

**Manual for Making Flood Hazard Map
Ubiquitous**

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River Bureau
Ministry of Land, Infrastructure and Transport

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Introduction

In many parts of Japan, efforts to pass on regional memories of floods to later generations have included building steles, setting up stakes as water-level gauges and preserving other markings that recall people's experience with floods.

On the other hand, changes in local communities in recent years have led to a decrease in the numbers of residents that have experienced flood disasters. Most community residents lack information on major regional flood damage in the past and lack knowledge of projected flood water depths in the area in which they live and other facts pertaining to flood risk.

Along with the recent amendment to the Flood Fighting Law, progress has been made in designations and announcements of flood-prone areas and in preparing flood hazard maps. To help meet the need for wide dissemination of flood information, "The Flood Hazard Mapping Manual," which was published in June 2005 by the River Improvement and Management Division, River Bureau, Ministry of Land, Infrastructure and Transport, suggests preserving flood marks and staff gauges displayed on streets as a way to bring about greater public awareness of flood hazard maps.

The aims of this manual are to promote the further dissemination of flood hazard maps, to create a heightened sense of risks, and better awareness of shelters in case of floods in each community. To enable residents to appreciate the real risk of floods in their areas, this manual provides guidelines for the creation of "Ubiquitous Flood Hazard Maps (Comprehensive Town-Wide Hazard Maps)" and signs providing flood-fighting information that can be displayed in communities.

Main Section

1. Main Section

1-1 Purpose

[Purpose of this Manual]

The aim of this manual is to help bring about safe and smooth evacuation necessitated by floods and to help minimize flood damage by providing facts and encouraging the dissemination of knowledge of possible flood water depths and shelters and raising awareness of risks by displaying information on flood water depths and shelters in the form of flood-related signs in towns.

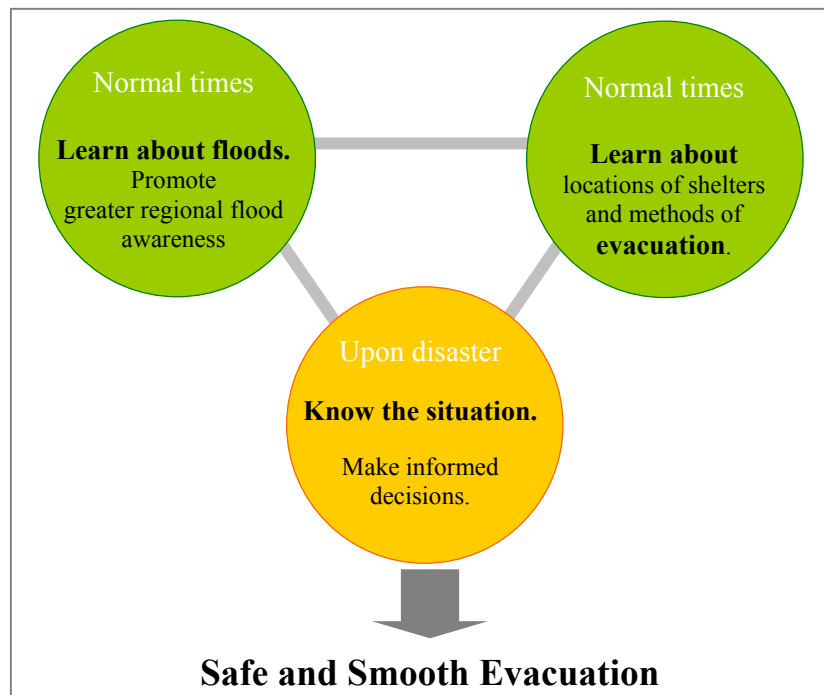


Fig. 1 Basic idea of flood-related signs in towns with ubiquitous flood hazard maps

1-2 Information provided and symbols

[Information provided and symbols]

This manual establishes three categories of information to be provided by flood-related signs: Flood (flood water depths), Shelters, and Levees.

The symbols indicated below are specified for nationwide use in providing each kind of information.¹

●Flood

[Meaning of the symbol]

Indicates river has overflowed.

[Purpose of the symbol]

To show areas likely to be affected by flooding.



●Shelter (building)

[Meaning of the symbol]

Indicates safe shelter (building) upon disaster

[Purpose of the symbol]

To show safe building as shelter in event of disaster.



●Levee

[Meaning of the symbol]

Indicates levee protecting residential area

[Purpose of the symbol]

To show the area is protected from flooding by a levee. (But it could be flooded if river overflows.)



Fig. 2 Meanings and purposes of the symbols of Flood, Shelter (building) and Levee

- In placing signs, it is recommended that eye-catching symbols be used nationwide for intuitive understanding by everyone and to urge evacuation.
- The colors and shapes of each symbol shall be in accordance with the “Conditions for using symbols” in Materials Section on page 16.
- The symbols should not only be used for flood-related signs, but also in paper hazard maps and other media related to flood fighting.

