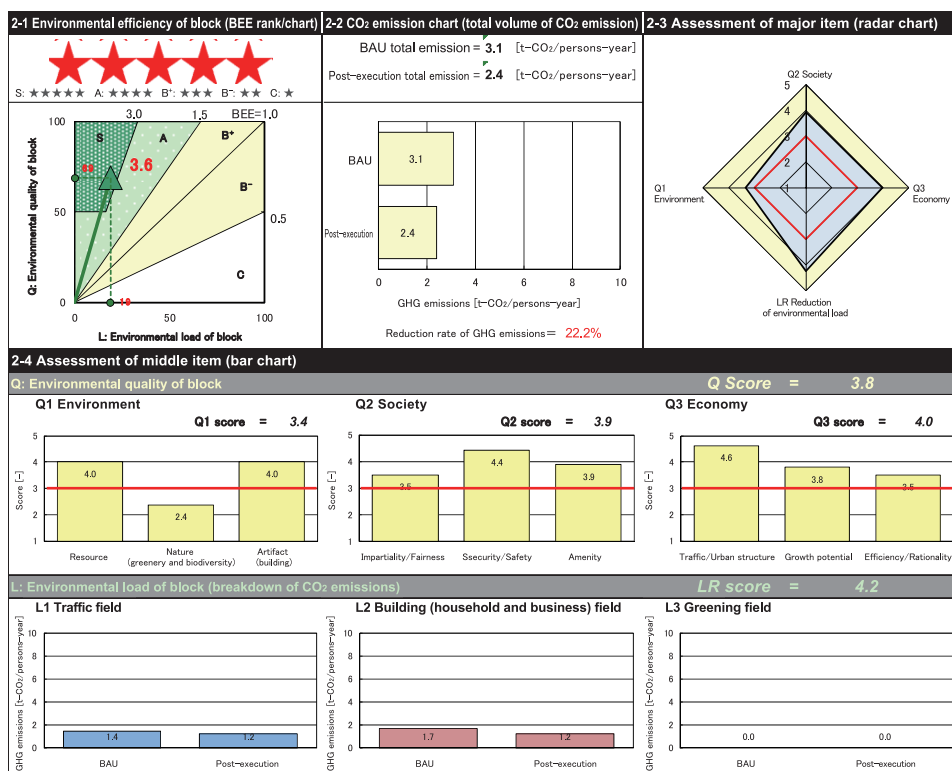
## Overview of assessment object

Location: Chuo-ku, Tokyo  
 Completion: March 2001  
 District and zone:  
 Commercial district: 80% / 500%  
 Quasi-industrial district: 60% / 400%  
 Category I residential district: 60% / 400%  
 Applicable system or project:  
 Redevelopment district plan  
 Class I urban redevelopment project

Allowable building coverage ratio /  
 Floor area ratio: 100% / 760%  
 Object zone area: 10.9 ha  
 Site area: 84,800ha  
 Building area: 66,350 m<sup>2</sup>  
 Gross floor area: Approximately 665,500 m<sup>2</sup>



## 1. CASBEE Assessment Results



## 2. Approach of scoring Characteristics related to environmental quality and environmental load reduction

### Characteristics related to environmental quality

#### Q<sub>UD</sub>1 Environment:

##### 1.1 Resource

Rain water from the roof of the office building is utilized and domestic wastewater is reused, aiming at reducing use of potable water.

Outflow reduction and reuse of rain water is performed through the use of a rain water storage tank with a capacity of 2,700 m<sup>3</sup> introduced in the object area and adoption of water permeable paving for 50% or more of the pavement.

In addition, kitchen wastewater and gray water are treated and reused for flushing toilets.

#### Q<sub>UD</sub>2 Society:

##### 2.2 Ssecurity/Safety

Sufficient capacity and aseismic strength are ensured for supply and processing systems such as waterworks, sewerage, and electricity. Water and generator fuel are stored for emergencies.

Artificial ground for exclusive use by pedestrians is laid out on most parts of the object area to separate pedestrians from vehicles, which improves safety and creates a lively atmosphere in the artificial ground area.

#### Q<sub>UD</sub>3 Economy:

##### 3.2 Growth potential

Redevelopment of a low-density area consisting mainly of housing, without causing inhabitants to move outside the area, results in a high-density town with a daytime population of about 20,000 and a nighttime population of about 5,300.

### Performance related to environmental load reduction

#### LR<sub>UD</sub>1 CO<sub>2</sub> emission from traffic sector:

(1) Development of an area that should be the base ground for concentrating urban functions and optimized distribution of urban functions  
Development of a town with a "pedestrian" lifestyle is promoted through the establishment of a large-scale complex facility consisting of housing and commercial and business facilities in an area 350 m from the nearest subway station and with a shuttle bus line to Tokyo Station.

(3) Rationalization of freight traffic

In the business and complex zones, a cooperative collection and delivery system is introduced in order to reduce the frequency of delivery vehicles entering the block.

#### LR<sub>UD</sub>2 CO<sub>2</sub> emission from building sector:

(5) Utilization of public facilities for establishment of facilities that contribute to use of non-fossil energy and efficient use of fossil fuels  
A district heating/cooling system (DHC) is adopted as a heat source for the business and complex zones. The DHC uses a high-efficiency heat pump and a large-capacity water heat storage tank to attain high energy efficiency.

(6) Promotion of CO<sub>2</sub> reduction of buildings

In the business and complex zones, many energy-saving systems including a large temperature difference water transfer system, a variable water volume (VWV) and variable air volume (VAV) system, and an outdoor-air cooling system are introduced, and energy use for the building is significantly reduced.

#### LR<sub>UD</sub>3 CO<sub>2</sub> emission of green sector:

(4) Green conservation and promotion of greening

Open spaces are actively created. Many trees and plants are planted in the artificial grounds and open spaces.

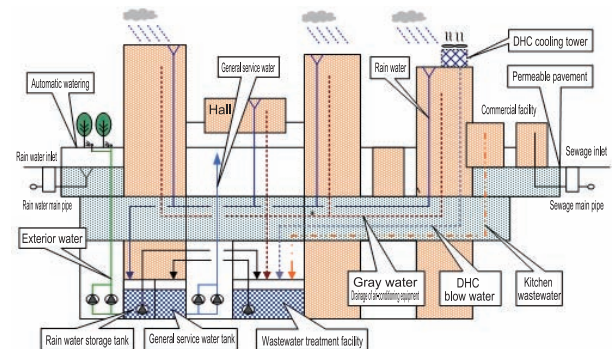


Figure 1 Circulation and reuse of water



Figure 2 Separation of pedestrians and vehicles and creation of a lively feeling with the artificial grounds



Figure 3 Pre-redevelopment status

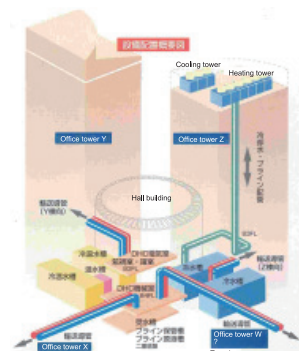


Figure 4 Introduction of district heating/cooling system (DHC)



## PART II. Scoring Criteria

### 1. Q<sub>UD</sub> Environmental quality of urban development

#### Q<sub>UD</sub>1 Environment

##### 1.1 Resource

##### 1.1.1 Water resource

##### 01.1.1.1 Waterworks

##### 1) Rain water utilization

The level of rain water utilization is evaluated regarding whether there is any measure to utilize said rain water, and the utilization rate.

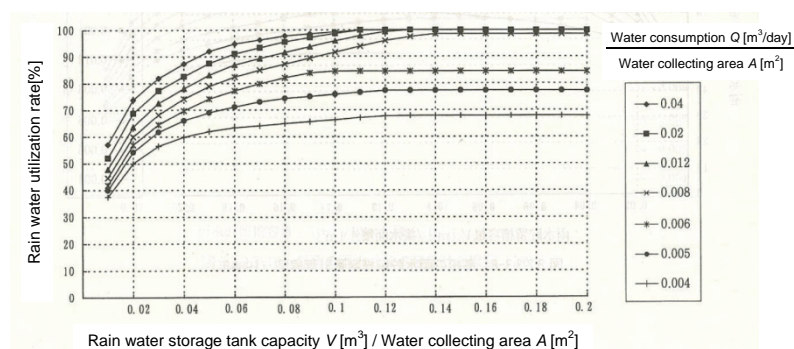
Level 1	No rain water is utilized.
Level 2	(Not applicable)
Level 3	Rain water is utilized.
Level 4	Rain water is utilized inside the building in addition to outdoor utilization such as watering.
Level 5	The rain water utilization rate is 80% or higher.

##### □ Description

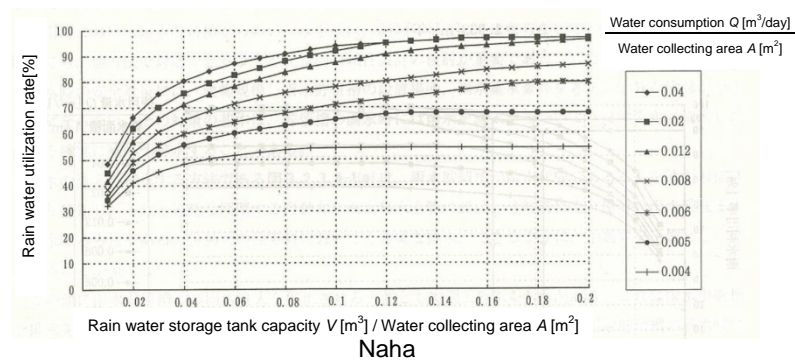
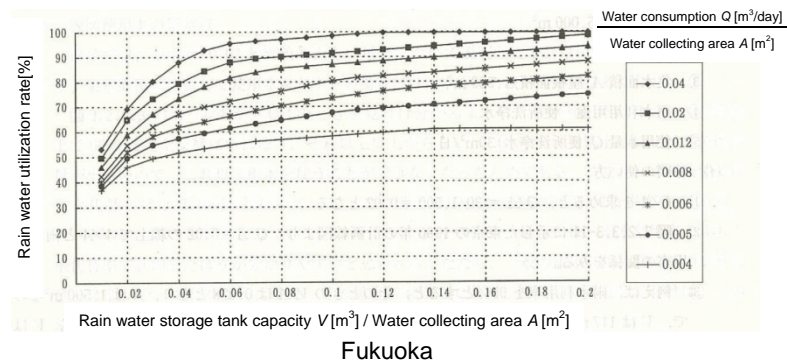
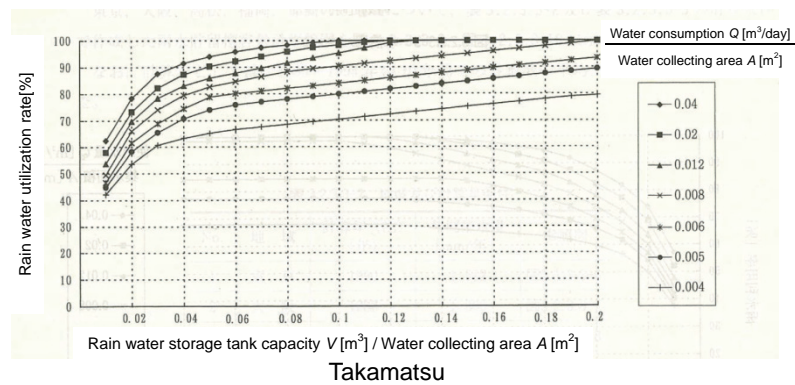
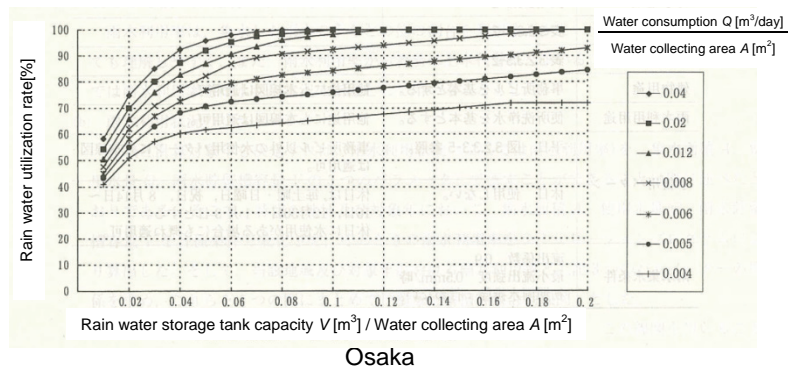
- An assessment is performed based on the status of rain water utilization and the rain water utilization rate, i.e., the rate of rain water utilization of equipment that can utilize rain water.
- The design value of the rain water utilization rate set in the design phase can be used.
- If the design value is unknown, a rain water utilization rate that is set as the design value can be obtained using the following method.
- This calculation method is based on "Planning Standards and Description for Waste Water Reuse/Rain water Utilization System (2004 Edition)" published by the Public Buildings Association.
  - (1) Calculate (Water consumption  $Q$  [m<sup>3</sup>/day]) / (Water collecting area  $A$  [m<sup>2</sup>]).
  - (2) Calculate (Rain water storage tank capacity  $V$  [m<sup>3</sup>]) / (Water collecting area  $A$  [m<sup>2</sup>]).

\* The water collecting area can be considered equal to the roof area.

  - (3) Use calculation results (1) and (2) to obtain the rain water utilization rate on the rain water storage tank capacity planning diagram of each area.



Tokyo



Rain water storage tank capacity planning diagram of each area

Source: "Planning Standards and Description for Waste Water Reuse/Rainwater Utilization System (2004 Edition)" published by the Public Buildings Association

## 2) Treated water

Measures for utilization of common treated water supply facility in the block or wide area treated water supply are evaluated.

Level 1	(Not applicable)
Level 2	(Not applicable)
Level 3	No utilization.
Level 4	Utilized in some facilities in the block.
Level 5	Utilized in a majority of the facilities in the block.

### ☐ Description

- Efforts for effective utilization of water resources excluding rain water evaluated in the previous section, that is, circulating utilization of water is evaluated.
- The assessment targets efforts for development of a facility for common treated water supply and its utilization in the block and efforts for utilization of recycled water or treated water established as public infrastructure of the area.

### O1.1.1.2 Sewerage

#### 1) Reduction of waste water discharge amount

Efforts for suppression of load on sewerage end treatment facilities is evaluated.

Level 1	No consideration.
Level 2	(Not applicable)
Level 3	Water-saving-type toilet systems (6 l/use or less) are used.
Level 4	Super-water-saving-type toilet systems (5 l/use or less) are used.
Level 5	Unique treated water supply system is established in the block.

#### □Description

- A facility for reduction of waste water discharge amount that leads to suppression of load on sewerage end treatment facilities is evaluated based on its introduction level.
- A water-saving-type or super-water-saving-type toilet system becomes an object of the assessment only when its introduction ratio exceeds about 80% of the whole block.
- A treated water supply system becomes an object of the assessment only when it treats and reuses water used in the block.
- Public treated water introduced from outside of the block is not an object of the assessment because this assessment item evaluates efforts for reduction of the waste water amount discharged from the block.
- Either treated water system covering the whole block or that covering an individual building may be evaluated as level 5.

## 2) Reduction of rain water discharge amount

### (1) Capacity of detention pond

Efforts for suppression of rain water discharge amount from the block with use of temporary rain water storage are evaluated.

Level 1	(Not applicable)
Level 2	(Not applicable)
Level 3	Regulating capacity according to the legal requirement.
Level 4	(Not applicable)
Level 5	Regulating capacity equal to or higher than the legal requirement.

#### ☐ Description

- Efforts evaluated in this assessment are those for temporary rain water storage equipment such as a detention pond or retarding basin, a crushed-stone-type reservoir under an exterior structure or an outdoor parking lot, and establishment of a rain water storage function with greening of buildings such as rooftop greening.
- A measurement is evaluated as level 3 when it is in line with administrative guidance for suppression of rain water outflow, and evaluated as level 5 when it is advanced further.
- For a district where there is no regulation in administrative guidance, efforts for storage capacity of less than 300 m<sup>3</sup>/ha are evaluated as level 3, and those for storage capacity of 300 m<sup>3</sup>/ha or more are evaluated as level 5.

### (2) Rain water permeable surface and equipment

Efforts for suppression of the rain water discharge amount from the block with promotion of rain water permeation into the ground are evaluated.

Level 1	Not introduced.
Level 2	(Not applicable)
Level 3	Introduced.
Level 4	(Not applicable)
Level 5	Introduced to the majority of vacant space, or there is a permeable trench having similar functions.

#### ☐ Description

- In addition to permeation equipment such as a permeable pavement, a permeation inlet, and a permeation trench, outdoor space on the ground surface where rain water can permeate such as a planting site or bare land is evaluated.
- Efforts are evaluated as level 3 when an underground rain water permeation measure is taken in any part of the object area, and evaluated as level 5 when an underground rain water permeation measure is taken in a majority of the vacant space area in the object area.
- If any measurement for suppression of rain water outflow is required by administrative guidance, a measurement is evaluated as level 3 when it is in line with the administrative guidance, and evaluated as level 5 when it is advanced much further.
- Cases where it is judged that rain water should not permeate into the ground and no permeation equipment is introduced based on administrative guidance, related laws and regulations, or a ground investigation are not the object of the assessment.
- Rooftop greening is not taken into consideration as an assessment object.



## ●1.1.2 Resources recycling

### ○1.1.2.1 Construction

#### 1) Wood material

The utilization level of wood materials produced from sustainable forests is evaluated.

Level 1	(Not applicable)
Level 2	No wood material produced from sustainable forests is used.
Level 3	There is a building that uses wood materials produced from sustainable forests.
Level 4	There are multiple buildings that use wood materials produced from sustainable forests.
Level 5	Wood materials produced from sustainable forests are used at the rate of 0.005 m <sup>3</sup> per floor area of 1 m <sup>2</sup> .

(\* Projects established before FY2011 can be excluded from the assessment object.)

##### □Description

- The utilization level of wood, which is a renewable material, is evaluated in terms of capturing CO<sub>2</sub> and resource circulation.
- Wood materials produced from tropical rainforests and from reckless deforestation are not taken into consideration as an assessment object. Only the wood materials produced from sustainable forests as shown below are considered as the assessment object.
  1. Thinned lumber
  2. Wood materials produced from forests that are certified as the place where sustainable forestry is carried out.
  3. Wood materials produced in Japan based on a sound operation plan.
- The evaluation index is indicated by the utilization amount (cubic volume) of the above wood materials per unit floor area.

#### 2) Recycled material

Utilization status of recycled material is evaluated.

Level 1	No recycled materials are used.
Level 2	(Not applicable)
Level 3	One article of recycled material is used.
Level 4	Two articles of recycled material are used.
Level 5	Four or more articles of recycled material are used.

(\* Existing buildings are not taken into consideration as the assessment objects.)

##### □Description

- The utilization status of recycled materials in structural frame materials and non-structural materials is evaluated.
- The assessment object is "Eco Mark Products" certified by the Japan Environment Association and recycled materials that are designated as "Designated Procurement Items" by the Law Concerning the Promotion of Procurement of Eco-friendly Goods and Services by the State and Other Entities (Law on Promoting Green Purchasing, established in May 2000). The number of items (converted to the number of items used per building) is evaluated.
- An item certified as both an "Eco Mark Product" and a "Designated Procurement Item" is considered as one item.
- Any utilization is judged as "use" except that the amount of use is very little.
- Information on Designated Procurement Items of the Law on Promoting Green Purchasing and eco mark items is updated accordingly. Check the websites shown below before assessment.

Information provision system for the designated procurement items of Law on Promoting Green Purchasing (MOE \*Out of service as of March 2014)

<http://www.env.go.jp/policy/hozen/green/g-law/gpl-db/>

Eco items net (Green purchasing network)

<http://www.gpn.jp/econet/>

Eco Mark Product search site (Japan Environment Association)

<http://www.ecomark.jp/search/search.php>

### O1.1.2.2 Operation

#### 1) Garbage separation

The garbage separation level in operation is evaluated.

Level 1	The number of separation items is less than that of the municipality's designation.
Level 2	(Not applicable)
Level 3	Garbage separation is performed according to the number of separation items designated by the municipality.
Level 4	The number of garbage separation items is that of the municipality's designation plus one.
Level 5	The number of garbage separation items is that of the municipality's designation plus two or more.

##### ☐ Description

- It is important for promotion of resource recycling to separate garbage generated in operations. This assessment evaluates the effort level for garbage separation.
- In general, the higher the number of garbage separation operations is, the higher the resource recycling ratio becomes. However, the form of garbage separation varies depending on the municipality that performs disposal.
- Using the number of garbage separation operations designated by the municipality as a standard, a case that has garbage separation for a number of items higher than the municipality's designation and works on resource recycling independently is evaluated highly.

#### 2) In-area resource circulation

Resource circulation executed in the object area is evaluated.

Level 1	(Not applicable)
Level 2	(Not applicable)
Level 3	No resource circulation.
Level 4	Fallen leaves are collected and used as compost for resource circulation.
Level 5	Raw garbage is correctly disposed of for resource circulation.

