

Additional information

1 The metadata element set summary table

Supplementary Table 1. Traffic Accident Metadata Summary Table

No.	Name	Data Type	Reuse Standard	Constraint
1	Accident Name	Character	-	M
2	Accident Identifier	Character	-	M
3	Accident Level	Character	-	M
4	Accident Participants	Character	-	M
5	Accident Participant Roles	Character	-	M
6	Accident Occurrence Time	Character	-	M
7	Accident Publication Time	Date	-	M
8	Accident Last Modified Time	Date	-	O
9	Vehicle Type	Character	-	O
10	Accident Location	Character	-	M
11	Accident Summary	Character	-	O
12	Accident Name	Character	General Element	M
13	Accident Identifier	Composite	General Element	O
14	Accident Level	Character	General Element	O
15	Accident Participants	Character	General Element	O

Supplementary Table 2. Traffic Vehicle Metadata Summary Table

No.	Name	Data Type	Reuse Standard	Constraint
1	Tool Name	Character	-	M
2	Vehicle Identifier	Character	-	M
3	Tool Type	Character	-	M
4	Tool User	Character	-	M
5	License Plate Number	Character	-	M
6	Plate Number Type	Character	-	M
7	Driving Status	Character	-	O
8	Driving Speed	Character	-	O
9	Manufacturer	Character	-	O
10	Years in Use	Character	-	O
11	Service Life	Character	-	O
12	Total Mileage	Character	-	O
13	Actual Load	Character	-	O
14	Approved Load	Character	-	O
15	Vehicle Usage Type	Character	-	M
16	Weight	Character	-	O
17	Owner	Character	-	M
18	Time	Date	-	M
19	Language	Character	General Element	M
20	Information Provider	Composite	General Element	O
21	Keywords	Character	General Element	O
22	Description	Character	General Element	O

Supplementary Table 3. Traffic Geography Metadata Summary Table

No.	Name	Data Type	Reuse Standard	Constraint
1	Geography	Character	-	M
2	Geography Identifier	Character	-	M
3	Geography Type	Character	-	M
4	Geography Construction Time	Date	-	M
5	Geography Usage Time	Date	-	O
6	Geography Active Time	Character	-	O
7	Geography Last Maintenance Time	Date	-	O
8	Geography Spatial Information	Character	-	M
9	Geography Summary	Character	-	O
10	Language	Character	General Element	M
11	Information Provider	Composite	General Element	O
12	Keywords	Character	General Element	O
13	Description	Character	General Element	O

Supplementary Table 4. Traffic Indicator Metadata Summary Table

No.	Name	Data Type	Reuse Standard	Constraint
1	Indicator Name	Character	-	M
2	Indicator Type	Character	-	M
3	Evaluation Object	Character	-	M
4	Indicator Value	Character	-	M
5	Time Information	Date	-	M
6	Location	Character	-	O
7	Indicator Summary	Character	-	O
8	Language	Character	General Element	M
9	Information Provider	Composite	General Element	O
10	Keywords	Character	General Element	O
11	Description	Character	General Element	O

Supplementary Table 5. Traffic Road Metadata Summary Table

No.	Name	Data Type	Reuse Standard	Constraint
1	Road Name	Character	-	M
2	Road Grade	Character	-	M
3	Road Type	Character	-	M
4	Number of Lanes	Character	-	M
5	Design Speed	Character	-	O
6	Minimum Clearance Height	Character	-	M
7	Allowed Vehicle Types	Character	-	O
8	Pavement Structure Type	Character	-	O
9	Basic Traffic Capacity	Character	-	O
10	Design Traffic Capacity	Character	-	O
11	Lane Width	Character	-	M
12	Traffic Facility Level	Character	-	O
13	Language	Character	General Element	M
14	Information Provider	Composite	General Element	O
15	Keywords	Character	General Element	O
16	Description	Character	General Element	O

Supplementary Table 6. Traffic Facility Metadata Summary Table

No.	Name	Data Type	Reuse Standard	Constraint
1	Facility Name	Character	-	M
2	Facility Identifier	Character	-	M
3	Facility Category	Character	-	M
4	Production Time	Date	-	M
5	Installation Time	Date	-	M
6	Latest Maintenance Time	Date	-	O
7	Service Life	Character	-	M
8	Facility Location	Character	-	M
9	Facility Summary	Character	-	O
10	Language	Character	General Element	M
11	Information Provider	Composite	General Element	O
12	Keywords	Character	General Element	O
13	Description	Character	General Element	O