¹ You can download and use the electronic file of the symbols at:
http://www.river.or.jp/pict_flood/zukigou_download.htm

1-3 Implementation of “Ubiquitous Flood Hazard Maps” program

1-3-1 General considerations

[Collaboration between river administrators and municipalities]

To implement the measures outlined in the “Ubiquitous Flood Hazard Map” program, the river administrators and municipality shall work together from the pre-planning stage through installation and management.

- The river administrators and municipality shall work together to implement the “Ubiquitous Flood Hazard Map” program. It is desirable that the signs be installed as part of various disaster management drills or in coordination with disaster management education at schools, thereby promoting disaster management awareness.

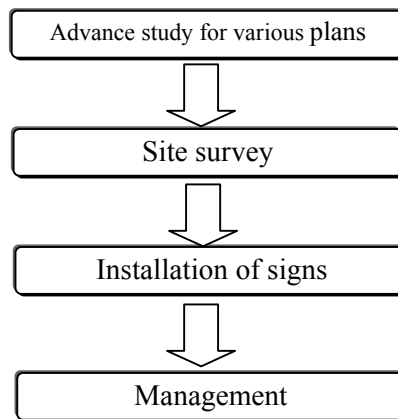


Fig. 3 Implementation Flow

1-3-2 Studies to be conducted prior to plan development

[Advance studies]

The signs shall be installed by coordinating various local plans after studying and grasping their content.

- To identify places or areas for sign placement, flood areas, projected flood water depths and recorded flood water depths should be confirmed by studying flood hazard maps and other materials.
- Disaster management plans as prescribed by municipalities such as regional disaster management plans should be studied.
- The possibility of inundation at shelters or along major evacuation routes should be confirmed, and reflected in the review of hazard maps as necessary.
- The contents and locations of any disaster management signs set up in the areas (wide-area shelter signs, etc.) must be grasped.
- If there are any ordinances or plans for landscaping, these considerations should be incorporated in the hazard mapping according to such ordinances or plans.

1-3-3 Site surveys

[Local surveys]

Signs shall be installed to meet local conditions by studying and identifying the conditions of candidate spots for signs.

- The location and direction of signs will be studied by identifying the conditions of the locations where signs are to be actually installed.
- Conformity with the information on existing signs or advertisements shall be studied. It will also be studied whether flood signs to be newly installed can be conspicuous and whether several signs would result in congested information.
- In site surveys, studies will be conducted for the following facilities in the relevant areas:
Major facilities in the area (stations and other transportation facilities, schools, municipality offices, parks, etc.); and major roads in the area
- Coordinate efforts with facility administrators to determine where signs will be installed (power company, NTT, public facility administrators, etc.)

1-3-4 Installation

[Selecting installation spots]

Sign installation spots shall be selected on the basis of 1-3-2 “Studies to be conducted prior to plan development” and 1-3-3 “Site surveys” so that large numbers of pedestrians will become aware of effective evacuation procedures and so that the procedures can be accomplished.

- For efficient and effective provision of information by the flood-related signs, major evacuation routes and places where there is a great deal of pedestrian traffic (stations, bus stops and other transportation nodes, and public facilities such as town hall) shall be selected as sites for installation of signs.

[Added explanation]

As a rule, signs shall have symbols together with written explanations.

- As flood-related signs are products of brand new initiatives, written explanations shall be added to symbols to facilitate understanding of the policies. However, in consideration of the intervals of sign installation in an area, it is not necessary to add written explanation to all signs.
- Please refer to the following pages for examples of explanations.

[Installation of flood signs]

Flood signs shall indicate flood water depths (projected or recorded) in positions as high as the actual levels.

- From the viewpoint of providing information on overall flood water depths in an area, it is desirable to install water depth signs at the heights of 0.5m, 1.0m, 2.0m, 3.0m and 5.0m where practicable.
- In principle, flood water depth shall be indicated by the projected flood water depth. It is also possible to indicate flood water depths recorded during well known floods in the area. However, either projected depths or recorded depths shall be indicated in an area to avoid confusion between them.
- Example: "This place may suffer a flood water depth of ○m in the case of inundation of ○○ river."
"This place suffered a flood water depth of ○m due to Typhoon ○○ in the year ○○."

[Installation of signs indicating shelters from floods]

The signs of shelters in times of flood shall be installed at such shelters and in places that are suitable for effective guidance to the shelters.