##### ☐ Description

- Efforts for composting organic matter in the object area, such as fallen leaves, and reusing it as fertilizer for green zones in the object area are evaluated as level 4.
- Efforts for correct disposal and reuse of organic matter such as raw garbage generated in the object area with the use of any device such as a raw garbage disposer are a level 5.

##### <Reference cases>

- Garbage is converted to RDF (refuse-derived fuel) with the use of compression disposal, etc., and used as fuel.
- Raw garbage is composted using a raw garbage disposer and used as fertilizer.
- etc.

## ● 1.2 Nature (greenery and biodiversity)

### ● 1.2.1 Greenery

#### ○ 1.2.1.1 Ground greening

##### 1) Greening ratio

Efforts for greening of ground surfaces in the block are evaluated.

Level 1	Less than 10%
Level 2	10% or more but less than 20%
Level 3	20% or more but less than 30%
Level 4	30% or more but less than 40%
Level 5	40% or more

##### ☐ Description

- This assessment is performed for evaluating promotion of greening in the block and formation of a green block environment.
- This assessment also evaluates the effect on mitigation of the heat island phenomenon.
- Efforts for parking lots are evaluated in this item.
- A greening ratio is evaluated based on the rate of the sum of the green zone area and the water surface area to the block area.
- Therefore, A greening ratio is represented as  $(\text{Green zone area} + \text{Water surface area}) / \text{Block area}$ .
- However, when a boundary of the block is the center line of a road, the road area is excluded from the block area for this calculation.
- A greening application sheet or the like may be used as assessment evidence materials.

#### ○ 1.2.1.2 Building top greening (A block consisting only of detached houses is excluded from this assessment.)

##### 1) Rooftop greening

The effort level for greening on the rooftop of buildings is evaluated.

Level 1	Less than 15%
Level 2	15% or more but less than 20%
Level 3	20% or more but less than 30%
Level 4	30% or more but less than 40%
Level 5	40% or more

##### ☐ Description

- This assessment is performed for evaluating promotion of greening in the block and formation of a green block environment.
- This assessment also evaluates the effects on mitigation of the heat island phenomenon.
- A greening ratio is evaluated based on the rate of the sum of the green zone area and the water surface area to the rooftop area.
- Therefore, A greening ratio is represented as  $(\text{Green zone area} + \text{Water surface area}) / \text{Rooftop area}$ .
- The rooftop area in this calculation excludes the area used for equipment necessary for maintenance of the building such as solar panels and air-conditioning systems and is therefore difficult to be greened.
- A greening application sheet or the like may be used as assessment evidence material.
- For a complex application block including detached houses, the ratio above is used for calculating the area excluding the detached houses.

## 2) Wall greening

Efforts for greening on walls of buildings are evaluated.

Level 1	(Not applicable)
Level 2	(Not applicable)
Level 3	No wall is greened.
Level 4	Any part of the walls is greened.
Level 5	5% or more of whole wall area is greened.

### ☐ Description

- This assessment is performed for evaluating the promotion of greening in the block and formation of a green block environment.
- Walls of a multistory parking lot or the like are included in the object of the assessment.
- This item also evaluates the effects on mitigation of the heat island phenomenon.
- The greening ratio is evaluated based on the rate of the exterior wall greened surface area to the whole exterior wall area, i.e.,  $\text{<greened wall area> / <exterior wall area>}$ .
- The exterior wall described here is a wall constructed almost vertically to the ground surface. A wall of any structure with or without glass material may be an object of the assessment.
- For a complex application block including detached houses, the ratio above is calculated for the area excluding the detached houses.

## ●1.2.2 Biodiversity

### ○1.2.2.1 Preservation

#### 1) Natural resources

The utilization level of natural resources existing in the object area is evaluated.

Level 1	Natural resources to be preserved are not understood.
Level 2	(Not applicable)
Level 3	Natural resources to be preserved are understood.
Level 4	Natural resources to be preserved are understood and a part of the natural resources is preserved.
Level 5	Natural resources to be preserved are understood and the majority is preserved.

(\* A district containing no preservation object natural resources is excluded from this assessment.)

##### ☐Description

- As shown in the nature conservation ordinance of Tokyo, the understanding and assessment of natural resources on site are two of the most important processes in development.
- The assessment of the ecosystem is performed based on research of animals and plants in the area including the object district and its periphery in order to understand the potential of the ecosystem in the object district.
- Efforts for identification of valuable species and indicator species and establishment of a conservation plan for such species are evaluated as a standard level (level 3).
- When the biodiversity of species including those in the outside of the object district is evaluated and a part or majority of the natural resources is preserved in order to maintain or improve the biodiversity, such efforts are evaluated as level 4 or level 5.

#### 2) Landform

Consideration of development for landform property and landform transformation is evaluated.

Level 1	(Not applicable)
Level 2	(Not applicable)
Level 3	Landform transformation is performed according to development activity.
Level 4	Artificial transformation of natural landform is suppressed or conservation of effective surface soil is performed.
Level 5	Artificial transformation of natural landform is suppressed and conservation of effective surface soil is performed.

(\* Development without landform transformation or a block apparently containing no effective surface soil is excluded from this assessment.)

##### ☐Description

- Artificial transformation of natural landform includes establishment of retaining walls in development that causes occurrence of discontinuous space in a continuous landform.
- Through research and understanding of the productive functions of surface soil, productive soil is identified and its reutilization as surface soil is evaluated.



### O1.2.2.2 Regeneration and creation

#### 1) Patch (planar) quality

##### (1) Habitat space of species

Establishment of habitat space of various species such as biotopes and sanctuaries is evaluated.

Level 1	No habitat space of various species is established.
Level 2	(Not applicable)
Level 3	A collection of green areas into which people cannot enter are established.
Level 4	Habitat space of various species is established collectively.
Level 5	Habitat space of various organisms is established collectively and its area is 3% or more of the assessment object area.

#### □ Description

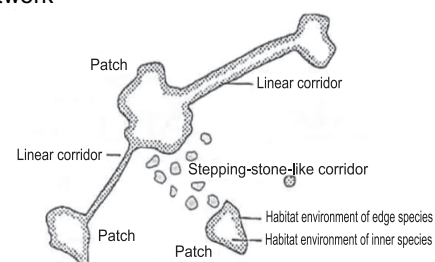
- As a basic element that realizes biodiversity, habitat space (patch) of species that spread is evaluated.
- Conservation of natural space having high ecosystem potential is also included in this assessment.

#### Reference 1) Formation of patch and corridor in ecosystem network

The diversity and existing quantity of species significantly vary depending on correlation between environmental elements.

Patch: Diversity of green elements, Unit space of highly productive coherent ecosystem

Corridor: Linear natural space linking patches along which species can move.



#### <Reference literature>

Architectural Institute of Japan, "Architectural Design Data Corpus (District and City II ssessment.ated.nt object area.reutilization as surface so

**(2) Consideration for regionality**

Existence of consideration for regionality is evaluated.

Level 1	No greening plan being conscious of plant species that originally lived in the area (native species) is carried out.
Level 2	(Not applicable)
Level 3	Greening with plant species that originally lived in the area (native species) is partly performed.
Level 4	Greening that uses plant species that originally lived in the area (native species) for a majority of the block is performed.
Level 5	Greening with use of plant species that originally lived in the area (native species) for almost all the block is performed.

☐ Description

- Establishment of a greening plan in consideration of plant species adapting to the climatic characteristic of the relevant area and that originally lived in the area (native species) is evaluated.
- The planning must premise that invasive alien species, uncategorized alien species, and alien species requiring caution shown in the Invasive Alien Species Act are not introduced.

Reference 1) Invasive alien species, uncategorized alien species, and alien species requiring caution defined in the Invasive Alien Species Act

- Invasive alien species: Specified from foreign species that originated in a foreign country that cause or may cause damage to the ecosystem, human's, and the agriculture, forestry and fisheries industries. Breeding, growing, storing, transporting, and importing of these organisms are prohibited as a rule. Also, discarding them outdoors, planting them and seeding them are prohibited.
- Uncategorized alien species: Specified foreign species originating from a foreign country that are unknown or suspected to cause damage to ecosystems, human's, and the agriculture, forestry and fisheries industries. The import of these species is subject to prior application to the responsible cabinet minister.
- Alien species requiring caution: These organisms are not subject to regulations on breeding or similar activities based on the Invasive Alien Species Act, but these foreign organisms may have an adverse effect on the ecosystem. Therefore, the MOE is asking individuals or business operators who are involved in the use of these organisms for their understanding and cooperation on appropriate handling.

(For details, refer to the website of MOE, "Invasive Alien Species Act" (<http://www.env.go.jp/nature/intro/index.html>).)

## 2) Corridor (network) quality

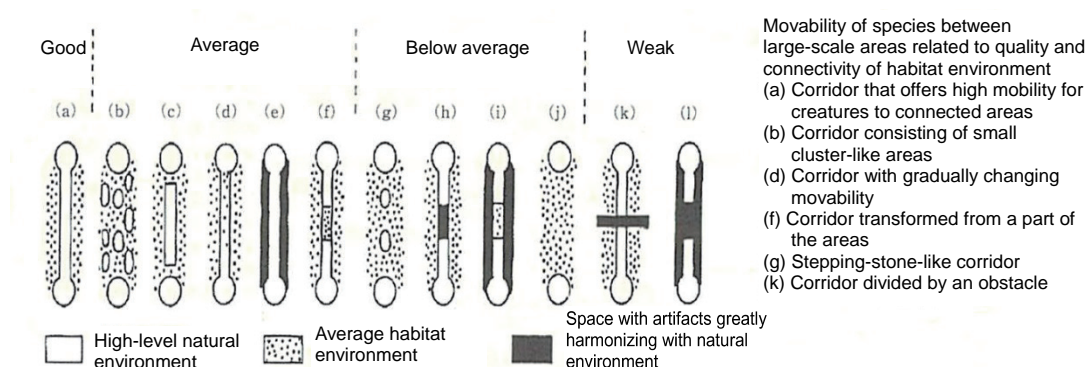
The establishment status of a network with peripheral natural space through a corridor or the like is evaluated.

Level 1	The network of species is not taken into consideration.
Level 2	An ecological corridor that supports the movement of species is established by partly dividing roadside trees.
Level 3	An ecological corridor that supports the movement of species is established by continuous roadside trees.
Level 4	An ecological corridor that supports the movement of species is established by stepping-stone-like green zones in addition to continuous roadside trees.
Level 5	An ecological corridor that supports the movement of species is established by a belt-shaped green zone in addition to continuous roadside trees.

### □ Description

- The level of establishment of a network with peripheral patches through formation of corridors consisting of continuous green zones such as a row of trees or shrubs that have the role of creating an effective movement space for creatures is evaluated.
- Fulfillment of the network (ease of movement for creatures) is evaluated based on the location of green zones constituting the network and land use.
- A case where the establishment of a network is not considered and there are many elements inhibiting the movement of species is evaluated as level 1.
- A corridor space in an urban area typically consists of roadside trees. A case with such roadside trees is evaluated as level 2 or level 3 depending on the condition of the roadside trees.
- In addition, a case where stepping-stone-like green zones are established in consideration of the movement of species is evaluated as level 4. A case where green zones including roadside trees constitute corridors that act as a network between patches while considering the movement of species sufficiently is evaluated as level 5.

### Reference 1) Type and assessment of corridor



When the spatial scale is determined, the next important issue is a space arranging method such as the conditions of a geographic and natural environmental chain and mosaic.

Regarding the continuity of ecological space, some discontinuity of a corridor is not an obstacle for flying species, but only a little discontinuity of a corridor eliminates its function for species that crawl on the ground such as reptiles or move through water, such as fish.

<Reference literature> R.T.T. Forman: Land Mosaics, CAMBRIDGE UNIVERSITY PRESS p. 201 (1995)

### ●1.3 Artifact (building)

#### ●1.3.1 Environmentally friendly buildings

The level of effort for CASBEE assessment (New Construction, Detached House, or Property) in the block is evaluated.

Level 1	There is no building evaluated with CASBEE.
Level 2	(Not applicable)
Level 3	There are some buildings evaluated or to be evaluated with CASBEE.
Level 4	The majority of buildings are evaluated or to be evaluated with CASBEE.
Level 5	The majority of buildings are evaluated or to be evaluated with CASBEE and there are some buildings that have been certified by a third party and obtained A or a higher rank.

#### □Description

- The environmental consideration of buildings is included as an assessment object in CASBEE for Blocks. However, it is favorable that more detailed consideration and evaluation in addition to the assessment of CASBEE for Blocks are performed according to the assessment object facility.
- The level of proactive utilization of CASBEE tools is evaluated.
- CASBEE for Construction (New Construction, Existing Building, and Renovation), CASBEE for Detached House (New Construction and Existing Building), and CASBEE for Market Promotion are included as the assessment object. Another proper tool among these tools may be used depending on the application, business condition, and situation of the building.

## Q<sub>UD</sub> 2 Society

### ● 2.1 Impartiality/Fairness

#### ● 2.1.1 Compliance

A case is evaluated highly that observes the laws and regulations regarding wind damage, radio waves, traffic, sunlight, light damage, soil pollution, noise, vibration, odors, air pollution, groundwater withdrawal, and water quality applicable to the relevant project, executes an independent environmental assessment and environmental measurement, and publishes and reflects them in the plan results.

Observation of applicable laws and regulations and verification

Level 1	There are many buildings based on a lower standard than the current laws and regulations.
Level 2	There are several buildings based on a lower standard than the current laws and regulations.
Level 3	Laws and regulations applicable to the relevant project are observed.
Level 4	An environmental assessment or environmental measurement independently executed depending on the characteristics of the project is published.
Level 5	An environmental assessment or environmental measurement independently executed depending on the characteristics of the project is published and the results are reflected in planning.

#### ☐ Description

- A building based on a lower standard than the current laws and regulations indicates a so-called existing non-conforming building. A case where the majority of buildings in the assessment object block are existing non-conforming buildings is evaluated as level 1, and where less than half of them in the assessment object block are existing non-conforming buildings is evaluated as level 2.
- A case where independent environmental assessment or environmental measurement that is not particularly required by laws and regulations is executed depending on the characteristics of the block or the project is evaluated as level 4 when the results are published, and evaluated as level 5 when the results are fed back to and reflected in the planning.



### ●2.1.2 Area management

Existence of a neighborhood association or an area management organization (involving the inhabitants of the block, tenant companies and their employees, inhabitants of the periphery of the block, and the local government), the existence of a system that can operate the organization continuously, and existence of a system in which the relevant local government, regional inhabitants, and companies can participate in according to the progress of the project are evaluated.

#### Cooperation of local community

Level 1	No neighborhood association or area management organization exists in the block.
Level 2	(Not applicable)
Level 3	A neighborhood association or area management organization exists in the block.
Level 4	A neighborhood association or area management organization exists in the block. A promotion entity and fund for continuous operation of the organization are planned and secured.
Level 5	A neighborhood association or area management organization exists in the block. A cooperation system with peripheral area communities of the block has been established.

#### □Description

- A neighborhood association or an area management organization indicates a town council, alliance town council, store association, or other neighborhood association. Its organizers include inhabitants, companies, and the local government.
- A case where no area management organization exists in the block is evaluated as level 1, and where one does exist in the block is evaluated as level 3 or higher.
- A case where an area management organization exists in the block and a plan and fund for continuous operation of the organization are secured is evaluated as level 4. Specific examples of such an effort include cases where officials and special committee members are elected and their term is set to two years or longer in order to operate activities continuously, where a conference body is established and held periodically, where rules are set, and where appropriate accounting processing such as budgetary decisions through a general meeting decision is performed.
- A case where a cooperation system with the peripheral area communities is established or planned additionally is evaluated as level 5. Examples of such an effort include cases where a network with area management organizations outside the block, including the municipalities, is established as an effort for disaster prevention, disaster mitigation, and global environmental problems in consideration of the future direction of the whole block, and annual cooperation with and participation in local events and festivals.

## ● 2.2 Security/Safety

### ● 2.2.1 Disaster prevention

#### ○ 2.2.1.1 Basic disaster prevention performance

Understanding of contents of various hazard maps (resistance to natural disasters, fire, etc.) and establishment of land use plans in the block based thereon in consideration of countermeasures to earthquakes, landslides, floods, etc., are evaluated. The disaster prevention performance of various infrastructures is evaluated based on a level of efforts for disaster prevention measures including functional substituting performance for information, water supply/treatment, and energy supply infrastructures in the block.

##### 1) Understanding of hazard map

Level 1	No hazard map is checked.
Level 2	(Not applicable)
Level 3	A hazard map is checked, and problems are understood.
Level 4	(Not applicable)
Level 5	There is no problem, or disaster prevention measures are taken against problems found through checking a hazard map.

##### 2) Disaster prevention of various infrastructures

Level 1	No items are worked on.
Level 2	(Not applicable)
Level 3	Working on one item for each of a, b, and c.
Level 4	(Not applicable)
Level 5	Working on one or more items for each of a, b, and c, and working on five or more items in total.

Effort items to be evaluated

##### <a. Communication infrastructure>

Item	Content
(1) Measures on equipment and piping	Measures for flood damage prevention, earthquakes, and power disruption are available.
(2) Connection with the outside of the area	Two or more communication systems with the outside of the area are available. Wireless connection such as WiFi can be considered as a communication system here.

##### <b. Water supply/treatment infrastructure>

Item	Content
(1) Aseismic performance of potable water and sewerage pipes	Normal earthquake resistance standards are met.
(2) Emergency measure	A common facility for storing potable water or a system for sharing clean water between buildings in the block is available.

##### <c. Energy supply infrastructure>

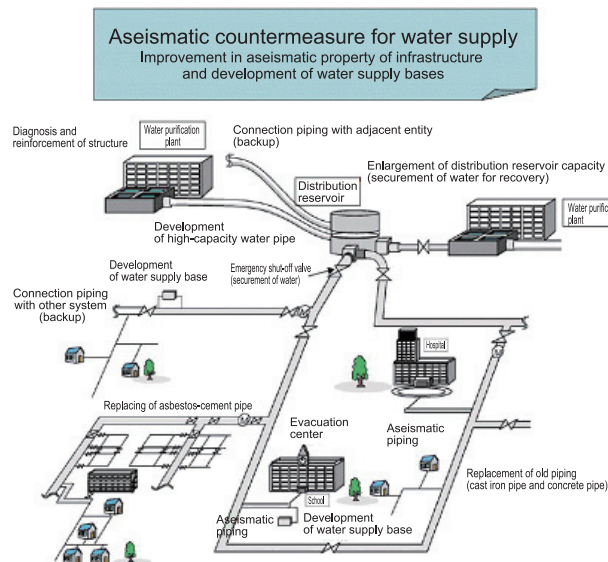
Item	Content
(1) Aseismic performance of energy-related equipment	Normal earthquake resistance standards are met.
(2) Connection with the outside of the area	A medium pressure gas supply system is used, or supply of electric power and heat is connected with the outside of the area (district heating/cooling system).
(3) Securement of autonomous power supply	An autonomous power supply system that can cover the load of the disaster key point in the block for 72 hours or more is available.

#### □Description

- A case where a disaster hazard map for areas including the object block that is created by the municipalities or the like is not checked is evaluated as level 1.
- A case where problems in the object block are understood on the disaster hazard map is evaluated as level 3.
- A case where there is no problem in the object block indicated by the disaster hazard map is evaluated as level 5. Also, a case where there was a problem in the object block, and civil engineering disaster prevention measures have been taken against the problems, and the land is used is evaluated as level 5.
- A case where no measures for disaster prevention including functional substituting performance for information, water supply/treatment (Reference 1), and energy supply infrastructures in the block are worked on is evaluated as level 1. A case where one item for each infrastructure field is worked on is evaluated as level 3. A case where five or more items in total are worked on is evaluated as level 5.

#### Reference 1) Aseismic countermeasure for water supply

The Ministry of Health, Labour and Welfare (MHLW) revised and enforced a part of the "Ministerial Ordinance Regarding the Technical Standards for Water Supply Facilities" on October 1, 2008 in order to establish the high strength and aseismic performance of all water supply facilities in their future renewal, and advises and directs water suppliers to systematically work on the establishment of the earthquake resistance of existing facilities in consideration of their importance and priority.



(Source: Website of the MHLW, "Promotion of earthquake resistance of water supply facilities" (updated at the end of March 2013)  
<http://www.mhlw.go.jp/stf/seisakunitsuite/bunya/topics/bukyoku/kenkou/suido/taishin/index.html>)

### O2.2.1.2 Disaster response ability

This assessment is performed based on the contribution to improving the disaster prevention performance of the block and the periphery area and on whether or not routine life and business activities in the block are maintained is possible for a certain time period even when a disaster occurs. A case where a functions maintenance plan or a disaster prevention agreement for the whole block including the tenants is established is evaluated highly. For buildings in the block, the concept of an evacuation route network and the distance to an evacuation site are considered depending on their conditions from the entrance of the building.

#### 1) Disaster prevention vacant space and evacuation route

Level 1	No items are worked on.
Level 2	One item is worked on.
Level 3	Two items are worked on.
Level 4	Three items are worked on.
Level 5	Four items are worked on.

