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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 42056-2022

**Specifications for high accuracy expression of route and
facility elements of electronic highway map**

电子公路图路线及沿线设施要素高精度表达规范

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Foreword

This document was issued on 12 October 2022 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 February 2023.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

1 Scope

GB/T 42056-2022 concerns the electronic highway map when it is put to work at something harder than showing a driver the way: fine highway management and vehicle-highway coordination, where a feature has to be placed accurately enough to be acted on. Basic requirements fix the common frame first - the 2000 National Geodetic Coordinate System,

the elevation datum, the projection, and how the dataset is stored. Selection rules then decide which features along a road are worth expressing at high accuracy, and a classification sorts them. The expression clauses work through those classes in turn: general requirements, the basic elements of the route itself, the traffic safety facility elements, the service and management facility elements, and the remaining highway facilities. Most of the document sits in that last group of clauses, because the value is entirely in the detail - what geometry stands for a guardrail, a sign, a gantry or an interchange, and which attributes travel with it. Maps compiled by different suppliers are of no use to an automated system if each draws the same roadside object in its own way and places it to its own tolerance. Road authorities, surveying and mapping contractors and the makers of connected-vehicle systems are the users.

This document specifies basic requirements, element selection rules and classification as well as the expression specifications for high accuracy expression of route and facility elements of electronic highway map.

This document applies to the production of electronic highway maps and the development of related information systems.

2 Normative references

This document has no normative references.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 electronic highway map

The highway map that is digitally stored and used via computer technology.

3.2 relative accuracy

The ratio of the absolute error to the true value.

NOTE: Relative accuracy also refers to the ratio between the absolute distance deviation value and

the true value between two measurement objects.

3.3 absolute accuracy

In a specific coordinate system, the distance difference between the coordinate value measured by the measuring instrument and the real coordinate value of the measurement object.

4 Basic requirements

4.1 Coordinate system

The 2000 National Geodetic Coordinate System (CGCS2000) shall be used.

4.2 Elevation datum

The 1985 national elevation datum shall be used.

4.3 Projection

Data producers can specify the projection method of the data set according to the relevant national regulations and the needs of data users.

4.4 Dataset storage

Electronic highway map data can be managed hierarchically according to element content. Mapping areas are managed in blocks according to administrative divisions or rectangular map sheets.

5 Element selection rules and classification

5.1 Selection rules

In the highway route and the facilities along the route, select elements that require high accuracy expression in fine highway management, vehicle-highway coordination, and automated driving. The elements not covered in this document are regulated by the data producers themselves according to the relevant national regulations and the needs of data users.

5.2 Classification

According to the selection rules of 5.1, the elements that need high accuracy expression in the electronic highway map are divided into four categories: basic elements, traffic safety facility elements, service and management facility elements, and other highway facility elements. Each category is subdivided into several subcategories.

The electronic highway map route and the classification of facilities along the route are shown in Figure 1.

6.2.4 Route intersection

6.2.4.1 Element definition

A route intersection is the intersection of two or more roads.

Route intersection is divided into:

- Plane intersection: the intersection of road and road in the same plane. The forms mainly include straight intersection, oblique intersection, circular intersection, T-shaped intersection, and dislocation intersection;
- Overhead intersection: the three-dimensional space intersection of road and road or road and railway at different elevations. The forms mainly include separated overhead intersection, intercommunicate overhead intersection and cloverleaf overhead intersection.

[Source: Section 3 Road Intersection, Chapter 4, JTJ 002-1987, modified]

6.2.4.2 Element attributes

The attributes of route intersection elements shall include number, name, type, intersection spacing, design service level, and approach road sight distance.

6.2.4.3 Geometric expression specification

The plane intersection geometry shall be expressed by point elements (division and confluence) or area elements (plane intersections). The overhead intersection geometry is expressed by area elements.

6.2.4.4 Spatial geometry acquisition method

A plane intersection is a ramp or level crossing. The ramp intersection obtains route intersection. The level crossing obtains intersection area. The spatial geometry acquisition method of typical category plane intersection is shown in Figure 6.

The overhead intersection is the intersecting area surface of a highway and a highway OR a highway and a railway three-dimensional space. Figure 7 shows the spatial geometry acquisition method of typical overhead intersection.

characters, patterns, facade marks, physical marks, protruding road signs and contour marks drawn or installed on the road.

[Source: GB 5768.3-2009, 3.1]

According to the expression form of road traffic markings, it is divided into four