- The shelters to be used in time of flood shall be indicated by using flood and shelter signs together.
- Example: "The shelter in the event of a flood in this area is ○○ Elementary School."
"Shelter upon flood: ○○ Elementary School"
- When indicating shelters in the event of a flood, the order shall be the shelter and flood.
Example : Vertical sign : Shelter above and flood below
Horizontal sign : Shelter left and flood right
Guidance : Align the order in the direction of an arrow
- The symbol for shelter shall indicate the direction of a shelter, right or left, in consideration of the position of the symbol with the shelter as shown below.



[Installation of levee signs]

The levee signs shall show that the relevant area is protected by levees (but may be inundated if the river overflows). Being different from flood signs, no height shall be indicated.

- Heights of levees vary depending on how they were constructed. Further, the heights of levees cannot be fixed uniformly. Unlike flood signs, the levee signs will not be accompanied by indication of heights. They will be used to show that a particular area is protected by levees.
- Example: This place is protected by levees from flooding of ○○ River. Inundation may occur if the ○○ River overflows."

1-3-5 Management

[Management of signs]

Signs shall be properly administered by compiling such information as where and when they were installed.

Because signs are set up outdoors, they are subject to damage and aging. In order to respond to damage such as posters or scars, and to protect the town landscape, it is necessary to keep them clean at all times by periodical cleaning and repair. Further, as town situations change over time, users may become confused without precise updating of information.

Proper use and maintenance shall be carried out by arranging information such as places and dates of installation.

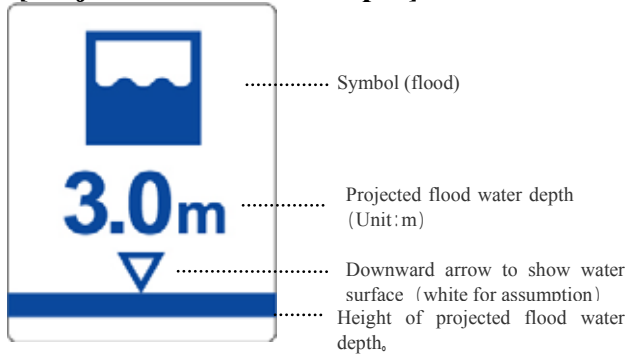
1-4 Examples of sign plates and installation images

1-4-1 Flood signs (flood water depth)

The blue color shall be in accordance with the Munsell value:
 ■ Safety color Blue: 2.5PB 3.5/10 □■ Contrast white: N9.5 Black: N1

1) Flood depth plates

[Projected flood water depth]



[Recorded flood water depth]

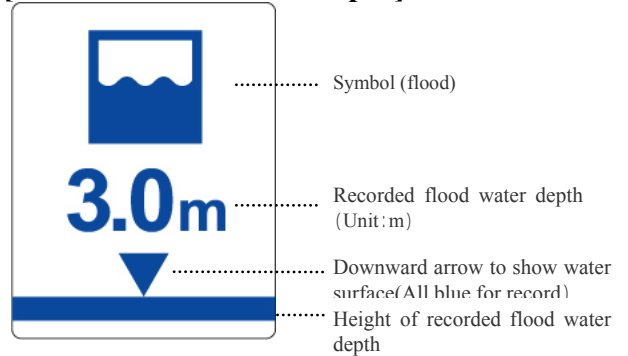


Fig. 4 Flood sign plates (indicating flood water depth)

2) Plates to explain the indications

a. Basic

It is desirable to show information in Japanese and English for wider dissemination. The examples below show Japanese-only sign and English-only sign.