#### Effort items to be evaluated

Item	Content
(1) Appropriate scale and location of vacant space	An appropriate plan regarding the scale and location is established, and plenty of space is secured.
(2) Formation of urban fire prevention district with firebreak belts	Urban fire prevention district is formed.
(3) Formation of evacuation route network	Evacuation route network is formed including securing of road width (8 m or wider) and two directions for evacuation.
(4) Access to evacuation site	The distance to the nearest (or designated) evacuation site is 250 m or less.

#### ☐ Description

- Efforts for securing a disaster prevention center with the appropriate scale and location in the case where there is no existing disaster prevention center in the object area and its periphery are evaluated.
- Whether urban fire prevention districts where the spread of fires is prevented in the case of a fire occurring in the object area are formed or not is evaluated. An urban fire prevention district is a unit of the area divided by a network of effectively placed firebreak belts. A fire break belt consists of noncombustible areas or open spaces such as a group of fireproof buildings, roads, and parks/green spaces. The fire spread prevention effect is established by arranging these buildings and public facilities so that a network is formed.
- A network of evacuation routes is evaluated based on securing a network of roads having a certain width according to disaster prevention plans of the object district or the wider area.
- Access to an evacuation site is evaluated based on the length of the evacuation route from the point where the distance to the nearest (or designated) evacuation site in the object district or the peripheral area is longest.

## 2) Continuity of business and life in the block

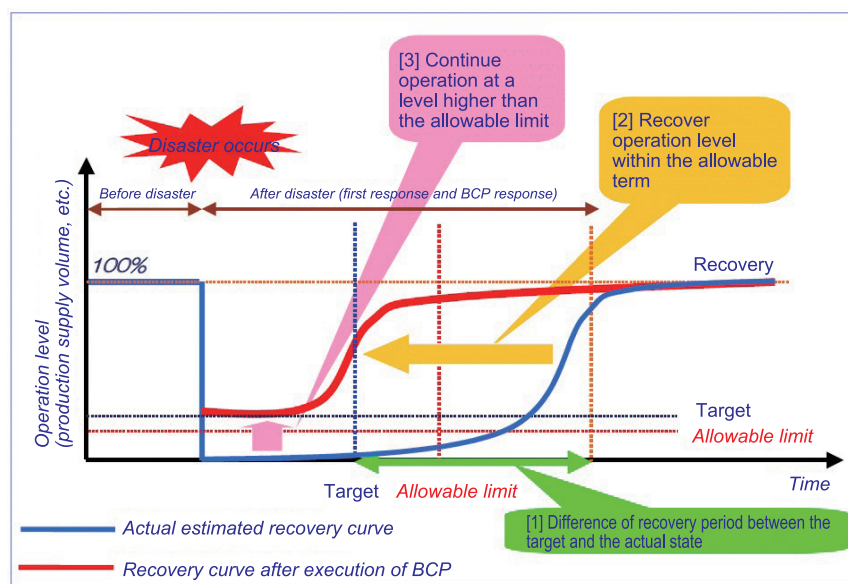
Level 1	No consideration.
Level 2	(Not applicable)
Level 3	BCP and LCP (for common areas of buildings and the block) are established by the developer.
Level 4	BCP and LCP are established by the developer and occupants (tenants and inhabitants).
Level 5	BCP and LCP are established by the developer and occupants (tenants and inhabitants), and a disaster prevention agreement is concluded with the municipalities or the like.

### □Description

- A case where BCP (reference 1) and LCP are established is evaluated as level 3 or higher. Establishment standard of LCP in Tokyo is around the status level that satisfies the registration standard of Tokyo LCP housing (reference 2).
- A case where BCP and LCP are established only by the developer is evaluated as level 3. A case where BCP and LCP are established by the developer and occupants is evaluated as level 4. A case where BCP and LCP are established by the developer and occupants and a disaster prevention agreement (such as a disaster support agreement) is concluded with the municipalities or the like is evaluated as level 5.

### Reference 1) Efforts for continuity of business

Even if damaged by a disaster or an accident, a company is desired by concerned parties such as business partners to avoid interruption to important businesses, or to resume operations as soon as possible if their businesses are interrupted. Also, for the company themselves, continuity of their business is a strategic issue at the management level that protects them from losing customers to another company, decline of their market share, and decrease of company valuation caused by interruption of important businesses. A plan for continuity of business is called a Business Continuity Plan (BCP). Typically, a BCP consists of securing backup systems or offices, immediate securing of staff, prompt safety confirmation, etc. Such efforts of a BCP are dependent on the business details and the company size, and efforts at a certain level can be made without a large amount of expenses. Therefore, all companies are desired to work on BCPs accordingly.



### Concept of business continuity plan

(Source: Website of Cabinet Office, "BCP guideline for private companies" prepared by Cabinet Office in August 2005)

<http://www.bousai.go.jp/taisaku/chuogyoumukeizoku/pdf/guideline01.pdf>



Reference 2) Registration standard of Tokyo Metropolitan LCP (\*1 Life Continuity Performance) housing

Tokyo Metropolitan LCP housing is a housing complex that requires electric power for the water supply and elevator operation and satisfies the following registration standards.

1. The housing complex shall have aseismatic performance regulated in the Building Standards Act.
2. The housing complex shall be equipped with a power generator that has enough power generation capacity to supply water and operate one elevator simultaneously or alternately. The generator shall receive a continuous and stable fuel supply and be able to work even if the electric power supply from the outside of the housing complex stops.
3. This regular-use power generator in 2 (above) shall try to utilize heat from power generation and have functions necessary for utilization of the heat.
4. For establishment and operation of equipment necessary for registration of Tokyo Metropolitan LCP housing, any new burden shall not be placed on the inhabitants and owners of the house as a rule.
5. If establishment and operation of this equipment in 2 (above) is consigned, the consignment term shall be 15 years or longer and the owners of the house shall conclude the agreement in consideration of the consignee's business, tax payment, and financial conditions and future management of the house after the end of consignment.

(Source: Website of Bureau of Urban Development, Tokyo Metropolitan Government, Tokyo Metropolitan LCP housing information registration and inspection system implementation standards (updated in May 2013)  
[http://www.toshiseibi.metro.tokyo.jp/juutaku\\_seisaku/pdf/lcp\\_juutakujoho\\_01\\_01.pdf](http://www.toshiseibi.metro.tokyo.jp/juutaku_seisaku/pdf/lcp_juutakujoho_01_01.pdf))

### ●2.2.2 Traffic safety

This assessment is performed based on establishing sidewalks for securing pedestrian safety and existence of plans of movement lines. A case where universal design is considered is evaluated higher.

#### Execution of separating pedestrians and vehicles

Level 1	No consideration.
Level 2	(Not applicable)
Level 3	A mixing of pedestrians and vehicles may occur and safety is ensured by guidance, etc.
Level 4	(Not applicable)
Level 5	An arrangement is planned so that a mixing of pedestrians and vehicles cannot occur as a rule while taking vulnerable road users into consideration.

#### □Description

- Efforts and consideration for securing safety of pedestrians in the object district is evaluated.
- Also, securing the safety of pedestrians based on the relation between pedestrians and bicycles (including a case where a traffic line of motorized two-wheeled vehicles is mixed) is evaluated here.
- A case where the safety of pedestrians is not particularly considered or it is not known whether the safety of pedestrians is considered or not and therefore the safety issue of pedestrians such as a mixing of pedestrians and vehicles arises is evaluated as level 1.
- A case where traffic flow plans for pedestrians and vehicles (general vehicles and service vehicles), respectively, are prepared in consideration of their relation, and a case where points on which there is concern over a mixing of pedestrians and vehicles are understood and the safety of pedestrians is secured by establishing countermeasures such as allocating guides on those points are evaluated as level 3.
- A case where an arrangement plan is established so that no mixing of pedestrians and vehicles occurs as a rule (such as vertical separation frequently using decks or Radburn-type separation between the pedestrian network and the roads) and additionally a walkway arrangement plan is established so that pedestrians, including vulnerable road users such as wheelchair users, can move in safety and comfort is evaluated as level 5.
- An arrangement plan in which a mixing of pedestrians and delivery vehicles occurs at points where the pedestrian traffic amount is very low can be considered as an arrangement plan in which no crossing points of pedestrians and vehicles occur as a rule.
- The plan for a road and pathway for the coexistence of vehicles and pedestrians can be considered as an arrangement plan in which no crossing points of pedestrians and vehicles occur as a rule.

### ●2.2.3 Crime prevention

The level of efforts for security measures including night lighting, monitorable characteristics from the periphery, security cameras, and security patrol systems in the block is evaluated. The assessment object is the outside of buildings in the block.

#### Security measure

Level 1	No items are worked on.
Level 2	One item is worked on.
Level 3	Two items are worked on.
Level 4	Three items are worked on.
Level 5	Four items are worked on.

#### Effort items to be evaluated

Item	Content
(1) Night lighting installation level	Sufficiently installed.
(2) Monitorable characteristics from the periphery	Almost monitorable from the periphery. No blind spots. Easily monitorable from buildings in the district or periphery.
(3) Deployment of security cameras	Security cameras are deployed.
(4) Security guard	A patrol system of security guards is established.

#### □Description

- For night lighting, its installation level and actual luminance in public spaces such as streets, squares, and parks is evaluated. When the installation level and actual luminance is sufficient, night lighting is considered as being worked on. Assessment is performed in a position on a pathway mainly for pedestrians where light from the lighting becomes weakest.
- Blind spots in the block are considered as being worked on when squares in the block are entirely visible from the periphery and have no object that shuts out the view, resulting in no blind spots.
- Measures with security cameras are considered as being worked on when blind spots are covered by deployment of security cameras.

## ●2.3 Amenity

### ●2.3.1 Convenience/welfare

This item is evaluated based on the standard distance (or time distance for some facilities) from the nearest entrance of the block to the relevant convenient facilities. It is a case where the relevant convenient facilities existing in the block are evaluated based on the standard distance (or time distance for some facilities) from the farthest point in an area that covers 80% or more of both the working population and the resident population in the block to the facilities. If the distribution measurement of the working population and resident population is difficult, the area can be substituted with an area that covers 80% or more of the gross floor area of all the resident and business facilities in the block.

#### O2.3.1.1 Convenience

Distance to everyday facilities (nearest supermarket, shopping street, bank, post office, and government office)

Level 1	1500 m or more
Level 2	800 m or more but less than 1500 m
Level 3	600 m or more but less than 800 m
Level 4	300 m or more but less than 600 m
Level 5	Less than 300 m

#### O2.3.1.2 Health and welfare, education

(1) Distance to medical and health/welfare facility (hospital/clinic that deals with daily medical treatment needs, elderly welfare facility, child welfare institution, welfare facility for mentally disabled people, etc.)

Level 1	1500 m or more
Level 2	800 m or more but less than 1500 m
Level 3	600 m or more but less than 800 m
Level 4	300 m or more but less than 600 m
Level 5	Less than 300 m

(2) Distance to educational facility (kindergarten, elementary school, and junior high school)

Level 1	1500 m or more
Level 2	800 m or more but less than 1500 m
Level 3	600 m or more but less than 800 m
Level 4	300 m or more but less than 600 m
Level 5	Less than 300 m

(3) Time distance to cultural facility (library, museum, sport facility, etc.)

Level 1	60 minutes or more
Level 2	(Not applicable)
Level 3	30 minutes or more but less than 60 minutes
Level 4	(Not applicable)
Level 5	Less than 30 minutes

□Description

- Everyday, medical and health/welfare, and educational facilities are evaluated based on the distance, and cultural facilities are evaluated based on the time distance (total time required for walking and public transportation).

### ●2.3.2 Culture

History and culture are evaluated based on whether efforts for preservation and restoration of historical legacies and buildings and inheritance of the regional history and traditional cultures including events and festivals exist or not and whether there are efforts to create new culture. Consideration for the landscape focal point, continuity of the natural environment, and the skylines of the peripheral area are evaluated based on whether or not a target/policy or specific rules are defined by guidelines and implementation tools are secured.

#### ○2.3.2.1 History and culture

Inheritance of history and culture, and creation of culture (creativity)

Level 1	No items are worked on.
Level 2	(Not applicable)
Level 3	One item is worked on.
Level 4	Two items are worked on.
Level 5	Three items are worked on.

Effort items to be evaluated

Item	Content
(1) Preservation and restoration of historical legacies and buildings	Preserved and restored.
(2) Preservation and inheritance of history and cultural assets	Preservation and inheritance is worked on from a software aspect.
(3) Other efforts	Efforts for creation of new culture.

#### ☐Description

- Establishment of hardware such as that for the preservation and restoration of assets including historical legacies/buildings and regionally representative natural objects is qualitatively evaluated. The assessment objects include not only preservation and restoration of assets specified by an urban planning or upper level planning but also those from an independent viewpoint.
- Software measures for preservation and inheritance of history, culture, and natural assets are qualitatively evaluated.
- Even when no cultural assets exist, efforts, if any, to create new culture (new festivals or special products) are evaluated.



### O2.3.2.2 View

Each item is judged not based on determination of the business operator in the block but based on whether or not implementation tools are secured by defining a target/policy or specific rules according to guidelines of the block or the whole area. In particular, harmonization with the periphery is judged based on whether a master plan of the municipalities or the like is followed or not, where appropriate. With regard to harmonization with the periphery, consideration of the object district is evaluated qualitatively based on a view from outside the object district.

#### 1) Consideration for formation of townscape and landscape in the district

Level 1	No items are worked on.
Level 2	One to two items are worked on.
Level 3	Three to four items are worked on.
Level 4	Five to six items are worked on.
Level 5	Seven to eight items are worked on.

#### Effort items to be evaluated

Item	Content
(1) Consideration for wall surface position	Implementation tools are secured by defining specific rules with guidelines.
(2) Consideration for harmonization of exterior material and color	Implementation tools are secured by defining specific rules with guidelines.
(3) Consideration for human scale in low-story sections (consideration for scenery in streets and squares)	Implementation tools are secured by defining specific rules with guidelines.
(4) Consideration for harmonization of material and color of pavement material	A target or policy is defined by guidelines.
(5) Consideration for tree species and arrangement of planting	A target or policy is defined by guidelines.
(6) Consideration for lighting, furniture, and sign plans	A target or policy is defined by guidelines.
(7) Consideration for effects of infrastructure on scenery	Implementation tools are secured by defining specific rules with guidelines.
(8) Consideration for large-scale parking lot	Implementation tools are secured by defining specific rules with guidelines.

#### ☐ Description

- Consideration for a wall surface position is evaluated when specific rules regarding consideration for a wall surface position have been defined by the guideline, district plan, or landscape district, or are newly defined.
- Consideration for harmonization of exterior material and color is evaluated when specific rules regarding consideration for harmonization of exterior material and color have been defined by the guideline, district plan, or landscape district, or are newly defined.
- Consideration for human scale at low-story sections is evaluated when specific rules regarding consideration for human scale at low-story sections have been defined by the guideline, district plan, or landscape district, or are newly defined.

- Consideration for harmonization of material and color of a pavement material is evaluated when a policy and target regarding consideration for harmonization of material and color of a pavement material have been indicated on documents of the guideline, district plan, or landscape district, or are newly indicated.
- Consideration for tree species and arrangement of planting is evaluated when a policy and target regarding consideration for tree species and arrangement of planting have been indicated on documents of the guideline, district plan, or landscape district, or are newly indicated.
- Consideration for lighting, furniture, and sign plans is evaluated when a policy and target regarding consideration for lighting, furniture, and sign plans have been indicated on documents of the guideline, district plan, or landscape district, or are newly indicated.
- Consideration for effects of infrastructure on scenery is evaluated when specific rules regarding consideration for effects of infrastructure on scenery have been defined by the guideline, district plan, or landscape district, or are newly defined.
- Consideration for a large-scale parking lot is intended for a ground level surface parking lot with a capacity of 30 cars or more and is evaluated when specific rules regarding consideration for the scenery of a parking lot have been defined by the guideline, district plan, or landscape district, or are newly defined.

## 2) Harmonization with the periphery

Level 1	No items are worked on.
Level 2	(Not applicable)
Level 3	One item is worked on.
Level 4	Two items are worked on.
Level 5	Three items are worked on.

### Effort items to be evaluated

Item	Content
(1) Consideration for landscape focal point	A target or policy is defined by guidelines.
(2) Consideration for continuity of natural environment	A target or policy is defined by guidelines.
(3) Consideration for skylines of peripheral area	Implementation tools are secured by defining specific rules with guidelines.

### ☐ Description

- Consideration for a landscape focal point is evaluated when a policy and target regarding consideration for a landscape focal point have been indicated on documents of the guideline, district plan, or landscape district, or are newly indicated.
- Consideration for continuity of the natural environment is evaluated for development of the natural environment that contributes especially to the formation of the townscape and landscape such as the formation of waterfronts and continuous green escarpment lines when a policy and target regarding consideration for continuity of the natural environment have been indicated on documents of the guideline, district plan, or landscape district, or are newly indicated.
- Consideration for skylines of the peripheral area is evaluated for entire consideration that aims to prevent disruption of skylines of the periphery as much as possible such as making the height of buildings uniform and suppression of disorderly construction of high-rise buildings when specific rules regarding consideration for skylines of the peripheral area have been defined by the guideline, district plan, or landscape district, or are newly defined.

### Q<sub>UD</sub> 3 Economy

#### ●3.1 Traffic/Urban structure

##### ●3.1.1 Traffic

Traffic functions that support regional economic activities are evaluated from both view points of flow of people and logistics.

##### O3.1.1.1 Development of traffic facilities

###### 1) Traffic facilities in the district

The development level of roads, parking lots, bicycles parking areas, etc., is evaluated.

Level 1	Response status to the demand is unclear.
Level 2	(Not applicable)
Level 3	Response status to the demand is clear. The planning standard is fulfilled quantitatively.
Level 4	(Not applicable)
Level 5	Fulfilled quantitatively. Also, comfort is considered in terms of arrangement and shape.

###### □Description

- Quantitative securement of traffic facilities and the scheme for system operation are evaluated.
- This assessment premises that traffic demand (such as the generated traffic concentration volume, the required capacity of a parking lot, the required number of freight handling berths, etc.) in the block is correctly estimated. For estimation of the generated traffic concentration volume and the required capacity of a parking lot, the Large-Scale Development Region-Related Traffic Planning Manual (Revised Edition) published by the Urban Transportation Planning Office, City Planning Division, City and Regional Development Bureau, MLIT (March 2007) (<http://www.mlit.go.jp/crd/tosiko/manual/index.html>) is used and quoted. Personal trip survey results, etc., which are used for data acquisition of the sharing ratio for each means of transportation, may be available at a department of the municipalities concerned with traffic.
- A case where a traffic plan is established and traffic facilities according to traffic demand and traffic flow are quantitatively secured is evaluated as level 3 (including a case where dynamic traffic simulation is used).
- Traffic facilities that must reach a certain satisfactory quantitative level, first of all, the access road and pathway and the other elements depending on the traffic type. For general vehicles, these include a parking lot, a vehicle path in the parking lot, an entrance to the parking lot, etc. For service vehicles, these include a freight handling facility, an access way to the premises, etc., which are evaluated in 3.1.1.2. For pedestrians and bicycles, these include a walkway, bikeway, bicycle parking space, etc.
- In addition, a case where comfort is considered in the main part of the block in terms of arrangement and design of traffic facilities, such as clear separation between pedestrians and vehicles, compliance with a rule that requires vehicles to enter and leave a parking lot by turning left, etc., is evaluated as level 5.

## 2) Usability of public transportation

Distance to a railway station (including LRT/BRT station) or a bus stop is evaluated in combination with a measure for a comprehensive transportation system.

Level 1	The distance to a station is 1 km or more or to a bus stop is 500 m or more, and any comprehensive transportation measures are not taken.
Level 2	The distance to a station is 600 m or more (and less than 1 km) or to a bus stop is 300 m or more (and less than 500 m), and any comprehensive transportation measures are not taken.
Level 3	The distance to a station is less than 600 m or to a bus stop is less than 300 m, or comprehensive transportation measures are taken though the above is not met.
Level 4	The distance to a station is less than 300 m or a bus stop is directly connected, or comprehensive transportation measures are taken though the distance is equivalent to level 3.
Level 5	A station is directly connected, or comprehensive transportation measures are taken though the distance is equivalent to level 4.

### ☐ Description

- Distance to a railway station or a bus stop is evaluated in combination with a measure for a comprehensive transportation system.
- The railway station may include an LRT (Light Rail Transit) station and a BRT (Bus Rail Transit) station for this assessment.
- A comprehensive transportation measure is a measure that intends to establish a traffic environment where vehicles, bicycles, pedestrians, etc., are combined in a good balance focusing on public transportation in order to realize a sustainable traffic system that aims at countering the effects of an aging society with fewer children and realizing a low carbon society. Specifically, the measure includes arrangement of bicycle spaces and park-and-ride in cooperation with the road administrator and transportation business operator.

### O3.1.1.2 Logistics management

A logistics system in the block is evaluated in terms of rationalization and cooperative delivery.

Level 1	Measures are not taken.
Level 2	(Not applicable)
Level 3	Rules for freight handling (carrying in/out route, time zone, etc.) exist.
Level 4	Level 3 is met. In addition, sufficient space is secured for freight handling.
Level 5	Level 4 is met. In addition, cooperative delivery is worked on.