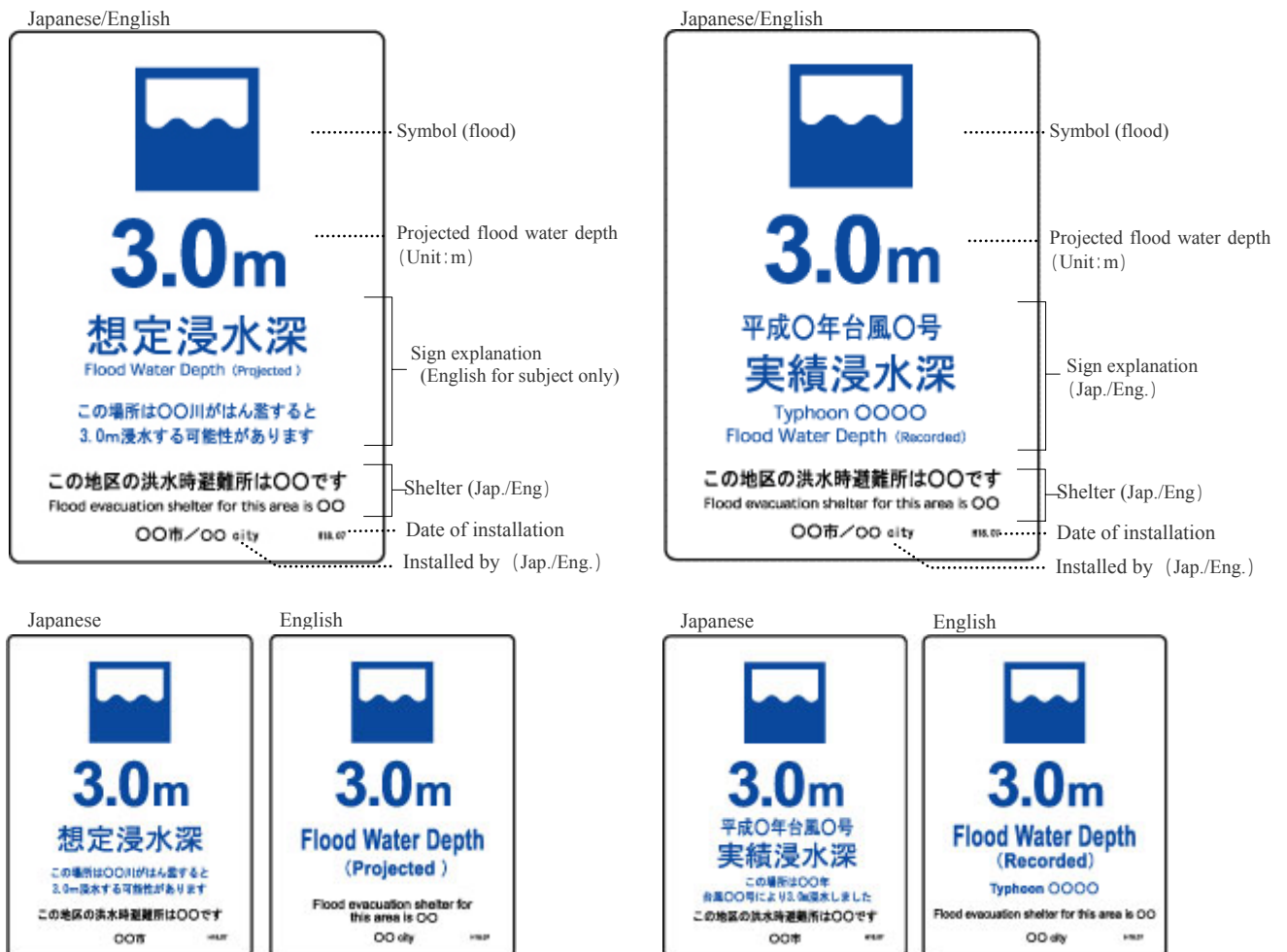


Fig. 5 Flood sign plates (with explanation of indications)

b. Integrated indication of symbol and figures (when plate is small)



Fig. 6 Flood sign plates (integrated expression with symbols and numbers)

*If the minimum size (8mm x 8mm) is used for a hazard map, raised water surface shall be adopted for ease in reading.



Basic style
: less illegible letters



Raised water surface
: easy to read the larger letters

c. Combined indication of flood shelters by symbols

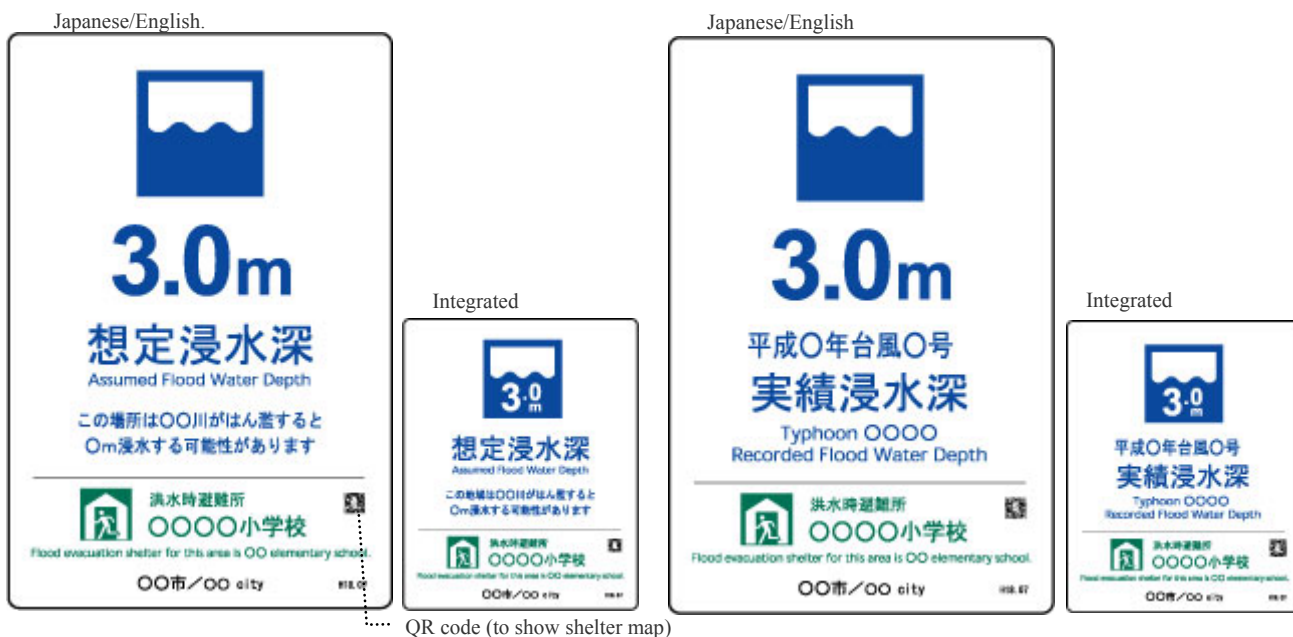


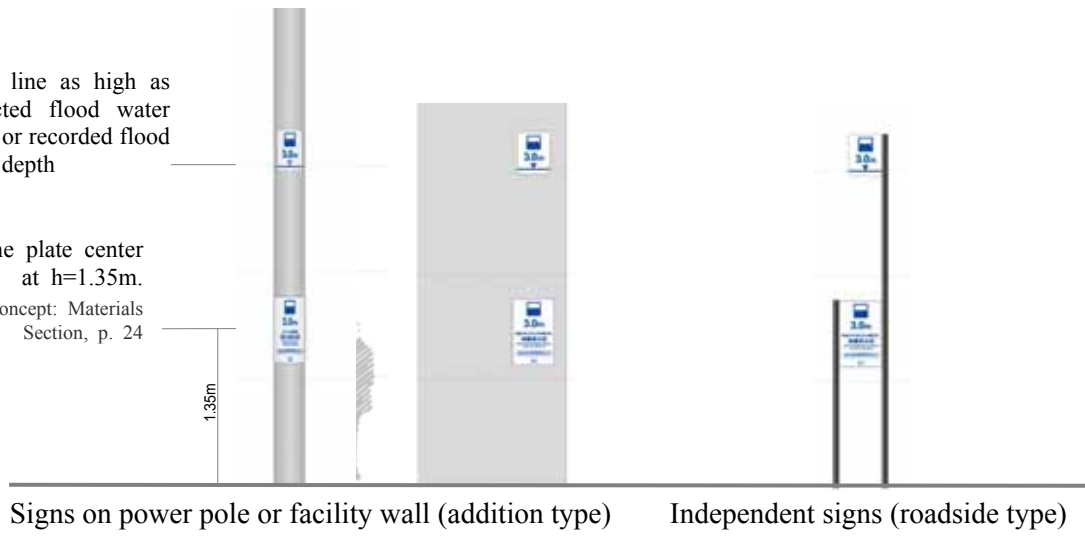
Fig. 7 Flood sign plates (with shelter symbol)

3) Image of installation

Set a line as high as projected flood water depth or recorded flood water depth

Set the plate center at $h=1.35\text{m}$.

*Concept: Materials Section, p. 24



Sign on power pole
(projected flood water depth)



Sign on a wall
(projected flood water depth)

Fig. 8 Image of flood sign placement (flood water depth, projected or recorded)

1-4-2 Shelter sign

1) Indicating shelter location with symbol

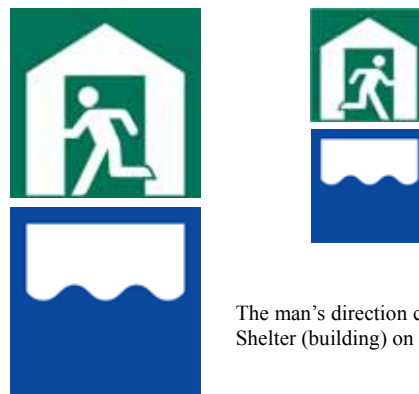
Use Munsell values below:
 ■ Safety color green: 10G 4/10
 ■ Safety color blue: 2.5PB 3.5/10 □ ■ Contrast white: N9.5 Black: N1

a . Basic: Horizontal



The man's direction can be left or right.
(Man escaping from water.)

b. Basic: Vertical



The man's direction can be left or right.
Shelter (building) on the flood symbol

The man's symbol cannot be left or right. (expression moving in the direction of water.)



Do not place shelter (building) below water.



Fig. 9 Conditions for using symbols to show flood shelters

2) Plate with name of shelter

a. Horizontal

Symbol: Shelter (building)/flood Explanation of the sign (in Jap. and Eng.)



Facility name (Japanese/English/furigana)

Date established

Built by (in Jap. and Eng.)