### ☐ Description

- Sufficient space for freight handling means securement of space that has enough capacity for prevention of traffic congestion and on-road freight handling during peak freight handling time.
- Efforts for cooperative delivery include establishment of a cooperative delivery center where freight is sorted according to the item category and destination and distributed to freight cars allocated according to the route. A case where related facilities are secured outside the object area can be included in this assessment, provided that the permanence of the system is assured.

### ●3.1.2 Urban structure

#### O3.1.2.1 Consistency with and complementing of upper level planning

This assessment is performed based on consistency with and utilization of urban infrastructures (in existence and planned). In addition, introduction of functions required in terms of urban management and an urban policy are also evaluated.

Level 1	Any consistency is not considered.
Level 2	(Not applicable)
Level 3	Consistent with an upper level plan.
Level 4	(Not applicable)
Level 5	Level 3 is met. District plans are proposed and introduced, or contributions to solving urban structural issues that were a concern in the area are worked on.

##### ☐Description

- An upper level plan includes the basic concept, basic planning, urban master plan, redevelopment policy, wide range traffic planning, etc., of the relevant municipalities. If a municipal policy such as these upper level plans clearly exists, assessment is necessary.
- A case where the application and facility structure of the block are found to be consistent with those of the upper level plan after comparison is evaluated as level 3. In addition, the case where the application and facility structure of the block contributes to proposing district plans and solving urban structural issues in the area is evaluated as level 5.
- Solving of urban structural issues includes opening of a new urban planning road due to development of the relevant area, i.e., resolution of a 'missing link'.

#### O3.1.2.2 Land use

##### 1) Utilization level of standard floor area ratio

The utilization level of the standard floor area ratio for areas where the specified floor area ratio is 400% or more is evaluated.

Level 1	Level 2 is not met.
Level 2	30% of the standard floor area ratio is utilized.
Level 3	50% or more of the standard floor area ratio is utilized.
Level 4	The major portion (90% or more) of the standard floor area ratio is utilized.
Level 5	Space larger than the standard floor area ratio is realized by a system or method.

(\* A case where the specified floor area ratio is less than 400% may be excluded from the assessment.)

##### ☐Description

- Districts and zones where the floor area ratio of 400% or more is specified by the urban planning are areas where the relevant municipalities expect its advanced utilization, and infrastructure development (public investment) for such advanced utilization is implemented. This assessment is based on the view that utilization of the floor area contributes to improvement of local economic performance.
- A case where an extra floor area ratio is realized by development methods is evaluated as level 5.
- The development methods include the comprehensive design system, the specific block, the efficient utilization district, the district plan specifying the redevelopment promotion district, and the special urban renaissance district.

## 2) Handling of brownfield site

Handling of a case where the Soil Contamination Countermeasures Act is applicable is evaluated.

Level 1	(Not applicable)
Level 2	(Not applicable)
Level 3	(Not applicable)
Level 4	The district is designated as an "area for which notification is required upon a change to form or nature". For development, a plan for prevention of diffusion is notified and a measurement based on that is taken.
Level 5	The area designation of the act is canceled by taking an independent detoxifying measure.

(\* A case where the Soil Contamination Countermeasures Act is not applicable may be excluded from the assessment.)

### ☐ Description

- A brownfield site is defined as "real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant" by the Small Business Liability Relief and Brownfields Revitalization Act in the United States. Also in Japan, this term is used for a site that is hardly developed because of contamination. A certain theory or definition is not established in Japan.
- If the development cost of an uncontaminated site (so called green field) is lower than the decontamination cost of a brownfield site, development of a suburban area particularly in an urban neighborhood is advanced resulting in acceleration of the destruction of nature. Therefore, development of a brownfield site should be evaluated highly because it promotes harmonization with the global environment and efficient use of existing urban assets.
- For measures for the Soil Contamination Countermeasures Act, a case where a brownfield site is handled is evaluated as level 4 or higher.
- The Soil Contamination Countermeasures Act defines measures for understanding the soil contamination conditions and for prevention of human health hazards caused by the contamination in order to implement soil contamination countermeasures and lead to public health protection. If the form or nature of the land used as a site for a plant or workplace for an abolished specified facility using hazardous substances or land with the suspected threat of soil contamination is changed, investigation of soil contamination is required for land where prefectures consider there is the threat of a health hazard by soil contamination. On the MOE website, details of the Soil Contamination Countermeasures Act (law, cabinet order, ordinance, public notice, and notice) are described.



## 3.2 Growth potential

### 3.2.1 Population

The population in the area is evaluated from the two viewpoints of inhabitant population and staying population based on the belief that the population in the area is one of the important sources of economic activity.

#### 3.2.1.1 Inhabitant population

Implementation results of the relevant district development project are evaluated based on an increase or decrease in comparison to the past state.

Level 1	Decreased by half in comparison to the past state.
Level 2	Middle between level 1 and level 3.
Level 3	Equivalent or higher in comparison to the past state.
Level 4	Increased twofold in comparison to the past state.
Level 5	Increased fourfold in comparison to the past state.

##### ☐ Description

- The "past state", which is the comparison standard, means five years ago from the start of the relevant project (used similarly in 3.2.1.2.)
- For details of assessment timing, refer to PART I 2.3.

#### 3.2.1.2 Staying population

Implementation results of the relevant district development project are evaluated based on an increase or decrease in comparison to the past state.

Level 1	Decreased by half in comparison to the past state.
Level 2	Middle between level 1 and level 3.
Level 3	Equivalent or higher in comparison to the past state.
Level 4	Increased twofold in comparison to the past state.
Level 5	Increased fourfold in comparison to the past state.

##### ☐ Description

- The staying population means the average staying number of people of each building application. For details of calculation, refer to PART I 2.4.1.

### ●3.2.2 Economic development

This assessment is performed from the viewpoint that inviting companies, investment, and community support for the area contribute significantly to the development of the local economy.

#### ○3.2.2.1 Revitalization activity

Efforts for economic revitalization programs are evaluated with separate assessment standards of the housing system and the non-housing system because the number of housing system items expected to be applicable is small. After assessment of the housing system and the non-housing system, perform weighted average with the rate of the scale (gross floor area).

Efforts for economic revitalization programs (housing system)

Evaluate according to the number of items worked on.

Level 1	(Not applicable)
Level 2	(Not applicable)
Level 3	No items are worked on.
Level 4	One item is worked on.
Level 5	Two or more items are worked on.

Efforts for economic revitalization programs (non-housing system)

Evaluate according to the number of items worked on.

Level 1	No items are worked on.
Level 2	One item is worked on.
Level 3	Two items are worked on.
Level 4	Three items are worked on.
Level 5	Four or more items are worked on.

Effort items to be evaluated

Item	Content
(1) Company advancement and investment	An organization that attracts company advancement and investment to the area exists.
(2) Cooperative sales and events	Cooperative sales promotion and events are implemented organizationally and systematically.
(3) Local company support	Products are purchased systematically from local companies.
(4) Cooperative activities with the area	Cooperative activities with the area are implemented.
(5) Area management	Business schemes for establishment of financial base of area management such as finance are set.
(6) Other efforts	Other advanced efforts exist.

☐ Description

- The organization that attracts company advancement and investment introduces governmental support measures for attracting companies and unoccupied property in the block and sends information for company advancement and investment all at once.
- The cooperative activities with the area include an approach based on collaboration between government, industry and academia, a cooperative business with companies in and around the block, and a cooperative approach with residents in and around the block.
- Establishment of the financial base of area management is evaluated when there are schemes so that an SPC is formed for development of public facilities and/or that the administration body has ownership of leased land in the block and manages the area based on the rental income from the property.

### 3.3 Efficiency/Rationality

#### 3.3.1 Information system

The flexibility and usability of the information environment of the block (LAN or wireless LAN) is evaluated. In addition, block infrastructure system management utilizing ICT is evaluated. (However, energy-related matters evaluated in 3.3.2 are excluded.)

##### Q3.3.1.1 Information service performance

This assessment is performed based on efforts for communication line capacity, Internet communication speed, and utilization methods.

Information service performance

Level 1	No items are worked on.
Level 2	One item is worked on.
Level 3	Two items are worked on.
Level 4	Three items are worked on.
Level 5	Four or more items are worked on.

Effort items to be evaluated

Item	Content
(1) Communication line capacity	Sufficient capacity of communication line is secured in comparison to estimated communication traffic volume in the block.
(2) CATV	CATV is introduced.
(3) Security measure	Security is assured by network monitoring.
(4) High speed Internet	Connectivity to high speed Internet is secured even for outdoor space.
(5) Other efforts	Other advanced efforts exist.

☐ Description

- Development of WiFi as well as indoor wired LAN in the block is evaluated. The communication line includes the main line connected to the block and LAN cables in the block. High speed Internet means optical lines and WiFi.
- The estimated communication traffic volume in the block is set based on understood inhabitant population and staying population, and also the number of expected visitors.
- Security assurance with network monitoring is evaluated based on measures in area information centers that keep all information related to the block.

### O3.3.1.2 Block management

Uniform management conditions of infrastructure in the block are evaluated.

Block management

Level 1	(Not applicable)
Level 2	No items are worked on.
Level 3	One item is worked on.
Level 4	Two items are worked on.
Level 5	Three or more items are worked on.

Effort items to be evaluated

Item	Content
(1) Water demand and supply management	Water demand and supply is managed.
(2) Waste	Waste treatment and recycling is performed.
(3) Medical information	Medical information is transmitted and shared.
(4) Public service information	Public service information is transmitted and shared.
(5) Traffic management	Traffic management is performed.

☐ Description

- Management of water demand and supply is evaluated in cases where water utilization is optimized by a comprehensive management system utilizing ICT. Specifically, development of advanced water leakage detection systems utilizing ICT cooperatively with the administration and realization of a water smart grid that integrates water usage into a network are included.
- Medical information and public service information are evaluated based on transmission and sharing of information using a bulletin board, digital signage, local news, community notice, etc. The digital signage represents an advertising medium that utilizes digital technologies for display and communication to display images and information using a flat display or a projector.
- Traffic management is evaluated in a case where the Intelligent Transport Systems (ITS), which utilize the latest ICT to establish a system integrating people, roads, and vehicles, are introduced.

### ●3.3.2 Energy system

Flexibility to change in energy demand and price (such as diversified supplier, demand response (a method to balance the energy demand and supply by changing the electricity fee depending on the time zone so that the electricity fee at a peak time is higher in order to suppress electric power consumption), etc.) and medium- and long-term easiness of updating and expansion for the whole block are evaluated.

#### ○3.3.2.1 Possibility to make demand/supply system smart

Technology introduction for smartification of energy demand and supply system in the block is evaluated based on the number of items.

Smartification of demand and supply system

Level 1	No items are worked on.
Level 2	One item is worked on.
Level 3	Two items are worked on.
Level 4	Three items are worked on.
Level 5	Four or more items are worked on.

Effort items to be evaluated

Item	Content
(1) Smart meter	A smart meter is introduced.
(2) BEMS, HEMS	BEMS and HEMS are introduced in buildings.
(3) CEMS	CEMS is established in the whole block.
(4) Renewable energy and unused energy	Renewable energy and unused energy are utilized.
(5) Other efforts	The other schemes of advanced efforts or business exist.

☐Description

- The supply and treatment system in the block is evaluated based on improvement in the efficiency of maintenance through integration and networking and flexibility for functional expansion.
- BEMS represents the building energy management system, HEMS represents the home energy management system, and CEMS represents the community energy management system.
- Utilization of renewable energy and unused energy is evaluated based on utilization of solar energy, wind power energy, river water heat energy, ground water heat energy, sewage heat energy, etc.

### 03.3.2.2 Updatability and expandability

Efforts of piping and wiring are evaluated based on renewability and expandability.

Renewability and expandability

Level 1	No items are worked on.
Level 2	(Not applicable)
Level 3	One item is worked on.
Level 4	(Not applicable)
Level 5	Two or more items are worked on.

Effort items to be evaluated

Item	Content
(1) Piping and wiring material	Piping and wiring material that has long renewal period are selected.
(2) Utility corridor	A utility corridor exists.
(3) Other efforts	Other advanced efforts or business schemes exist.

☐ Description

- Consideration for piping and wiring material is evaluated when material with a long renewal period is selected in reference to the renewal standard of Building and Equipment Long-life Cycle Association (BELCA) or the like.
- This utility corridor represents not a conventional conduit of individual piping systems for each building but a wire common trench installed in the block.
- The other advanced efforts include a district heating/cooling system or the like, if any.



## 2. Environmental load of urban development

### 2.1 Basic policy of $L_{UD}$ assessment

#### 2.1.1 $L_{UD}$ assessment procedure

Figure II.2.1 shows outline flow of assessment of  $L_{UD}$ .

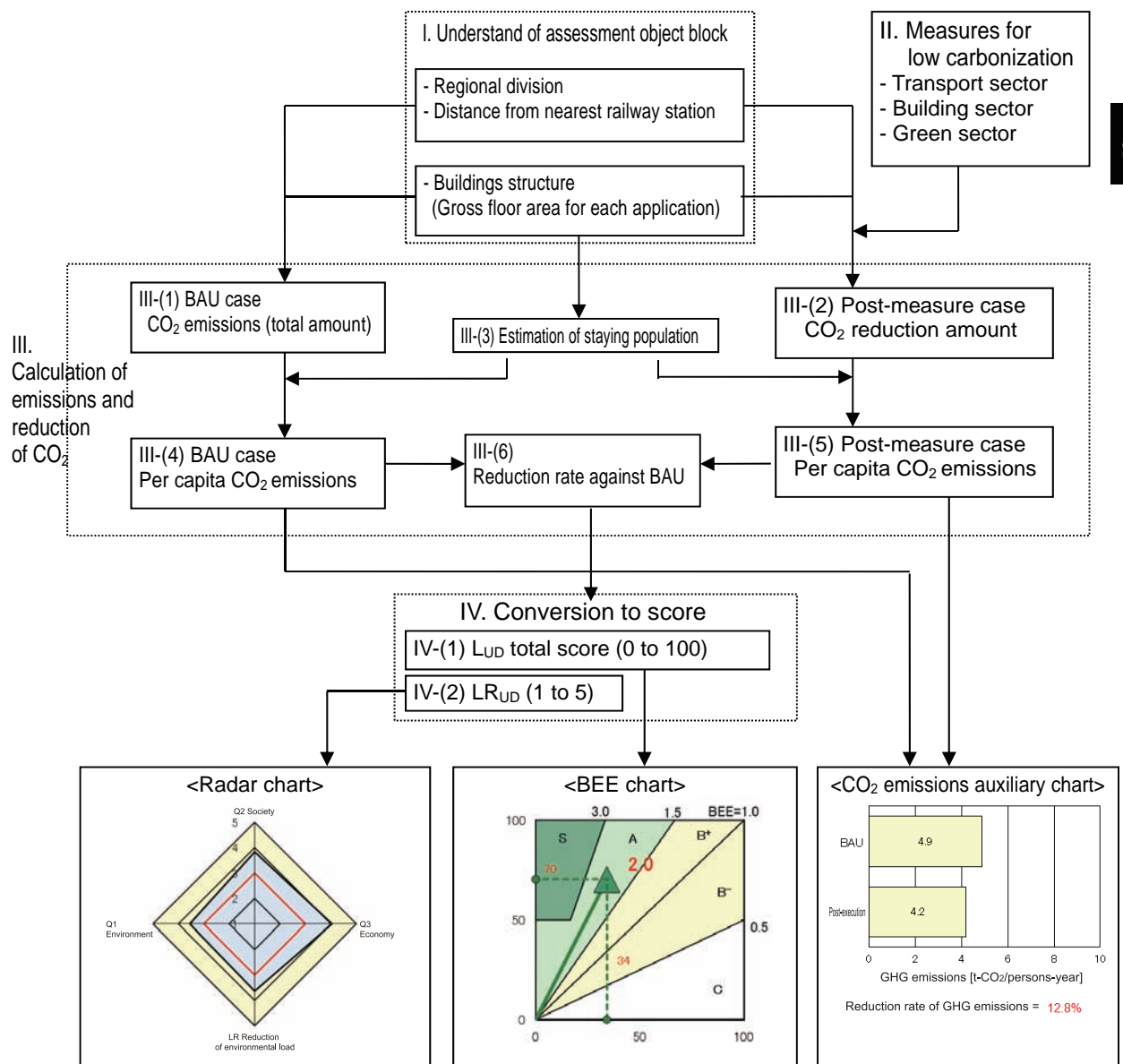


Figure II.2.1 Outline flow of assessment of  $L_{UD}$  and  $LR_{UD}$

In zone III above, emissions and reduction of CO<sub>2</sub> are calculated for each of the L<sub>UD</sub>1 transport sector, the L<sub>UD</sub>2 building sector, and the L<sub>UD</sub>3 green sector described below according to the "Manual for Low Carbon City Development" (MLIT, MOE, and METI, December 2012) and "Integrated Urban Development Project Plan Certification Application Manual" (MLIT, December 2012).

For the zone IV conversion to score above, the sub of L<sub>UD</sub>1, L<sub>UD</sub>2, and L<sub>UD</sub>3 is evaluated.

The assessment in zone III is performed practically and rationally using one of the following calculation methods:

- (1) Calculation based on actual values
- (2) Calculation based on the target reduction rate
- (3) Calculation based on simulation of the low carbon measures to be introduced
- (4) Estimation based on the introduced energy saving measures

Selection from (1) to (4) shall be based on the following criteria in principle, depending on the judgment of the evaluator.

- When the past block conditions are evaluated without change and actual results in the object site are available, method (1) can be used for assessment.
- In the development stage of a future concept where the building plan has not been clearly defined and therefore the reduction amount cannot be calculated, method (2) can be used for assessment based on the target value of the reduction rate (e.g., 20% reduced against BAU, etc.) instead. In this case, however, a target value of ten or less years later after implementation of the measures shall be used, and it is necessary to indicate the cause of the target value such as the reference of the upper level plan.
- When the amount of GHG emissions from the building to be constructed can be calculated using a program released to the public, method (3) can be used for assessment.
- Regardless of a planned building or an existing building, method (4) can be used for assessment based on the application ratio of the environmental measure to be introduced when the application and gross floor area of the building can be understood and the actual results, calculation results, and target values are not available.

### **2.1.2 Handling of GHG emissions of products in industrial field**

Typically, products in industrial fields are distributed beyond the boundary to the outside of the object block and utilized outside the boundary. Therefore, CASBEE for Urban Development considers GHG emissions of industry fields as emissions at the place of consumption and does not count such emissions in the assessment object block regardless of the BAU value or the post-execution value.

### **2.1.3 Handling of low carbon measures worked on beyond the relevant block**

Low carbon measures such as the business operator's independent efforts or through governmental regulations, which are not measures taken by the relevant block, are judged on a case-by-case basis.

(1) For lowering of GHG emissions, establishment of a reduction target for each of the transport, building, and green sectors, for every type of business, and for every product, and efforts for its achievement (sectoral approach) are considered and promoted in various fields. When evaluated as efforts of the relevant block, these can be reflected in the LR assessment as a reduction effect for BAU cases.

(2) The reduction amount of GHG due to the measures worked on beyond the relevant block such as the direct effects of governmental regulations and uniform improvement in fuel consumption of transportation facilities is equally considered for both BAU and post-execution values.

## 2.2 Concept for each assessment item

Basically, the configuration of  $L_{UD}$  assessment items is according to the "Manual for Low Carbon City Development" as shown in Table II.2.1. For each item, the annual total emissions amount in the relevant block (t-CO<sub>2</sub>) is calculated, and then the per capita emissions amount [t-CO<sub>2</sub> / person-year] for the staying population is calculated.

**Table II.2.1 Configuration of  $L_{UD}$  assessment items (same as Table I.2.3)**

Major item	Middle item	Small item	Corresponding with standard method examples (1) to (7) described in the Manual for Low Carbon City Development
$L_{UD1}$ CO <sub>2</sub> emissions from traffic sector	—	—	(1), (2), (3), (7)
$L_{UD2}$ CO <sub>2</sub> emissions from building sector	—	—	(5), (6)
$L_{UD3}$ CO <sub>2</sub> absorption by green sector	—	—	(4)

Overview of each item is as the following:

### 2.2.1 $L_{UD1}$ : CO<sub>2</sub> emissions amount from traffic sector

#### (1) CO<sub>2</sub> emissions in BAU case

CASBEE for Urban Development uses the calculation tool of the "Integrated Urban Development Project Plan Certification Application Manual".

Emissions amount in the BAU case can be calculated by entering the classification of the city that contains the assessment object block (central part of metropolitan area, suburb of metropolitan area, or local city), the gross floor area (m<sup>2</sup>) for each building application, and the distance from the nearest railway station in the relevant block (m).