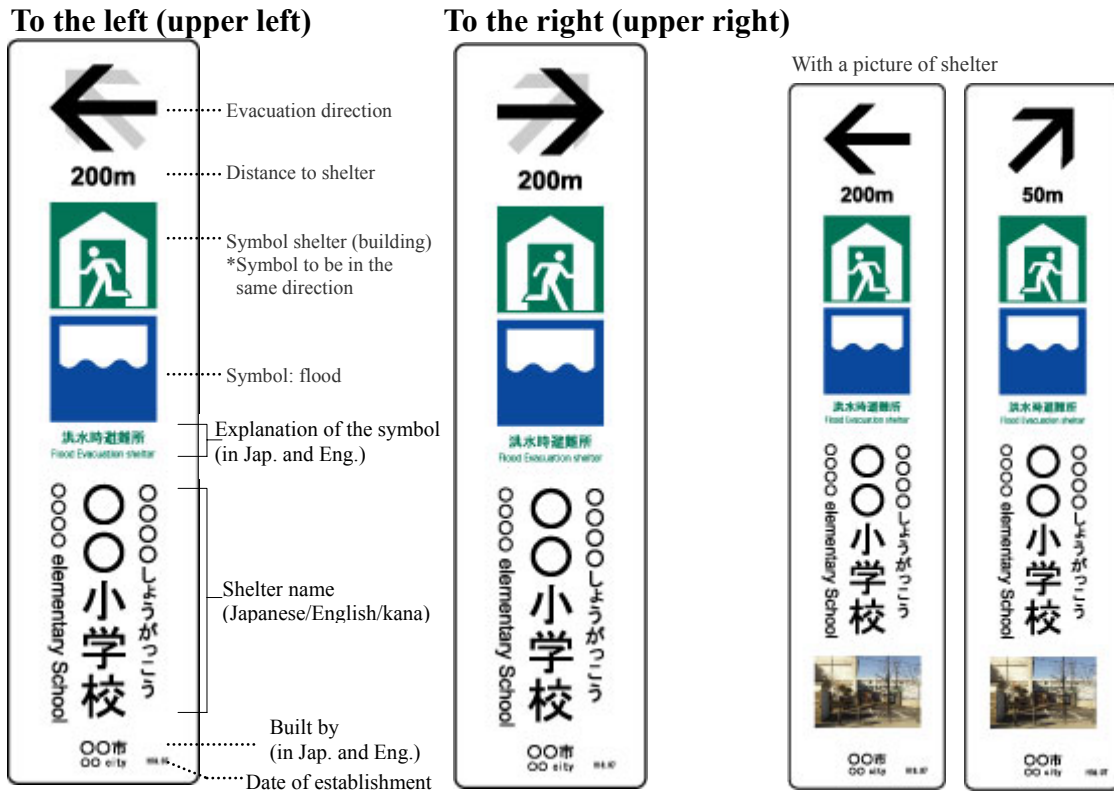
b. Vertical



Fig. 10 Shelter signs (with shelter name)

3) Shelter guidance plate

a. Vertical



b. Horizontal

As a basic style, an arrow (distance), a shelter (building) and flood are grouped together and names (characters) are placed to the right or left.

To the left (upper left)



To the right (upper right)

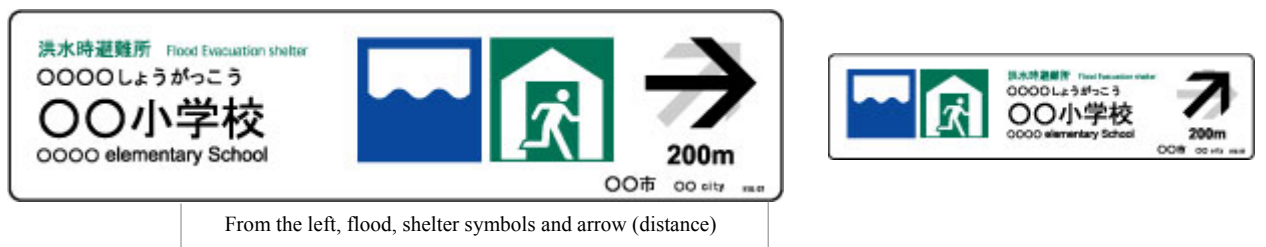
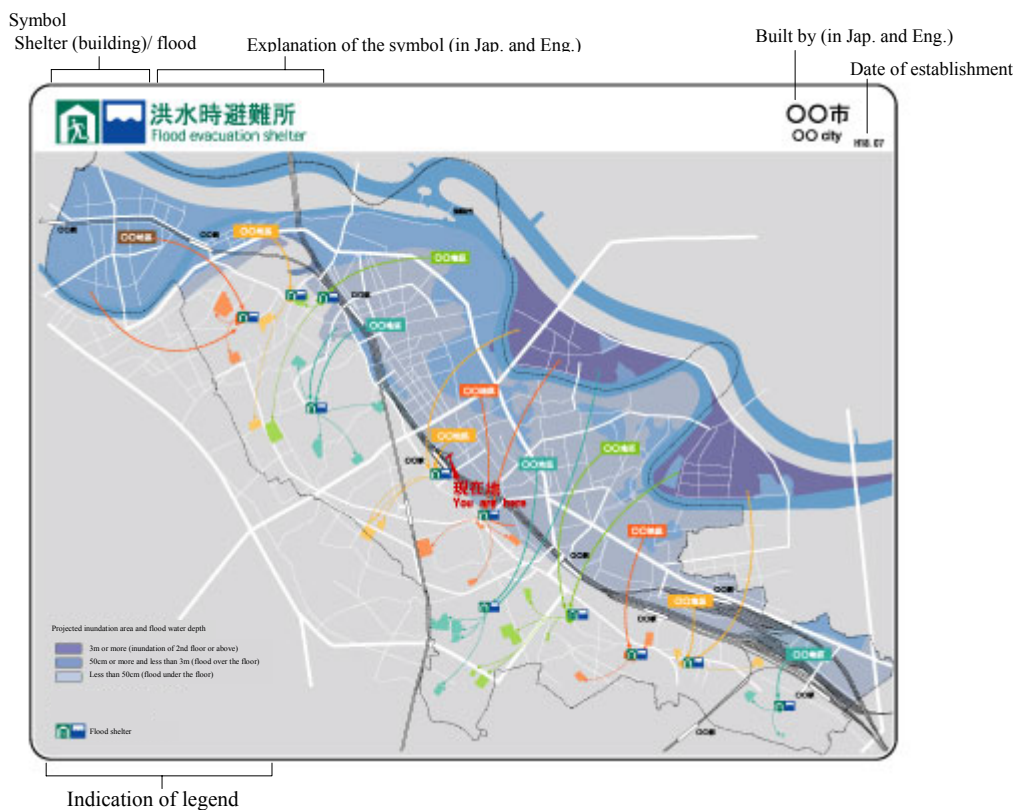


Fig 11 Shelter sign plates with guidance

4) Shelter guidance type plate

a. Independent (wide-area)



b. Addition type (on facility walls or power poles: middle area)

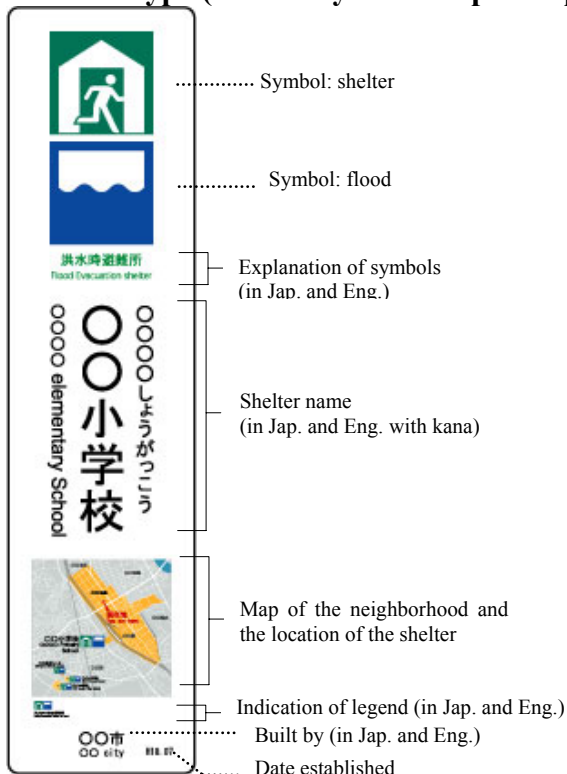
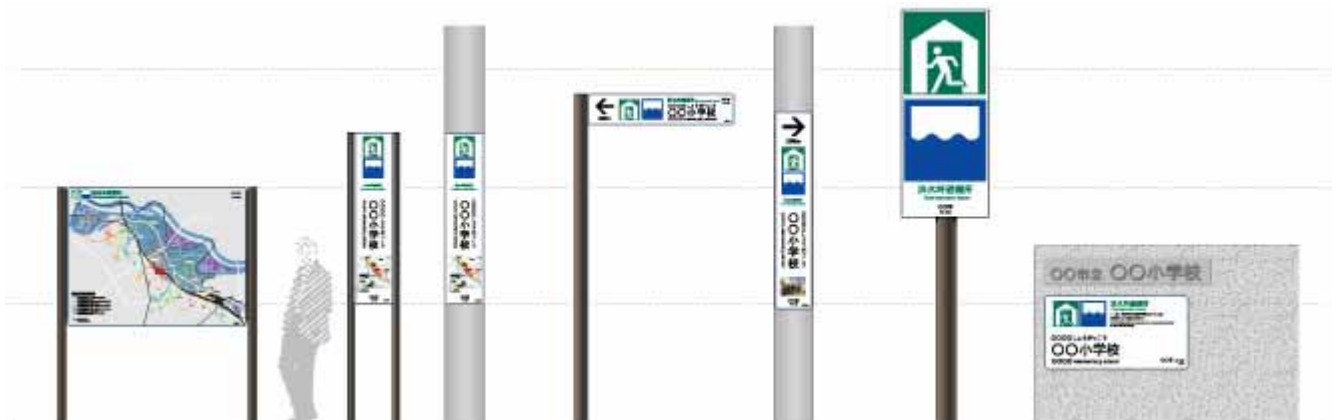