#### (2) CO<sub>2</sub> reduction amount due to measures

For the CO<sub>2</sub> emissions amount generated along with energy consumption in the traffic sector, four standard measures are described in the "Manual for Low Carbon City Development". In CASBEE for Urban Development, these are handled as the following:

##### [1] Development of an area that is the base for concentration of urban functions and adjustment of positioning of urban functions

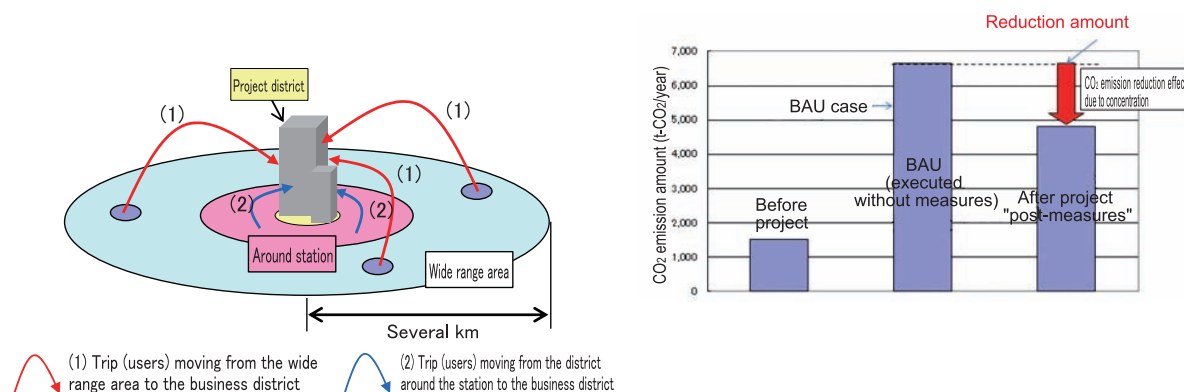
For accumulation of various urban functions in the relevant block, the low carbon measures in this item include attraction of residents, location of business functions, location of other urban functions (medical and commercial functions), development of intensive parking facilities, and promotion of development of a town of "on-foot" lifestyle (arrangement of walkways and bicycle pathways, adoption of barrier-free design, etc.).

The CO<sub>2</sub> reduction effect due to this measure is worked out using the calculation tool in the "Integrated Urban Development Project Plan Certification Application Manual" (City Bureau and Housing Bureau, MLIT). The Score Sheet of CASBEE for Urban Development (2014 Edition) has a calculation function, and BAU emissions amount, reduction amount, and post-execution amount are automatically calculated.

\* Figure II.2.2 shows the general picture of the "Integrated Urban Development Project Plan Certification Application Manual" (City Bureau and Housing Bureau, MLIT) described above. In CASBEE for Urban Development, this calculation tool is operated according to the following policy.

- 1) Because calculation of the original calculation tool is based on the condition that widely dispersed urban functions users are gathered in the business district, the post-project total amount of urban functions of the assessment object urban area is not changed and arrangement of urban functions is changed. On the other hand, because CASBEE for Urban Development focuses on the block where the project is executed, the calculation tool can trial-calculate BAU CO<sub>2</sub> emissions amount on the assumption of a wide dispersion of urban functions and post-project CO<sub>2</sub> emissions amount on the assumption of gathered urban functions for post-project gross floor area of each application in the assessment object block.
- 2) The original calculation tool adopts a transportation sharing ratio for each urban classification, and the classification "center part of metropolitan area" is common for Tokyo 23 wards, Nagoya city, and Osaka city. However, because Tokyo 23 wards have a tendency to have a transportation sharing ratio different from the other cities due to the status of railway networks, etc., the calculation tool in

CASBEE for Urban Development can select "Tokyo 23 wards" or "Center part of other metropolitan area" separately. (The transportation sharing ratio of "Tokyo 23 wards" uses the latest person trip survey data of Tokyo metropolitan area (Tokyo 23 wards) and the ratios of the others are the set values of the original calculation tool.)



**Figure II.2.2 General picture of CO<sub>2</sub> reduction effect calculation tool in the "Integrated Urban Development Project Plan Certification Application Manual"**

#### [2] Utilization promotion of public transportation

Measures for improvement in public transportation sharing ratio include improvement in convenience of railways, buses, LRT, etc., popularization of eco-commuting, etc. Some of them can be evaluated as the assessment tool used in (1) and others are measures of the level outside the boundary of the assessment object block. The latter case should be considered equally for BAU in the relevant block and all of the post-measure cases according to the policy of 2.1.3 and shall not be included in the calculation of the reduction effect.

Refer to the calculation method in "Manual for Low Carbon City Development", if necessary.

#### [3] Rationalization of freight traffic

Rationalization of freight traffic includes promotion of efficiency improvement in urban logistics (cooperation of delivery). Generally, this is an effort of the level outside the block and should be considered equally for BAU in the relevant block and all of the post-measure cases according to the policy of 2.1.3 and shall not be included in the calculation of the reduction effect.

Refer to the calculation method in the "Manual for Low Carbon City Development", if necessary.

#### [4] Promotion of reduction of CO<sub>2</sub> emissions caused by use of automobiles

Methods for lowering of CO<sub>2</sub> emissions caused by use of automobiles include promotion of electric vehicles, promotion of eco-driving, utilization of very small vehicles, etc. Some of them can be evaluated as the assessment tool used in (1) and others are measures of the level outside the boundary of the assessment object block. The latter case should be considered equally for BAU in the relevant block and all of the post-measure cases according to the policy of 2.1.3 and shall not be included in calculation of the reduction effect.

Refer to the calculation method in the "Manual for Low Carbon City Development", if necessary.

## 2.2.2 L<sub>UD</sub>2: CO<sub>2</sub> emission from building sector

The CO<sub>2</sub> emissions amount from the building sector includes CO<sub>2</sub> emissions associated with energy use of business buildings and residential buildings (detached houses and housing complexes). The reduction amount of CO<sub>2</sub> emissions due to efforts such as the energy saving measures of buildings and efforts of the whole area including district heat supply in comparison to a case where buildings and houses in the object block are planned with average specifications (BAU case) is evaluated.

### (1) Calculation of CO<sub>2</sub> emissions of BAU case

For a BAU case of business buildings, the average value of primary energy consumption for each building application in "Database for Energy Consumption of Commercial Building (DECC)" is adopted, and the average CO<sub>2</sub> emissions amount is calculated in reference to the energy component percentage of energy consumption for each building application in the DECC (Table II.2.2). For a BAU case for residential buildings, the value corresponding to "Inhabit" in a reference case of the LCCO2 calculation procedure (2014 edition) in CASBEE for Detached House and CASBEE for Dwelling Unit is adopted as the BAU value (Table II.2.3).

The Score Sheet of CASBEE for Urban Development (2014 Edition) calculates the CO<sub>2</sub> emissions intensity against the primary energy consumption by setting a CO<sub>2</sub> emissions factor (kg-CO<sub>2</sub>/kWh) of electricity used in the assessment for energy consumption and the classification in Table II.2.2 and Table II.2.3 below.

The CO<sub>2</sub> emissions amount of a BAU case in the building sector is calculated by multiplying this CO<sub>2</sub> emissions intensity by the gross floor area (m<sup>2</sup>) for each building application.

**Table II.2.2 Primary energy consumption intensity and energy component percentage for CO<sub>2</sub> calculation of business buildings**

Building application	Primary energy consumption (MJ/m <sup>2</sup> -yr)	Primary energy composition ratio per energy source (%)		
		Electricity	Town gas	Other
Offices	1,745	90	6	4
Schools	973	79	12	9
Elementary, junior high, and high schools	376	70	13	17
Retailers	4,171	92	3	5
Restaurants	17,920	50	38	12
Halls	1,320	75	16	9
Factories	500	100	0	0
Hospitals	2,428	65	15	20
Hotels	2,630	77	10	13

\* Edited from published data of Database for Energy Consumption of Commercial Building (2014)

**Table II.2.3 Primary energy consumption intensity for CO<sub>2</sub> calculation of residential buildings**

Application	Area classification						Ratio (%)		Energy classification	Unit
	I	II	III	IV	V	VI	Detached house	Residential complex		
Heating	23.0	15.6	12.0	6.5	4.3	0.0	100	50	Electricity	kWh/m <sup>2</sup> -year
Cooling	0.0	0.1	0.5	1.5	1.5	4.0	100	100	Electricity	kWh/m <sup>2</sup> -year
Water heater	172.0	207.1	208.4	194.8	158.8	117.5	100	100	Town gas	MJ/m <sup>2</sup> -yr
Lighting	6.8	6.8	6.8	6.8	6.8	6.8	100	100	Electricity	kWh/m <sup>2</sup> -year
Home electric appliances	13.6	14.2	15.0	15.0	14.4	14.2	100	100	Electricity	kWh/m <sup>2</sup> -year
Cooking	24.7	25.6	27.1	27.2	26.1	25.6	100	100	Town gas	MJ/m <sup>2</sup> -yr
Ventilating	3.4	3.5	3.7	3.7	3.6	3.5	100	100	Electricity	kWh/m <sup>2</sup> -year
Water saving	1.6	1.6	1.6	1.6	1.6	1.6	100	100	Electricity	kWh/m <sup>2</sup> -year
Common use	10.3	10.3	10.3	10.3	10.3	10.3	0	100	Electricity	kWh/m <sup>2</sup> -year

\* Cited from CASBEE for Detached House (New Construction) 2014 Edition, CASBEE for Dwelling Unit (New Construction) 2014 Edition Manual

**Table II.2.4 CO<sub>2</sub> emissions factor for each energy classification for calculation of LCCO<sub>2</sub>**

Classification	CO <sub>2</sub> emissions factor		Remarks
Electricity	※	kg-CO <sub>2</sub> /MJ	* The value obtained by converting the evaluator-selected value (kg-CO <sub>2</sub> /kWh) by 9.76 MJ/kWh (All-day average conversion factor of Energy Saving Law 2013)
Town gas	0.0499	kg-CO <sub>2</sub> /MJ	
Kerosene	0.0678	kg-CO <sub>2</sub> /MJ	
Type A heavy oil	0.0693	kg-CO <sub>2</sub> /MJ	
LPG	0.0590	kg-CO <sub>2</sub> /MJ	Used for dwelling application in standard calculation
Other	0.0686	kg-CO <sub>2</sub> /MJ	(Average value of (kerosene + type A heavy oil))

**(2) Calculation of CO<sub>2</sub> reduction amount due to certain measures**

The "Manual for Low Carbon City Development" includes two standard policies as low carbon policies of the building sector (home and business). In CASBEE for Urban Development, these are handled as the following:

**[1] Promotion of low-carbonization of buildings**

Low-carbonization of buildings includes various energy saving measures for new constructions and the existing stocks.

The energy saving ratio for each equipment item resulting from the measuring of buildings is calculated by referring to the energy saving ratio for each measure item shown in "Standard for Assessment of the Environmental Preservation Performance of Government Building Facilities and Renovation Plan (supervised by Government Buildings Department, Minister's Secretariat, MLIT)" and by utilizing the released reduction rate and general-purpose energy simulation tools such as the primary energy consumption calculation program (for dwellings/buildings), "BEST program", "LCEM tool", etc.

- \*1) Standard for Assessment of the Environmental Preservation Performance of Government Building: Renovation standard regarding environmental preservation of government buildings supervised by Government Buildings Department, Minister's Secretariat, MLIT
- \*2) BEST program: Comprehensive energy simulation tool for buildings published by Institute for Building Environment and Energy Conservation
- \*3) LCEM tool: Life Cycle Energy Management procedure for government buildings supervised by Government Buildings Department, Minister's Secretariat, MLIT

**[2] Utilization of public facilities for establishment of facilities that contribute to use of non-fossil energy and efficient use of fossil fuel**

This includes the reduction of consumption of energy derived from fossil fuels through sharing of heat such as a district heating/cooling system and heat accommodation between buildings (extended use of energy) or effective utilization of renewable energy and unused energy.

For the reduction amount in a case where extended measures such as connection to the district heat supply is taken, the heat-source-derived CO<sub>2</sub> emissions amount among CO<sub>2</sub> emissions amount of the building itself in [1] above is multiplied by the CO<sub>2</sub> emission reduction ratio according to the existence of management policies for operation. (Refer to Figure II.2.3.)

\* CO<sub>2</sub> emissions reduction ratio: effects due to connection to district heat supplies by the Japan Heat Supply Business Association in 2004 in a research project commissioned by METI in FY2002. The net effect that is the sum of the energy saving effect and the energy increasing effect shown here is as follows:

- In the case where management policies for operation are established ----- 12% (=16+9-10-3)
- In the case where management policies for operation are not established ----- 3% (=16-10-3)

For detailed calculation, annual conditions of electric demand, heat demand, plant equipment constitution, equipment characteristics, operation policies, and utilization possibility of unused energy in the calculation object area are taken into consideration.



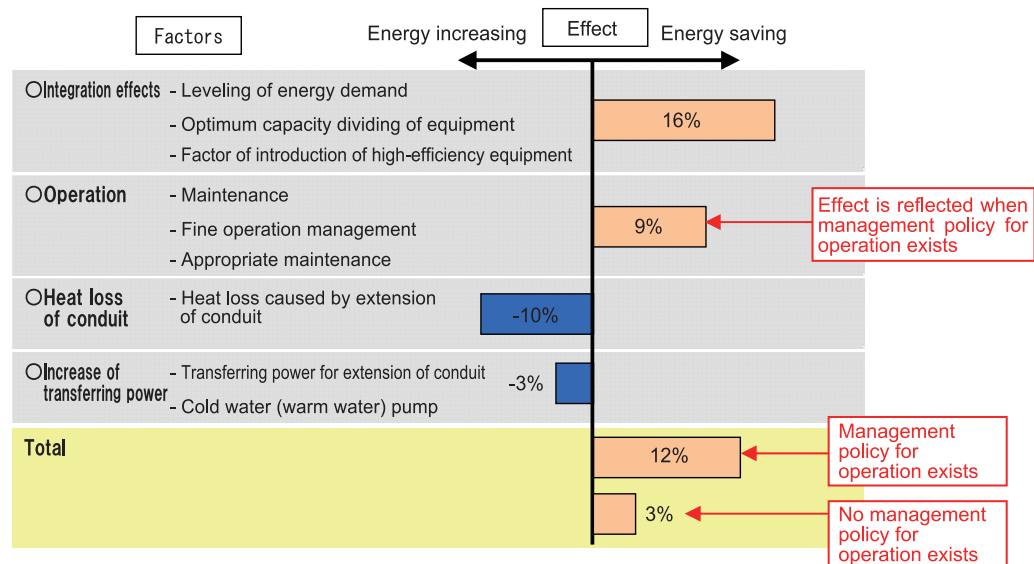


Figure II.2.3 Energy saving effect with sharing of heat (extended energy use)

### 2.2.3 L<sub>up</sub>3: CO<sub>2</sub> absorption of green sector

Manual for Low Carbon City Development contains development of green zones in public spaces, planting of tall trees on private lands, maintenance of green zones, and improvement in heat environment with rooftop greening. These are handled in CASBEE for Urban Development as the following:

#### (1) Calculation of CO<sub>2</sub> emissions in BAU case

In a BAU case, the BAU emissions amount is calculated by the following formula on the assumption that 3% of the relevant block site area is maintained green zones.

$$[\text{CO}_2 \text{ absorption amount (t-CO}_2\text{/year)}] = 4.95 (\text{t-CO}_2\text{/ha-year}) \times [\text{Relevant block site area (ha)}] \times 0.03$$

The absorption intensity (4.95) used in the above formula is explained in (2) below.

#### (2) Calculation of post-measure CO<sub>2</sub> absorption amount

Promotion of development of parks and green zones in urban public spaces and greening of public benefit facilities allow for securement of GHG absorption sources. Maintaining green zones in the relevant block allows for securement of GHG absorption sources.

##### [1] CO<sub>2</sub> absorption due to development of green zones in public spaces and planting of tree trees on private lands

For the object block where the number of tall trees cannot be ascertained and greening with 200 or more trees per hectare is performed, the following formula shown in the Manual for Low Carbon City Development is used.

$$[\text{CO}_2 \text{ absorption amount (t-CO}_2\text{/year)}] = 14.45 (\text{t-CO}_2\text{/ha-year}) \times [\text{Greening area (ha)}]$$

##### [2] CO<sub>2</sub> absorption amount due to maintenance of green zone

For a case where maintenance such as thinning and complementary planting is performed, the following formula shown in the Manual for Low Carbon City Development is used.

$$[\text{CO}_2 \text{ absorption amount (t-CO}_2\text{/year)}] = 4.95 \text{ (t-CO}_2\text{/ha-year)} \times [\text{Maintained area (ha)}]$$

[3] CO<sub>2</sub> reduction amount due to rooftop greening

The following formula is used in reference to a calculation example using the cooling system heat load reduction effect due to greening shown in the Manual for Low Carbon City Development.

$$\begin{aligned} & [\text{CO}_2 \text{ reduction amount (t-CO}_2\text{/year)}] \\ & = 52 \text{ (t-CO}_2\text{/ha-year)} \times [\text{Rooftop greening execution area (ha)}] \end{aligned}$$

Standard calculations handled in CASBEE for Urban Development are as described above. Not only these, but also in cases where the number of tall trees can be ascertained or where the maintenance status of green zones meet certain conditions, separate calculations are performed according to the Manual for Low Carbon City Development, if necessary.

(Note)

Typically, a block where urban functions and houses are concentrated, L<sub>UD3</sub> is quantitatively smaller than L<sub>UD1</sub> or L<sub>UD2</sub>. But, greening and preservation of green zones have effects other than absorption of GHG. Therefore, a greening-related item is prepared for Q<sub>UD1</sub> (environment) in order to evaluate proactive efforts based on improvement in environmental quality.

## 2.3 Calculation of per capita value

### 2.3.1 Total CO<sub>2</sub> emissions amount from the object block

The CO<sub>2</sub> emissions amount and CO<sub>2</sub> reduction amount of L<sub>UD</sub>1 (traffic sector), L<sub>UD</sub>2 (building sector), and L<sub>UD</sub>3 (green sector) calculated in 2.2 are added up. CO<sub>2</sub> emissions in the relevant block in a BAU case and CO<sub>2</sub> emissions in a post-measure case are calculated with the following formulas:

(For both cases, the unit is t-CO<sub>2</sub>/year)

[CO<sub>2</sub> emissions in BAU case]

$$= [\text{CO}_2 \text{ emissions amount of L}_{UD1} \text{ (traffic sector) in BAU case}] \\ + [\text{CO}_2 \text{ emissions amount of L}_{UD2} \text{ (building sector) in BAU case}] \\ - [\text{CO}_2 \text{ absorption amount of L}_{UD3} \text{ (green sector) in BAU case}]$$

[CO<sub>2</sub> emissions in post-measure case]

$$= ([\text{CO}_2 \text{ emissions amount of L}_{UD1} \text{ (traffic sector) in BAU case}] - [\text{CO}_2 \text{ reduction amount of L}_{UD1} \text{ (traffic sector)}]) \\ + ([\text{CO}_2 \text{ emissions amount of L}_{UD2} \text{ (building sector) in BAU case}] - [\text{CO}_2 \text{ reduction amount of L}_{UD2} \text{ (building sector)}]) \\ - [\text{CO}_2 \text{ absorption amount of L}_{UD3} \text{ (green sector) in post-measure case}]$$

Figure II.2.4 shows a conceptual drawing of the above calculations (the unit is t-CO<sub>2</sub>/year)

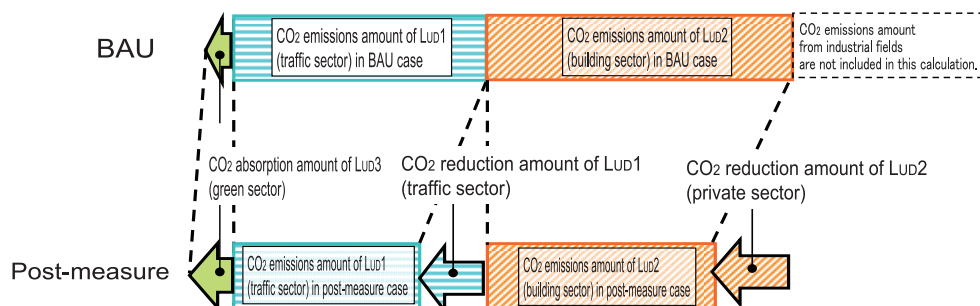


Figure II.2.4 Adding up of CO<sub>2</sub> emissions (conceptual drawing)

### 2.3.2 Estimation of staying population

As described in 2.5.2 of Part I, this tool uses the annual per capita CO<sub>2</sub> emissions amount converted from the added up CO<sub>2</sub> emissions amount in order to maintain neutrality regardless of the scale of the block.

As the population in the block, the "staying population" shown in 2.4 of Part I is used. The Score Sheet contained in this tool calculates the staying population automatically when the gross floor area for each building application in the object block is entered.

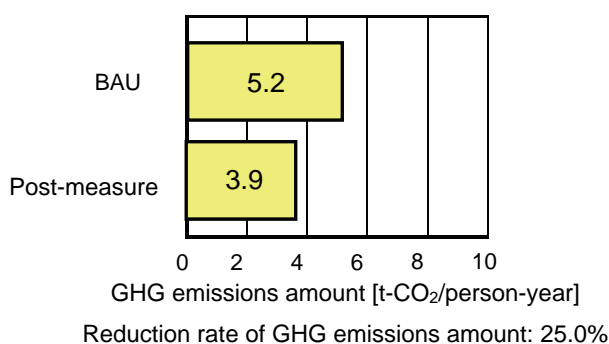
### 2.3.3 Calculation of per capita CO<sub>2</sub> emissions amount

Annual per capita CO<sub>2</sub> emissions amount is calculated for both a BAU case and a post-measure case using the following formulas:

$$\begin{aligned} & \text{[Annual per capita CO}_2 \text{ emissions amount in BAU case (t-CO}_2\text{/person-year)]} \\ &= \text{[CO}_2 \text{ emissions amount in BAU case (t-CO}_2\text{/year)]} / \text{[Staying population (persons)]} \end{aligned}$$

$$\begin{aligned} & \text{[Annual per capita CO}_2 \text{ emissions amount in post-measure case (t-CO}_2\text{/person-year)]} \\ &= \text{[Annual CO}_2 \text{ emissions amount in post-measure case (t-CO}_2\text{/year)]} / \text{[Staying population (persons)]} \end{aligned}$$

In the CASBEE for Urban Development Score Sheet, these calculation results are represented as an auxiliary chart shown in Figure II.2.5.



**Figure II.2.5 Auxiliary chart example of annual per capita CO<sub>2</sub> emissions amount**

#### (Supplement)

##### **In cases where the staying population differs between the BAU case and the post-measure case**

According to the "Integrated Urban Development Project Plan Certification Application Manual", the application and the scale of a building are the same for a BAU case and a post-measure case and the two cases differ only in their locations. In a BAU case, buildings are assumed to be separated from each other and from a station virtually. Therefore, average staying populations for each building application for both cases are the same, and the staying populations of the two cases do not differ.

Because of a difference in the integration level of the location, however, the number of visitors may differ between the two cases. In such case, different values can be used as the staying population for the BAU case and the post-measure case, but automatic calculation of the Score Sheet cannot be used and the evaluator is required to count the staying populations of the two cases independently.

## 2.4 $L_{UD}$ total score and conversion to $LR_{UD}$

### 2.4.1 Reference point of $L_{UD}$ total score

If the actual value of per capita CO<sub>2</sub> emissions amount (t-CO<sub>2</sub>/person-year) in the assessment object block is used as the  $L_{UD}$  total score (0 to 100) in calculation of BEE ( $Q_{UD}/L_{UD}$ ), the BAU case itself varies significantly depending on the characteristics of the relevant block such as whether the block mainly contains residential functions or economic activities including business and commerce. When a measure of a large-scale absorption source is taken in  $L_{UD}3$  (green sector) in addition, the emissions amount in a post-measure case may be a negative value. Therefore, the BEE calculation is required to deal with a possible negative value.

Accordingly, the  $L_{UD}$  total score in this tool is defined as the following:

- The level of efforts to reduce CO<sub>2</sub> as much as possible in comparison to a BAU case through taking low carbon measures in the block in consideration of the characteristics of the block that differ depending on the block is evaluated.
- The score is calculated using a logistic curve so that the  $L_{UD}$  total score does not result in a negative value and reduction efforts around  $L=50$  (corresponding to level 3 of  $LR_{UD}$ ) become sensitive.

Reference points of  $L_{UD}$  total score on a logistic curve are defined as shown in Table II.2.5.

**Table II.2.5 Reference points of  $L_{UD}$  total score**

Reference point of $L_{UD}$ total score	$LR_{UD}$ level	Setting standard
50	3	BAU emission minus 5%
25	4	BAU emission minus 18%

\* Definition of reference point

- 1) The reference point for  $LR=3$  is set to a level minimally required against BAU that is set to the conventional standard. In the block, currently, the ratio of CO<sub>2</sub> emissions from the traffic sector to the CO<sub>2</sub> emissions from the building sector is one-to-one to one-to-two including the traffic sector based on trip numbers coming and going in the block. In addition, the revision of the energy saving standard in FY2013 causes houses and buildings in the building sector to become the level of the conventional standard minus 10%. Taking these into consideration, at least the future standard of BAU minus 5% is required for the sum of traffic and building sectors. The reference point for  $LR=3$  is set to this.
- 2) Based on the long-term objective "Reduction of 80% by 2050" indicated in "Current Policy of Global Warming Countermeasures" published by the Global Warming Prevention Headquarters in March 2013 and decided by the Cabinet and the objective "Reduction of 3.8% from 2005 by 2020" decided in October 2013, "a reduction of approximately 1.8% is needed every year in order to attain the objective of a reduction of 80% by 2050 with respect to the 2005 level. In the case of "Ten years later, after implementation of measures", which CASBEE for Urban Development uses as a reference, this corresponds to minus 18%. The reference point for  $LR=4$  is set to this.

## 2.4.2 Conversion to $L_{UD}$ total score and $LR_{UD}$

According to the concept described in 2.4.1, the values of  $L_{UD}$  total score and  $LR_{UD}$  are calculated by the following conversion formulas.

$$[L_{UD} \text{ total score}] = 100 \times \frac{1}{1 + \exp(-a \times (X - m))}$$

X: Annual per capita CO<sub>2</sub> emissions in post-measure case

m: Annual per capita CO<sub>2</sub> emissions in BAU case minus 5%

a: Gain (coefficient for enhancing sensitivity around  $L_{UD}=50$ )

This coefficient is set defined so that the calculation results in  $L_{UD}=25$  in the case of annual per capita CO<sub>2</sub> emissions in BAU case minus 18%

--- =  $7.6923 \times \ln(3) / [\text{Annual per capita CO}_2 \text{ emissions in BAU case}]$

$$LR_{UD} = 5 - [L_{UD} \text{ total score}] / 25$$

Figure II.2.6 shows the logistic curve. On the CASBEE for Urban Development Score Sheet,  $L_{UD}$  total score and  $LR_{UD}$  are calculated automatically.

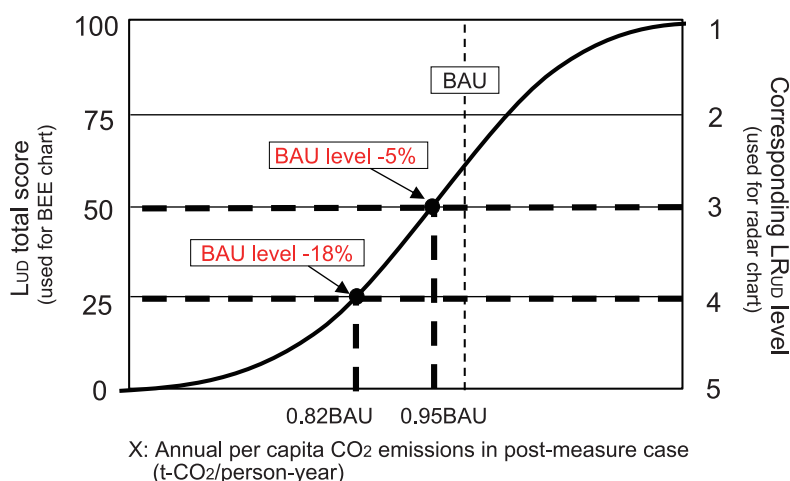


Figure II.2.6 Conversion to  $L_{UD}$  total score and  $LR_{UD}$  using the logistic curve

## PART III. Assessment procedures

### 3.1 Structure of assessment sheet

CASBEE for Urban Development (2014 Edition) is developed so that data can be entered on general-purpose spreadsheet software on the assumption of various utilizations of assessment results. Prepared main assessment sheets include the Main Sheet and the Score Entry Sheet for input and the Score Sheet and the Assessment Results Sheet for output. Into the Main Sheet, basic information related to the execution of assessments is entered. Into the Scoring Sheet, on which scoring criteria are indicated for each assessment item, scoring results are entered according to the criteria.

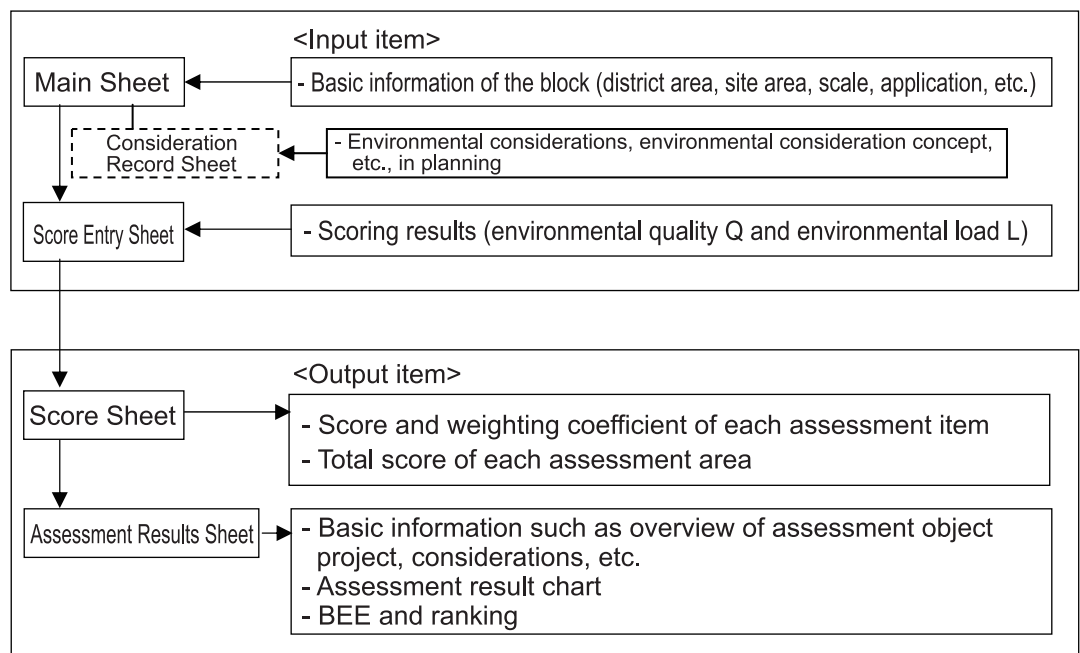


Figure III.1.1 Overall structure of assessment sheet

### 3.2 Main Sheet

The Main Sheet is a primary sheet into which the evaluator enters the overview of the assessment object project and information needed for assessment. Figure III.2.1 shows the Main Sheet.

With regard to the building coverage ratio and the floor area ratio, the four types of "specified", "standard", "allowable", and "planned" are used separately as the following:

- Specified building coverage ratio and specified floor area ratio: the building coverage ratio and floor area ratio by region specified together with application, etc., by urban planning.
- Standard building coverage ratio and standard floor area ratio: when the assessment object district stretches over two or more areas with different specified building coverage ratios and specified floor area ratios, a building coverage ratio and a floor area ratio weighted and averaged according to the district area of the object project belonging to each area are used.
- Allowable building coverage ratio and allowable floor area ratio: the allowable upper limit of the building coverage ratio and floor area ratio applied to the relevant project. Normally the standard building coverage ratio and the standard floor area ratio have the same meaning. If values unique to the assessment object district are specified independently by a system or method of the district planning, however, the specified values are the allowable building coverage ratio and allowable floor area ratio.
- Planned building coverage ratio and planned floor area ratio: the building coverage ratio and floor area ratio calculated by the actual facility scale and site area being constructed or planned in the relevant project. These are within the allowable building coverage ratio and allowable floor area ratio.

There are four sets of columns (1) to (4) for entry of the district and zone of the urban plan including



the specified building coverage ratio and specified floor area ratio. Up to four kinds of values can be entered into these columns. If the object district stretches over five or more different areas, enter the main four.

There are the columns for entry of the assessment date and the assessor names (preparing the relevant assessment sheet). Up to six assessor names can be entered. In addition, the verification date and referee name (one person) need to be entered in order to clearly indicate the check system of input information and assessment results. When entry of the overview is finished, each sheet can be called on the screen by clicking the sheet name displayed in the column in the lower part of the sheet.

**CASBEE® for Urban Development**

**Assessment software**

Version: CASBEE-UD\_2014(v1.00)  
Assessment manual used: CASBEE for Urban Development (2014 Edition)

**1) Entry of overview**

**[1] Overview of object district**

Development name: Project A  
Location: Chiyoda-ku, Tokyo  
Completion (planned completion/completed): January 2014  
Assessment software used: CASBEE-UD\_2014(v1.00)

District and zone

	District and zone (1)	District and zone (2)
Commercial district, fire prevention district		
Specified building coverage ratio	80.0 %	
Specified floor area ratio	800.0 %	

District and zone (3) District and zone (4)

Specified building coverage ratio		%
Specified floor area ratio		%

Housing system Non-housing system

Ratio of housing and non-housing	50.0	50.0 %
Standard building coverage ratio		70.0 %
Standard floor area ratio		445.0 %
Applied system or project	Class 1 urban redevelopment project	
	Redevelopment district plan	
Allowable building coverage ratio		100.0 %
Allowable floor area ratio		760.0 %
District area		5.0 ha
Site area		2.5 ha
Building area		16000 m <sup>2</sup>
Planned building coverage ratio		64.0 %
Gross floor area		200000 m <sup>2</sup>
Planned floor area ratio		800.0 %

**Others**

Upper level plan (Reference plan): ○○○

**[2] Execution of assessment**

Preparation date: 2014/X/X

Assessed by

Assessed by (1)	Assessed by (2)	Assessed by (3)
■■■■	■■■■	■■■■
Assessed by (4)	Assessed by (5)	Assessed by (6)
■■■■	■■■■	■■■■

Verification Date: 2014/X/X

Verified by: □□□□

**2) Display on each sheet**

Assessment Results Sheet: ● Display

Score Sheet: ● Score

Consideration Sheet: ● Consideration

Scoring Q sheet: ● Q1 ● Q2 ● Q3

Scoring L sheet: ● L ● L (entry in detail)

Figure III.2.1 Main Sheet screen (entry example)

The Main Sheet is accompanied by the Consideration Sheet, into which a comprehensive comment for the concept, etc., and considerations for the six areas of Q1 to L3 and other issues are entered with regard to the planned items and executed items related to environmental considerations of the assessment object project. The information entered into the Main Sheet (and also the Consideration Sheet) is automatically transcribed into the necessary columns on each sheet and the Assessment Results Sheet.

### 3.3 Score Entry Sheet

The Score Entry Sheet is a set of sheets on which the evaluator actually enters scores, and includes sheets for assessment fields of "Scoring Q1", "Scoring Q2", "Scoring Q3", "Scoring L", and "Scoring L (Energy Detail Entry)". The evaluator performs an assessment according to the assessment reference indicated for each of the assessment items in the sheet.

On a sheet, the cell to be entered is displayed in light blue, and the evaluator can answer the item through the pull-down system. Basically, the score is automatically calculated by performing a selection according to instructions on the screen, and operation procedures are clearly understandable.

#### 3.3.1 Scoring of environmental quality Q (Scoring Sheets Q1, Q2 and Q3)

The Score Entry Sheet contains scoring criteria and effort items as shown in Figure III.3.1 and Figure III.3.2. The evaluator performs scoring by selecting the relevant level directly or selecting the effort item according to the table. For some assessment items, "N.A." can be selected when the scoring criteria is inapplicable because of the individual conditions of the object district. When "N.A." is selected, the weight of the N.A. item is set to zero and distributed proportionally to the other items unless otherwise noted.

##### 1.1.1.2 1) Reduction of sewage discharge amount

Level 3	Assessment criteria
Level 1	Not considered.
Level 2	(Not applicable)
■ Level 3	Water saving-type toilet systems (6 l/use or less) are used.
Level 4	Water saving-type toilet systems (5 l/use or less) are used.
Level 5	Unique treated water supply system is established in the block.

Figure III.3.1 Score Entry Sheet screen (example of direct level selection)

##### 2.2.1.1 2) Disaster prevention of various infrastructures

Level 3	Assessment criteria
Level 1	No items are worked on.
Level 2	(Not applicable)
■ Level 3	Working on one item for each of a, b, and c.
Level 4	(Not applicable)
Level 5	Working on one or more items for each of a, b, and c, and working on five or more items in total.
Checklist	
Worked on	a. Communication infrastructure [1] Measures for flood damage prevention, earthquake, and power interruption are available.
Not worked on	a. Communication infrastructure [2] Two or more communication systems with the outside of the area are available. Wireless connection such as WiFi can be considered as a communication system here.
Worked on	b. Water supply/treatment infrastructure [1] Normal earthquake resistance standards are met.
Not worked on	b. Water supply/treatment infrastructure [2] A common facility for storing potable water, or a system for sharing clean water between buildings in the block is available.
Worked on	c. Energy supply infrastructure [1] Normal earthquake resistance standards are met.
Not worked on	c. Energy supply infrastructure [2] A medium pressure gas supply system is used, or the electric power and heat supply is connected with the outside of the area (district heating/cooling system).
Not worked on	c. Energy supply infrastructure [3] An autonomous power supply system that can cover the load of the disaster key point in the block for 72 hours or more is available.

Figure III.3.2 Score Entry Sheet screen (example of effort item selection)

### 3.3.2 Scoring of environmental load L (Scoring L Sheet and Scoring L (Energy Details Entry) Sheet)

Open the Scoring L Sheet. In cells in light blue, select the status of the assessment object block from the pull-down list or enter a value directly according to directions in the sheet.

Points of attention in entries on an assessment sheet of L environmental load are shown below.

#### 1. Object city

##### 1) City classification of object area

The evaluator need not judge the classification by himself or herself. City classification of the object area can be selected from the pull-down menu according to the classification shown in the following table.

**Table III.3.1 City classification of object area**

Classification	Location of object area
Central part of metropolitan area	Tokyo 23 wards, Nagoya city, Osaka city
Suburb of metropolitan area	Cities in three major metropolitan areas (Tokyo, Saitama, Chiba, Kanagawa, Aichi, Gifu, Mie, Osaka, Kyoto, Hyogo, and Nara prefectures) except for above-mentioned cities
Local city	Cities outside of three major metropolitan areas

##### 2) Region of object area

The relevant region classification of the assessment object area can be selected from the pull-down menu.

#### 2. Entry of overview of buildings in the block

In this item, the site area of the assessment object scope and the floor area constituting ratio of the buildings in the object site for each building application are entered. Classification of the building application is equivalent to that of CASBEE for Construction and entered in reference to the following table.

For a housing complex, the ratio of the common areas and the residential part of the building is needed for CO<sub>2</sub> calculation. Therefore, enter the ratio of the residential part for a housing complex.

**Table III.3.2 Example of classification of building application**

Classification	Building application	Types included
Non-housing	Offices	Offices, government buildings, libraries, museums, post offices etc.
	Schools	Elementary schools, junior high schools, high schools, universities, technical colleges, higher vocational school and other school types
	Retailers	Department stores, supermarkets, etc.
	Restaurants	Restaurants, canteens, cafes etc.
	Halls	Auditoriums, halls, bowling lanes, gymnasiums, theaters, movie theaters, pachinko parlors etc.
	Factories	Factories, garages, warehouses, spectator stands, wholesale markets, computer rooms, etc.
Housing	Hospitals	Hospitals, homes for elderly, welfare homes for the handicapped etc.
	Hotels	Hotels, inn, etc.
	Housing complexes	Housing complexes (detached houses are not applied.)

#### 3. Distance to nearest railway station

Enter the distance to the nearest railway station. For this entry, the distance from the center of the site is used. If there are two or more nearest stations depending on the location in the site, calculate the distance to be entered using the following formula.

[Distance to nearest railway station]

= [Site area of each block] x [Distance from nearest station to each block] / [Site area of whole blocks]

#### 4. Trial calculation of staying population

The staying population is calculated automatically when the floor area constituting ratio is entered, and therefore need not be entered by the evaluator.

### 5. Determination of CO<sub>2</sub> emissions factor of electric power

The CO<sub>2</sub> emissions factor of electric power is set individually by the evaluator. The latest value as of December 19, 2013 is indicated on the assessment sheet as a reference, but the evaluator needs to set the value for an actual assessment using the latest values such as one released by the power company to be used or planned to be used.

### 6. Energy saving measures of buildings

The effects of energy saving measures of buildings are calculated. The energy saving effect is determined as an effect based on the common standard level, using the average value for each building application in DECC data (Data-base for Energy Consumption of Commercial Building, released by JSBC) as a reference value. The energy saving effects are entered using one of the following four methods:

**Table III.3.3 Calculation of reduction amount of CO<sub>2</sub> emissions due to energy saving effect of building**

Calculation method	Entry method	Note
[1] Calculation based on result value	Enter the result value.	When the past block conditions are evaluated without change and the actual results in the object site are available, enter the result value.
[2] Calculation based on target reduction ratio	Enter the target value.	Enter the value for each building application.
[3] Calculation based on individual simulation of introduced CO <sub>2</sub> reduction measure	Enter the calculation result.	Calculate the CO <sub>2</sub> emissions amount of the building planned to be constructed using programs released to the public.
[4] Estimation based on introduced energy saving measure	Select the energy saving measure.	<p>When there is no result value, calculation result, or target value, select the application ratio of the environmental measure planned to be introduced. This method is adopted when entry using either of the above methods [1] to [3] is difficult.</p> <p>To enter measures, use the application ratio expressed as a percentage for each of the measures prepared. When applied thoroughly, the measure is entered as 100. When not applied at all, the measure is entered as 0. Measures need to be entered separately for residential and non-residential buildings.</p> <p>When solar power generation equipment is entered, use the rated output value planned to be introduced instead of the application ratio. In the case of the introduction of a solar collector, enter the panel area as the introduction scale. In the case of the introduction of cogeneration equipment, enter directly the reduction amount of CO<sub>2</sub> emissions calculated using the other program.</p>

### 7. Entry of greening area

Enter the greening area in the site of the block. The greening area is calculated by the calculation method prepared by the municipalities to which the assessment object site belongs, if available.