Fig. 12 Shelter guidance type plates

5) Image of installation



Shelter sign with name (additional)



Shelter guidance plate (additional)



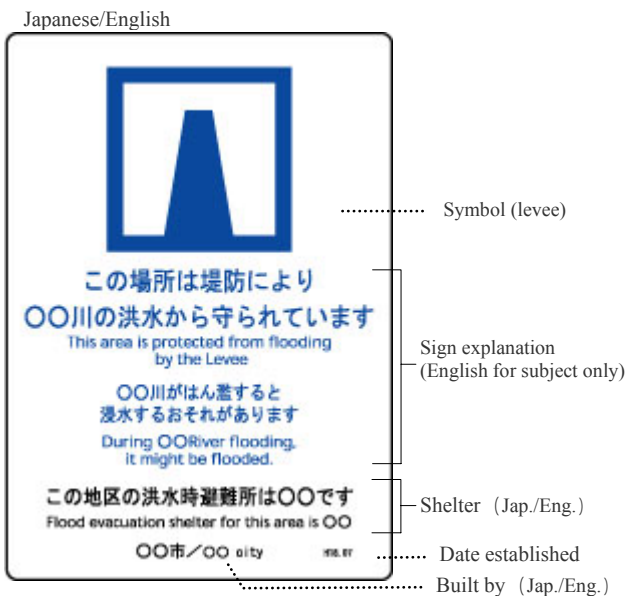
Shelter guidance plate (independent)

Fig. 13 Image of shelter signs

1-4-3 Levee sign

1) Levee sign plate

a. Basic



Use the following Munsell values:
■ Safety color blue: 2.5PB 3.5/10 □■ Contrast white: N9.5
Black:N1

b. Shelter symbol added

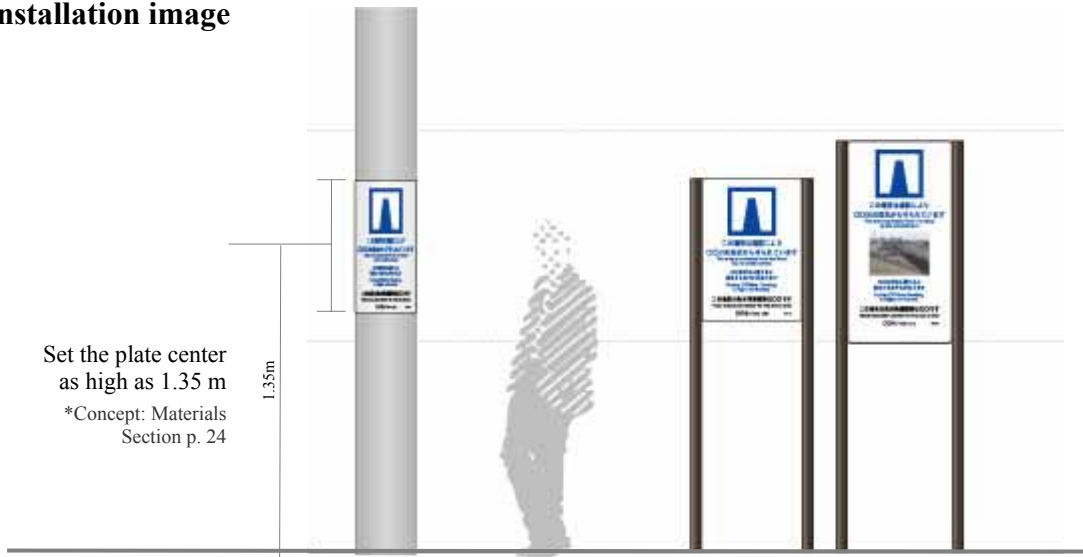


c. Levee symbol with picture



Fig. 14 Levee sign plates

2) Installation image



Signs on power poles and facility walls (additional)

Independent signs (roadside)



Plate attached on a power pole



Independent display

Fig. 15 Image of levee signs