When the value is entered into the relevant field on the Scoring L (Energy Detail Entry) Sheet after selection of the option, the CO<sub>2</sub> emissions amount is calculated. The CO<sub>2</sub> absorption amount is calculated when the green zone area in the block is entered.

## 3.4 Score Sheet

Figure III.4.1 shows the Score Sheet. On the Score Sheet, the scoring results of values entered into the Score Entry Sheet are listed. The scoring results that are automatically shown in this list are the values obtained by multiplying the score of each item by the respective weighting coefficient and adding up the weighted results thereof for fields Q1 to Q3 and L1 to L3.

Entry columns in light blue for an environmental consideration plan have no effect on the assessment result itself, but it is recommended that the evaluator explains specific details of the initiatives here.

CASBEE for Urban Development (2014 Edition)					■ Assessment manual used: CASBEE for Urban Development (2014 Edition)	
Project A					■ Assessment software: CASBEE-UD_2014(v1.00)	
Score Sheet						
Consideration item	Entry column for environmental consideration plan	Assessment score	Weighting coefficient	Total		
<b>Q Environmental quality of urban development</b>				<b>3.0</b>		
<b>Q1 Environment</b>				<b>3.0</b>		
<b>1.1 Resource</b>						
1.1.1 Water resource						
1.1.1.1 Waterworks						
1) Rain water utilization		3.0	0.125			
2) Treated water		3.0	0.125			
1.1.1.2 Sewage						
1) Reduction of sewage discharge amount		3.0	0.125			
2) Reduction of rain water discharge amount: Capacity of detention pond		3.0	0.063			
Reduction of rain water discharge amount: Rain water permeable surface and permeation facility		3.0	0.063			
1.1.2 Resources recycling						
1.1.2.1 Construction						
1) Wood material		3.0	0.125			
2) Recycled material		3.0	0.125			
1.1.2.2 Operation						
1) Garbage separation		3.0	0.125			
2) In-area resource circulation		3.0	0.125			
<b>1.2 Nature (greenery and biodiversity)</b>						
1.2.1 Green						
1.2.1.1 Greening of ground surface		3.0	0.250			
1.2.1.2 Greening on top of building						
1) Rooftop greening		3.0	0.125			
2) Wall greening		3.0	0.125			
1.2.2 Biodiversity						
1.2.2.1 Preservation						
1) Natural resources		3.0	0.125			
2) Terrain		3.0	0.125			
1.2.2.2 Regeneration and creation						
1) Patch (planar) quality: Habitat space of species		3.0	0.063			
Patch (planar) quality: Consideration for regionality		3.0	0.063			
2) Corridor (network) quality		3.0	0.125			
<b>1.3 Artifact (building)</b>						
1.3.1 Environmentally friendly buildings		3.0	1.000			
<b>Q2 Society</b>				<b>3.0</b>		
<b>2.1 Impartiality/Fairness</b>						
2.1.1 Compliance		3.0	0.500			
2.1.2 Area management		3.0	0.500			
<b>2.2 Security/Safety</b>						
2.2.1 Disaster prevention						
2.2.1.1 Basic disaster prevention performance						
1) Understanding of hazard map		3.0	0.083			
2) Disaster prevention of various infrastructures		3.0	0.083			
2.2.1.2 Disaster response ability						
1) Disaster prevention vacant space and evacuation route		3.0	0.083			
2) Continuity of business and life in the block		3.0	0.083			
2.2.2 Traffic safety		3.0	0.333			
2.2.3 Crime prevention		3.0	0.333			
<b>2.3 Amenity</b>						
2.3.1 Convenience and welfare						
2.3.1.1 Convenience		3.0	0.250			
2.3.1.2 Health and welfare, education						
1) Distance to medical and health and welfare facility		3.0	0.083			
2) Distance to educational facility		3.0	0.083			
3) Time distance to cultural facility		3.0	0.083			
2.3.2 Culture						
2.3.2.1 History and culture		3.0	0.250			
2.3.2.2 View						
1) Consideration for formation of townscape and landscape in the district		3.0	0.125			
2) Harmonization with the periphery		3.0	0.125			
<b>Q3 Economy</b>				<b>3.0</b>		
<b>3.1 Traffic/Urban structure</b>						
3.1.1 Traffic						
3.1.1.1 Development of traffic facilities						
1) Traffic facilities in the district		3.0	0.125			
2) Usability of public transportation		3.0	0.125			
3.1.1.2 Logistics management		3.0	0.250			
3.1.2 Urban structure						
3.1.2.1 Consistency with and complementing of upper level planning		3.0	0.250			
3.1.2.2 Land use						
1) Utilization level of standard floor area ratio		3.0	0.250			
2) Handling of brownfield site		N.A.	-			
<b>3.2 Growth potential</b>						
3.2.1 Population						
3.2.1.1 Inhabitant population		3.0	0.250			
3.2.1.2 Staying population		3.0	0.250			
3.2.2 Economic development						
3.2.2.1 Revitalization activity						
Housing		N.A.	-			
Non-housing		3.0	0.500			
<b>3.3 Efficiency and Rationality</b>						
3.3.1 Information system						
3.3.1.1 Information service performance		3.0	0.250			
3.3.1.2 Block management		3.0	0.250			
3.3.2 Energy system						
3.3.2.1 Possibility to make demand and supply system smart		3.0	0.250			
3.3.2.2 Updatability and expandability		3.0	0.250			
<b>L: Environmental load of urban development</b>				<b>49.7</b>		
<b>LR: Score of reduction of environmental load in block (out of a maximum of 5)</b>				<b>3.0</b>		
<b>1 Traffic sector</b>						
1.1 BAU		1.6				
1.2 Post-execution		1.5				
<b>2 Building sector</b>						
2.1 BAU		2.7				
2.2 Post-execution		2.5				
<b>3 Greening sector</b>						
3.1 BAU		0.0				
3.2 Post-execution		0.0				
<b>Total CO<sub>2</sub> emissions amount in BAU case</b>		<b>4.2</b>	<b>t-CO<sub>2</sub>/person-year</b>			
<b>Total CO<sub>2</sub> emissions amount in post-measures case</b>		<b>4.0</b>	<b>t-CO<sub>2</sub>/person-year</b>			

Figure III.4.1 Score Sheet of CASBEE for Urban Development

### 3.5 Assessment Results Sheet

On the Assessment Results Sheet, results of Q (environmental quality of urban development), L (environmental load of urban development), and BEE (environmental efficiency of urban development) are indicated by a chart and values. In addition, the relevant project information is summarized in a sheet to allow the assessment result of CASBEE for Urban Development to be readily understood. Figure III.5.1 shows the whole picture of the sheet. The outline of the design is unified with the other CASBEE assessment tools, while displaying characteristics of CASBEE for Urban Development.

#### 1 Object district overview

In "1-1 Block overview", information entered into the Main Sheet (project name, location, zone and district, building coverage ratio, floor area ratio, project overview, etc.) is indicated automatically, in addition to basic items related to the execution of assessment such as the preparation date, assessor name, verification date, and referee name.

In "1-2 Object district", the general plan view (facility location diagram) of the assessment object district is shown in principle. In addition, appropriate drawings can be pasted into the field "Block image" located thereunder.

#### 2 Assessment results

This field indicates environmental performance assessment results of the block. The results are shown in charts based on the results of scoring items obtained on the Score Sheet.

The scores of assessment items are indicated as values where the numbers beyond the first decimal place are truncated. The calculation of scores of items is performed based on the values that are not truncated.

##### 2-1 Environmental efficiency of urban development (BEE: Built Environment Efficiency)

This field indicates "environmental efficiency of urban development: BEE" calculated based on the assessment results of Q (environmental quality of the urban development) and L (environmental load of the urban development).

The relation between the total scores (out of a maximum of 100) of Q and L, the score SQ (1 to 5) of the sector Q, and the score SLR (1 to 5) of the sector LR is as the following:

$$\begin{aligned} \text{BEE} &= \frac{Q}{L} \\ &= \frac{25 \times (\text{SQ} - 1)}{25 \times (5 - \text{SLR})} \end{aligned}$$

The total score of Q (out of a maximum of 100), which is a converted value of the score SQ (1 to 5) of the sector Q, is defined as  $Q = 25 \times (\text{SQ} - 1)$ . The total score of L (out of a maximum of 100) and the score SLR (1 to 5) of the sector LR are calculated based on the CO<sub>2</sub> emissions amount in the block, and the relationship between them is defined as  $L = 25 \times (5 - \text{SLR})$ .

BEE is indicated as the value where the numbers beyond the first decimal place are truncated. Calculation of BEE is performed based on the value that is not truncated until the final result is obtained. On the left of the field, a graph of BEE representing Q on the Y axis and L on the X axis is displayed. In this graph, the BEE value is represented as the slope of a line connecting the origin (L=0, Q=0) and the point of coordinates (L, Q). When the value Q is larger and the value L is smaller, the BEE value becomes larger and the block is evaluated as being more sustainable.

CASBEE performs labelling of the comprehensive environmental performance assessment result of the block based on the range separated into the five ranks of C, B<sup>-</sup>, B<sup>+</sup>, A, and S according to the slope. Each rank corresponds to the expression of assessment shown in Table III.5.1, and is expressed with the number of stars so as to be easily understood.

**Table III.5.1 Relation of BEE value and rank/assessment**

Rank	Assessment	BEE value	Rank expression
S	Excellent	BEE is 3.0 or more and Q is 50 or more.	★★★★★
A	Very Good	BEE is 1.5 or more but less than 3.0 BEE is 3.0 or more and Q is less than 50.	★★★★★
B <sup>+</sup>	Good	BEE is 1.0 or more but less than 1.5.	★★★
B <sup>-</sup>	Fairly Poor	BEE is 0.5 or more but less than 1.0.	★★
C	Poor	BEE is less than 0.5.	★

## 2-2 CO<sub>2</sub> emissions chart

This chart indicates the BAU (Business As Usual) value that represents the trend value without the execution of any method and the post-execution value for the amount of GHG emissions from the object project.

## 2-3 Radar chart

Scores of four fields of Q1, Q2, Q3, and LR are collectively indicated in the radar chart located in column 2-3 so that characteristics of environmental consideration in the object district can be understood at a glance.

## 2-4 Bar chart

This field indicates Q (environmental quality of block) and L (environmental load of block). In the upper column of the field, assessment results of "Q1 Environment", "Q2 Society", and "Q3 Economy" are respectively shown in the bar chart consisting of middle items. In the lower column of the field, CO<sub>2</sub> emissions or absorption amount of "L1 Traffic sector", "L2 Building sector", and "L3 Green sector" is shown.

## 3 Considerations in planning

Considerations in the planning of the object project described in the "Consideration Sheet", which accompanies the Main Sheet, are automatically indicated as reference data of the assessment result.

## 4 Consistency with upper level planning

This column shows consistency with the upper level planning. The contents of "Upper level planning" of the Main Sheet are automatically indicated.



## CASBEE® for Urban Development

## Display contents

Assessment manual used CASBEE for Urban Development (2014 Edition) ■ Assessment Software: CASBEE-UD 2014 (v1.00)

## 【Display contents】

## 1-1 Block overview

## 1-2 Object district

## 2-1 Environmental efficiency of urban development

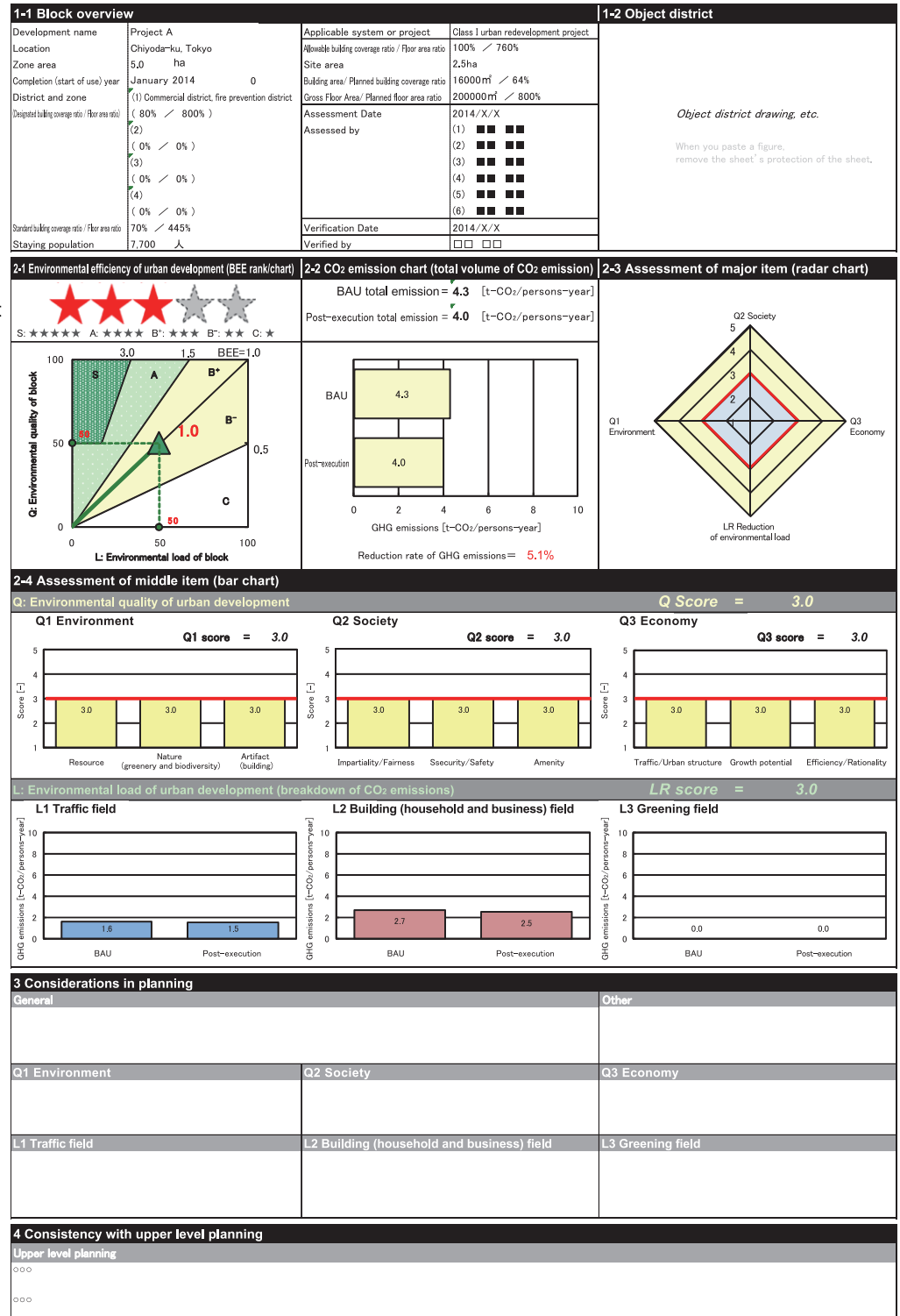
2-2 CO<sub>2</sub> emissions chart

## 2-3 Radar chart

## 2-4 Bar chart

## 3 Considerations in planning

## 4 Consistency with upper level planning



■ CASBEE: Comprehensive Assessment System for Built Environment Efficiency  
 ■ Q: Quality (environmental quality of block), L: Load (environmental load of block), BEE: Built Environment Efficiency (environmental efficiency of block), BAU: Business As Usual

Figure III.5.1 Assessment Results Sheet of CASBEE for Urban Development

**[Appendix]**  
**CASBEE for Urban Development**  
**List of assessment items**  
**and assessment standards    $Q_{UD}1, 2, 3$**

CASBEE for Urban Development Assessment Contents [Q<sub>UD</sub>1 "Environment"]

Middle item	Small item	Minor item	Details and methods of assessment		Assessment criteria				
					Level 1	Level 2	Level 3	Level 4	Level 5
1.1 Resource	1.1.1 Water resource	1.1.1.1 Waterworks	1) Rain water utilization	Rain water utilization of buildings and outdoor areas	No rain water is utilized.	(Not applicable)	Rain water is utilized.	Rain water is utilized inside the building in addition to outdoor utilization such as watering.	The rain water utilization rate is 80% or higher.
			2) Treated water	Utilization of common treated water supply facility in the block or wide area treated water supply	(Not applicable)	(Not applicable)	No utilization.	Utilized in some facilities in the block.	Utilized in a majority of the facilities in the block.
		1.1.1.2 Sewerage	1) Reduction of sewage discharge amount	Existence of advanced treatment equipment used for sewage and gray water discharged from the block	No consideration.	(Not applicable)	Water-saving-type toilet systems (6 l/use or less) are used.	Super-water-saving-type toilet systems (5 l/use or less) are used.	Unique treated water supply system is established in the block.
			2) Reduction of rain water discharge amount	[1] Capacity of detention pond: Capacity of detention pond for suppressing outflow of rain water from the block  [2] Rain water permeable surfaces and equipment: Introduction rate of rainwater permeable surfaces and facilities such as natural surfaces, permeable pavements, permeable trenches in the block	(Not applicable)  Not introduced.	(Not applicable)  (Not applicable)	Regulating capacity according to the legal requirement.  Introduced.	(Not applicable)  (Not applicable)	Regulating capacity equal to or higher than the legal requirement.  Introduced to the majority of vacant space, or there is a permeable trench having similar functions
	1.1.2 Resources recycling	1.1.2.1 Construction	1) Wood material	Utilization of wood materials produced from sustainable forests	(Not applicable)	No wood material produced from sustainable forests is used.	There is a building that uses wood materials produced from sustainable forests.	There are multiple buildings that use wood materials produced from sustainable forests.	Wood materials produced from sustainable forests are used at the rate of 0.005 m <sup>3</sup> per floor area of 1 m <sup>2</sup> .
			2) Recycled material	Average usage number of certified recyclable items in a building in the block	No recycled materials are used.	(Not applicable)	One article of recycled material is used.	Two articles of recycled material are used.	Four or more articles of recycled material are used.
		1.1.2.2 Operation	1) Garbage separation	Average weight of the number of garbage separation items (for which the disposal route is secured) in a building in the block	The number of separation items is less than that of the municipality's designation.	(Not applicable)	Garbage separation is performed according to the number of separation items designated by the municipality.	The number of garbage separation items is that of the municipality's designation plus one.	The number of garbage separation items is that of the municipality's designation plus two or more.
			2) In-area resource circulation	Existence of resource circulation efforts such as composting in the block	(Not applicable)	(Not applicable)	No resource circulation.	Fallen leaves are collected and used as compost for resource circulation.	Raw garbage is correctly disposed of for resource circulation.
1.2 Nature (greenery and biodiversity)	1.2.1 Greenery	1.2.1.1 Ground greening	1) Greening ratio	Amount of green zone area (including water surface) to block area (Efforts for parking lots are reflected in the assessment)	Less than 10%	10% or more but less than 20%	20% or more but less than 30%	30% or more but less than 40%	40% or more
		1.2.1.2 Building top greening (Detached houses are excluded)	1) Rooftop greening	Amount of the rooftop greening area (including water surface)	Less than 15%	15% or more but less than 20%	20% or more but less than 30%	30% or more but less than 40%	40% or more
			2) Wall greening	Amount of wall greening area (including walls of a multistory parking lot)	(Not applicable)	(Not applicable)	No wall is greened.	Any part of the walls is greened.	5% or more of whole wall area is greened.
	1.2.2 Biodiversity	1.2.2.1 Preservation	1) Natural resources	Understanding of natural resources to be preserved and preservation scale	Natural resources to be preserved are not understood.	(Not applicable)	Natural resources to be preserved are understood.	Natural resources to be preserved are understood and a part of the natural resources is preserved.	Natural resources to be preserved are understood and the majority is preserved.
			2) Landform	Existence of consideration for terrain characteristics and transformation of terrain in block development and building construction	(Not applicable)	(Not applicable)	Landform transformation is performed according to development activity.	Artificial transformation of natural landform is suppressed or conservation of effective surface soil is performed.	Artificial transformation of natural landform is suppressed and conservation of effective surface soil is performed.
		1.2.2.2 Regeneration and creation	1) Patch (planar) quality	(1) Habitat space of species: Existence of establishment of habitat space such as biotopes and sanctuaries for various species  (2) Consideration for regionality: Existence of consideration for regionality	No habitat space of various species is established.  No greening plan being conscious of plant species that originally lived in the area (native species) is carried out.	(Not applicable)  (Not applicable)	A collection of green areas into which people cannot enter are established.  Greening with plant species that originally lived in the area (native species) is partly performed.	Habitat space of various species is established collectively.  Greening that uses plant species that originally lived in the area (native species) for a majority of the block is performed.	Habitat space of various species is established collectively and its area is 3% or more of the assessment object area.  Greening with use of plant species that originally lived in the area (native species) for almost all the block is performed.
			2) Corridor (network) quality	Securing level of green environment in consideration of species network	The network of species is not taken into consideration.	An ecological corridor that supports the movement of species is established by partly dividing roadside trees.	An ecological corridor that supports the movement of species is established by continuous roadside trees.	An ecological corridor that supports the movement of species is established by stepping-stone-like green zones in addition to continuous roadside trees.	An ecological corridor that supports the movement of species is established by a belt-shaped green zone in addition to continuous roadside trees.
1.3 Artifact (building)	1.3.1 Environmentally friendly buildings		1) CASBEE assessment of building	Execution ratio of CASBEE assessment (New Construction, Detached House, and Market Promotion)	There is no building evaluated with CASBEE.	(Not applicable)	There are some buildings evaluated or to be evaluated with CASBEE.	The majority of buildings are evaluated or to be evaluated with CASBEE.	The majority of buildings are evaluated or to be evaluated with CASBEE and there are some buildings that have been certified by a third party and obtained A or a higher rank.

CASBEE for Urban Development Assessment Contents [Q<sub>UD</sub>2 "Society"]

Middle item	Small item	Minor item	Details and methods of assessment		Assessment criteria				
					Level 1	Level 2	Level 3	Level 4	Level 5
2.1 Impartiality/Fairness	2.1.1 Compliance	–	Observation of applicable laws and regulations and verification	A case that observes laws and regulations regarding wind damage, radio waves, traffic, sunlight, light damage, soil pollution, noise, vibration, odor, air pollution, groundwater withdrawal, and water quality applicable to the relevant project, executes independent environmental assessment and environmental measurement, and publishes and reflects in the plan the results is evaluated highly.	There are many buildings based on a lower standard than the current laws and regulations.	There are several buildings based on a lower standard than the current laws and regulations.	Laws and regulations applicable to the relevant project are observed.	An environmental assessment or environmental measurement independently executed depending on the characteristics of the project is published.	An environmental assessment or environmental measurement independently executed depending on the characteristics of the project is published and the results are reflected in planning.
	2.1.2 Area management	–	Securing system for cooperation with and promotion of local community	Evaluated based on existence of a neighborhood association or an area management organization (involving inhabitants of the block, tenant companies and their employees, inhabitants of the periphery of the block, and the local government). Evaluated based on existence of a system which the relevant local government, regional inhabitants, and companies can participate in according to progress of the project. A case where a cooperative system with the peripheral area communities is established is evaluated highly.	No neighborhood association or area management organization exists in the block.	(Not applicable)	A neighborhood association or area management organization exists in the block.	A neighborhood association or area management organization exists in the block. A promotion entity and fund for continuous operation of the organization are planned and secured.	A neighborhood association or area management organization exists in the block. A cooperation system with peripheral area communities of the block has been established.
2.2 Security/Safety	2.2.1 Disaster prevention	2.2.1.1 Basic disaster prevention performance	(1) Understanding of hazard map (strength against natural disasters, fire disasters, etc.)	Evaluated based on recognition of various hazard maps (such as flooding, liquefaction, tsunami, earthquake, landslide, lightning strike, etc.) and existence of countermeasures.	No hazard map is checked.	(Not applicable)	A hazard map is checked, and problems are understood.	(Not applicable)	There is no problem, or disaster prevention measures are taken against problems found through checking a hazard map.
			2) Disaster prevention of various infrastructures	Evaluated based on the level of efforts for disaster prevention measures including functional substituting performance for information, water supply/treatment, and energy supply infrastructures in the block. a. Communication infrastructure b. Water supply/treatment infrastructure c. Energy supply infrastructure	No items are worked on.	(Not applicable)	Working on one item for each of a, b, and c.	(Not applicable)	Working on one or more items for each of a, b, and c, and working on five or more items in total.
					a. [1] Measures for flood damage prevention, earthquakes, and power disruption for equipment and piping are available. [2] Two or more communication systems with the outside of the area are available b. [1] Potable water and sewerage pipes meet the earthquake resistance standards. [2] A common facility for storing potable water or a system for sharing clean water is available for an emergency. c. [1] Energy-related equipment meets the earthquake resistance standards. [2] Medium pressure gas supply and connection of electric power and heat supply with the outside of the area is available. [3] An autonomous power supply system that can cover the load of the disaster key point in the block for 72 hours or more is available.				
		2.2.1.2 Disaster response ability	1) Disaster prevention vacant space and evacuation route	Evaluated based on a level of efforts for contribution to improvement of disaster prevention performance of the block and the periphery area.	No items are worked on.	One item is worked on.	Two items are worked on.	Three items are worked on.	Four items are worked on.
					[1] An appropriate plan regarding the scale and location of vacant space is established, and plenty of space is secured. [2] Urban fire prevention district is formed with firebreak belts. [3] Evacuation route network is formed including securement of road width (8 m or wider) and two directions for evacuation. [4] The distance to the nearest (or designated) evacuation site is 250 m or less.				
			2) Continuity of business and life in the block (BCP, LCP, etc.)	Evaluated based on whether or not routine activities of life and business in the block are maintained for a certain time period even when a disaster occurs. A case where a functions maintenance plan or a disaster prevention agreement for the whole block including the tenants is established is evaluated highly.	No consideration.	(Not applicable)	BCP and LCP (for common areas of buildings and the block) are established by the developer.	BCP and LCP are established by the developer and occupants (tenants and inhabitants).	BCP and LCP are established by the developer and occupants (tenants and inhabitants), and a disaster prevention agreement is concluded with the municipalities or the like.
	2.2.2 Traffic safety	–	Execution of separating pedestrians and vehicles	Evaluated based on establishment of sidewalks and existence of circulation plans. A case where universal design is considered is evaluated highly.	No consideration.	(Not applicable)	A mixing of pedestrians and vehicles may occur and safety is ensured by guidance, etc.	(Not applicable)	An arrangement is planned so that a mixing of pedestrians and vehicles cannot occur as a rule while taking vulnerable road users into consideration.
	2.2.3 Crime prevention	–	Security measure	The level of efforts for security measures including night lighting, monitorable characteristics from the periphery, security cameras, and security patrol systems in the block is evaluated.	No items are worked on.	One item is worked on.	Two items are worked on.	Three items are worked on.	Four items are worked on.
2.3 Amenity	2.3.1 Convenience/welfare	2.3.1.1 Convenience	Accessibility to facilities and services	Evaluated based on the distance (or time distance in some cases) to the object facilities. The starting point is the nearest entrance of the block. Evaluated based on whether everyday facilities (nearest supermarket, shopping street, bank, post office, and government office) are located within walking distance or not.	1500 m or more	800 m or more but less than 1500 m	600 m or more but less than 800 m	300 m or more but less than 600 m	Less than 300 m
		2.3.1.2 Health and welfare, education	Accessibility to facilities and services	(1) Evaluated based on whether medical and health/welfare facilities (hospital/clinic that deals with daily medical treatment needs, elderly welfare facility, child welfare institution, welfare facility for mentally disabled people, etc.) are located within walking distance or not.	1500 m or more	800 m or more but less than 1500 m	600 m or more but less than 800 m	300 m or more but less than 600 m	Less than 300 m
				(2) Evaluated based on whether educational facilities (kindergarten, elementary school, and junior high school) are located within walking distance or not.	1500 m or more	800 m or more but less than 1500 m	600 m or more but less than 800 m	300 m or more but less than 600 m	Less than 300 m
				(3) Evaluated based on whether cultural facilities (library, museum, sport facility, etc.) are located within the time distance (total time required for walking and public transportation) or not.	60 minutes or more	(Not applicable)	30 minutes or more but less than 60 minutes	(Not applicable)	Less than 30 minutes
	2.3.2 Culture	2.3.2.1 History and culture	Inheritance of history and culture, and creation of culture (creativity)	Whether efforts for preservation and restoration of historical legacies and buildings and inheritance of the regional history and traditional culture including events and festivals exist or not is evaluated. And whether efforts for creation of new culture exist or not is evaluated.	No items are worked on.	(Not applicable)	One item is worked on.	Two items are worked on.	Three items are worked on.
		2.3.2.2 View	1) Consideration for formation of townscape and landscape in the district	Formation of townscape and landscape in the whole district: Consideration for exterior design and scenery of streets and squares. Consideration of ground level surface parking lot: Evaluated based on whether a target, policy, or specific rule is defined and implementation tools are secured by guidelines or not.	[1] Preservation and restoration of historical legacies and buildings [2] Efforts from a software aspect for preservation and inheritance of history and cultural assets [3] Other efforts for creation of new culture				
					No items are worked on.	One to two items are worked on.	Three to four items are worked on.	Five to six items are worked on.	Seven to eight items are worked on.
			2) Harmonization with the periphery	Consideration for the landscape focal point, continuity of the natural environment, and the skylines of the peripheral area is evaluated based on whether a target/policy or specific rules are defined by guidelines and implementation tools are secured or not. Consideration of the object district is evaluated qualitatively based on a view from outside the object district.	No items are worked on.	(Not applicable)	One item is worked on.	Two items are worked on.	Three items are worked on.
					[1] Consideration for landscape focal point [2] Consideration for continuity of natural environment [3] Consideration for skylines of peripheral area				

CASBEE for Urban Development Assessment Contents [Q<sub>UD</sub>3 "Economy"]

Middle item	Small item	Minor item	Details and methods of assessment		Assessment criteria								
					Level 1	Level 2	Level 3	Level 4	Level 5				
3.1 Traffic/Urban structure	3.1.1. Traffic	3.1.1.1 Development of traffic facilities	(1) The development level of roads, parking lots, bicycles parking areas etc.		Response status to the demand is unclear.	(Not applicable)	Response status to the demand is clear. The planning standard is fulfilled quantitatively.	(Not applicable)	Fulfilled quantitatively. Also, comfort is considered in terms of arrangement and shape.				
			2) Usability of public transportation Distance to a railway station (including LRT/BRT station) or a bus stop is evaluated in combination with measures for a comprehensive transportation system (including arrangement of bicycle space and park-and-ride in cooperation with the road administrator and transportation business operator).		The distance to a station is 1 km or more or to a bus stop is 500 m or more, and any comprehensive transportation measures are not taken.	The distance to a station is 600 m or more (and less than 1 km) or to a bus stop is 300 m or more (and less than 500 m), and any comprehensive transportation measures are not taken.	The distance to a station is less than 600 m or to a bus stop is less than 300 m, or comprehensive transportation measures are taken though the above is not met.	The distance to a station is less than 300 m or a bus stop is directly connected, or comprehensive transportation measures are taken though the distance is equivalent to level 3.	A station is directly connected, or comprehensive transportation measures are taken though the distance is equivalent to level 4.				
		3.1.1.2 Logistics management	Rationalization, cooperative delivery, etc., of logistics (including carrying out of waste material).		Measures are not taken.	(Not applicable)	Rules for freight handling (carrying in/out route, time zone, etc.) exist.	Level 3 is met. In addition, sufficient space is secured for freight handling.	Level 4 is met. In addition, cooperative delivery is worked on.				
	3.1.2. Urban structure	3.1.2.1 Consistency with and complementing upper level planning	Evaluated based on introduction of functions required in terms of urban management and an urban policy, in addition to consistency with and utilization of urban infrastructures (in existence and planned). If a local government policy such as for upper-level plans clearly exists, the assessment is necessary.		Any consistency is not considered.	(Not applicable)	Consistent with an upper level plan.	(Not applicable)	Level 3 is met. District plans are proposed and introduced, or contributions to solving urban structural issues that were a concern in the area are worked on.				
		3.1.2.2 Land use	1) Evaluated based on utilization level of standard floor area ratio Cases other than the above: excluded from assessment	Specified floor area ratio is 400% or more	Level 2 is not met.	30% of the standard floor area ratio is utilized.	50% or more of the standard floor area ratio is utilized.	The major portion (90% or more) of the standard floor area ratio is utilized.	Space larger than the standard floor area ratio is realized by a system or method.				
			2) Evaluated based on handling of brownfield site  A case where Soil Contamination Countermeasures Act is not applicable: excluded from assessment	Handling status Soil Contamination Countermeasures Act	(Not applicable)	(Not applicable)	(Not applicable)	The district is designated as an "area for which notification is required upon a change to form or nature". For development, a plan for prevention of diffusion is notified and a measurement based on that is taken.	The area designation of the act is canceled by taking an independent detoxifying measure.				
3.2 Growth potential	3.2.1. Population	3.2.1.1 Inhabitant population	Planned population or actual population (for assessment of existing state)		Evaluated based on increase or decrease in comparison to the past state	Decreased by half in comparison to the past state.	Middle between level 1 and level 3.	Equivalent or higher in comparison to the past state.	Increased twofold in comparison to the past state.	Increased fourfold in comparison to the past state.			
		3.2.1.2 Staying population	Average number of persons staying in each building type		Evaluated based on increase or decrease in comparison to the past state	Decreased by half in comparison to the past state.	Middle between level 1 and level 3.	Equivalent or higher in comparison to the past state.	Increased twofold in comparison to the past state.	Increased fourfold in comparison to the past state.			
	3.2.2. Economic development	3.2.2.1 Revitalization activity	Efforts for economic revitalization programs are evaluated.		After separate assessment of the housing system and the non-housing system, perform weighted average with the rate of the scale (gross floor area).								
			Housing system	(Not applicable)	(Not applicable)	No items are worked on.	One item is worked on.	Two or more items are worked on.					
			Non-housing system	No items are worked on.	One item is worked on.	Two items are worked on.	Three items are worked on.	Four or more items are worked on.					
			Establishment of a mechanism by the relevant project leading to contribution to local economic revitalization	[1] An organization that attracts company advancement and investment to the area exists. [2] Cooperative sales promotion and events are implemented organizationally and systematically. [3] Products are purchased systematically from local companies. [4] Cooperative activities with the area are implemented. [5] Business schemes for establishment of financial base of area management such as finance are set. [6] Other advanced efforts exist.									
3.3 Efficiency/Rationality	3.3.1. Information system	3.3.1.1 Information service performance	Flexibility and usability of information environment of the block (LAN or wireless LAN) is evaluated.		No items are worked on.					One item is worked on.	Two items are worked on.	Three items are worked on.	Four or more items are worked on.
					[1] Sufficient capacity of communication line is secured in comparison to estimated communication traffic volume in the block. [2] CATV is introduced. [3] Security is assured by network monitoring. [4] Connectivity to high speed Internet is secured even for outdoor space. [5] Other advanced efforts exist.								
		3.3.1.2 Block management	Block infrastructure system management utilizing ICT is evaluated. However, energy-related matters that are evaluated in 3.3.2 are excluded.		(Not applicable)		No items are worked on.		One item is worked on.	Two items are worked on.	Three or more items are worked on.		
			[1] Water demand and supply management		[2] Waste treatment and recycling		[3] Medical information		[4] Public service information				
	3.3.2. Energy system	3.3.2.1 Possibility to make demand/supply system smart	Flexibility to change in energy demand and price (such as diversified supplier, DR, etc.)		No items are worked on.		One item is worked on.		Two items are worked on.	Three items are worked on.	Four or more items are worked on.		
					[1] A smart meter is introduced.		[2] BEMS and HEMS are introduced in buildings.		[3] CEMS is established in the whole block.				
	3.3.2.2 Updatability and expandability	Medium- and long-term ease of update and expansion for the whole block.		No items are worked on.		(Not applicable)		One item is worked on.	(Not applicable)	Two or more items are worked on.			
				[1] Piping and wiring material that has long renewal period are selected.		[2] A utility corridor exists.		[3] Other advanced efforts or business schemes exist.					

## Afterword

This publication is developed by the Research Committee for CASBEE, established as part of a joint industrial/government/academic project with the support of the Housing Bureau of the MLIT and led by the Japan Sustainable Building Consortium (chaired by Shuzo Murakami, President of the Institute for Building Environment and Energy Conservation), requesting the participation of City Bureau, the MLIT. We hope this publication will be used in a wide-range of fields and make an important contribution in building a sustainable society.

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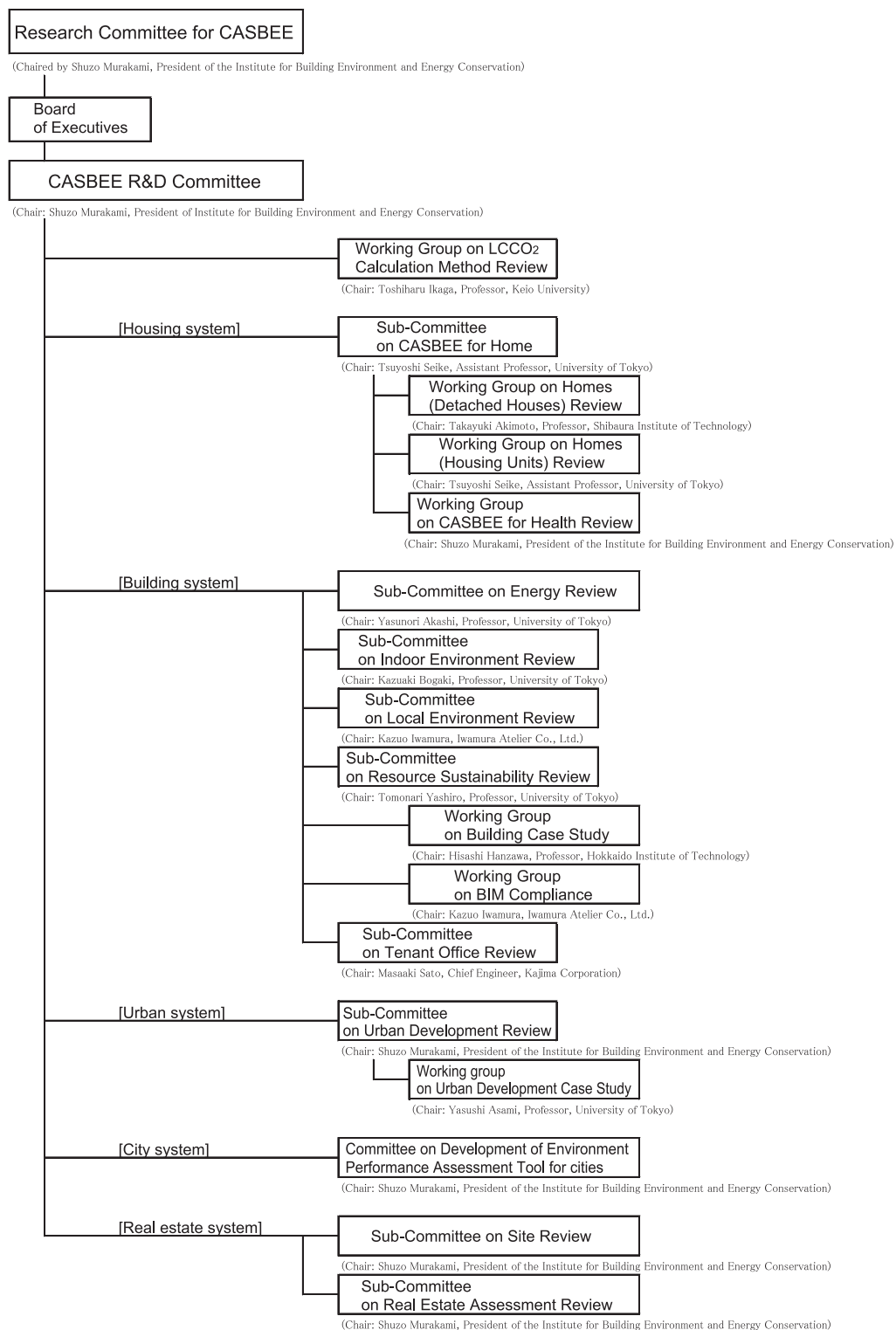
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### <Working group on Urban Development Case Study>

Chair: Yasushi Asami (University of Tokyo), Members: Tomohiro Uchiike (Taisei Corporation), Shinichi Kaburagi (Taisei Corporation), Shun Kawakubo (Hosei University), Takahiro Kawayoke (Nikken Sekkei Research Institute), Ryota Kuzuki (Tokyo Gas Co., Ltd.), Takashi Hashimoto (Shimizu Corporation), Tatsuya Hayashi (Chiba University), Nobuhaya Yamaguchi (Polytech Add, Inc.), Administrators: Kiyohisa Oine (JSBC), Shigeo Kida (JSBC), Nobufusa Yoshizawa (JSBC), Takehiko Ban (Polytech Add, Inc.)

## Project Organization

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Zenkyouren Building Kojimachi-kan, 3-5-1 Kojimachi, Chiyoda-ku, Tokyo 102-0083 Japan  
TEL: +81-3-3222-6723 FAX: +81-3-3222-6696

e-mail [casbee-info@ibec.or.jp](mailto:casbee-info@ibec.or.jp) URL <http://www.ibec.or.jp/CASBEE>

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