Supplementary Table 7. Traffic Role Metadata Summary Table

No.	Name	Data Type	Reuse Standard	Constraint
1	Name	Character	-	M
2	Role Identifier	Character	-	M
3	Role Category	Character	-	M
4	Role Gender	Character	-	M
5	Age	Character	-	M
6	Height	Character	-	O
7	Weight	Character	-	O
8	Role Occupation	Character	-	M
9	Contact Information	Composite	-	M
10	Role Summary	Character	-	O
11	Language	Character	General Element	M
12	Information Provider	Composite	General Element	O
13	Keywords	Character	General Element	O
14	Description	Character	General Element	O

Supplementary Table 8. Traffic Information Metadata Summary Table

No.	Name	Data Type	Reuse Standard	Constraint
1	Traffic Policy	Composite	-	M

Supplementary Table 9. Traffic-Related Information Metadata Summary Table

No.	Name	Data Type	Reuse Standard	Constraint
1	Meteorological Information	Composite	-	M
2	Land Use Planning	Composite	-	M

2 Element Description Specification Details Table

Supplementary Table 10. General Elements

Name	ShortName	Definition	ValueRange	Frequency	Constraints	Examples
Language	Lang	The language used to describe resource information.	Follows GB/T 4880.3-2009	[1,∞)	M	CN
Information Provider	InfoProvider	Traffic department responsible for the completeness, accuracy, and authenticity of the resource information.	Includes four elements:〈Unit〉, 〈Address〉, 〈Phone〉, 〈Email〉	[0,∞)	O	〈Beijing Jiaotong University〉, 〈 Haidian District, Beijing〉, 〈17679279230〉, 〈iflook@163.com〉
Keywords	Keywords	Keywords for retrieving resource information.	Free text	[0, ∞)	O	Traffic
Description	Desc	Description of the resource information.	Free text	[0, 1]	O	Standard metadata

Supplementary Table 11. Traffic Accident Metadata

Name	ShortName	Definition	ValueRange	Frequency	Constraints	Examples
Accident Name	AccidentName	Name of the accident	Free text	[1, 1]	M	Collision incident on Wen-qing Road
Accident Identifier	AccidentID	Unique identifier for the accident	Accident code: acc+area postal code+date+count	[1, 1]	M	acc341600202403050001
Accident Level	AccidentLevel	Severity level of the accident	Values follow accident level code table	[1, 1]	M	ACC001
Accident Participants	AccidentParticipants	Names of people involved in the accident	Free text	[1, n]	M	Zhang San
Accident Participant Roles	AccidentRoles	Roles of vehicles involved	Values follow traffic roles table	[1, n]	M	TR004
Accident Occurrence Time	AccidentOccTime	Time of accident occurrence	As per GB/T 7408.1-2023, format CCYY-MM-DD	[1, 1]	M	2024-09-15
Accident Publication Time	AccidentPubTime	Official publication time of the accident	As per GB/T 7408.1-2023, format CCYY-MM-DD	[1, 1]	M	2012-03-03
Accident Last Modified Time	AccidentLastModTime	Most recent modification time of accident data	As per GB/T 7408.1-2023, format CCYY-MM-DD	[0, 1]	O	2012-03-03
Vehicle Type	VehicleType	Type of vehicle involved at the time of accident	Values follow vehicle type table	[0, n]	O	VEH002
Accident Location	AccidentLoc	Location of the accident	As per GCJ-02 coordinate system	[1, 1]	M	Longitude 115.7°E–117.4°E, Latitude 39.4°N–41.6°N
Accident Summary	AccidentSummary	Brief description of the cause and results of the accident	Free text	[0, 1]	O	A collision occurred on Wen-qing Road

Supplementary Table 12. Traffic Vehicle Metadata

Name	ShortName	Definition	ValueRange	Frequency	Constraints	Examples
Tool Name	ToolName	The name of the vehicle or tool.	Free text	[1, 1]	M	Bus Route 603
Vehicle Identifier	VehicleID	A unique code or identifier for recognizing the vehicle.	For non-bicycles: m + license plate number. For bicycles: c + bicycle code as per relevant standards.	[1, 1]	M	mQ58A77
Tool Type	ToolType	Classification of vehicles based on their purpose, design, and technical characteristics.	Refer to GB 55011-2021, values follow the Vehicle Type Table.	[1, 1]	M	VEH003-PAS
Tool User	ToolUser	The operator or passenger of the vehicle.	Free text	[0, 1]	M	Zhang San
License Plate Number	LicensePlate	A unique identification number issued by government authorities for vehicle registration and tracking.	Complies with GA 36-2018.	[1, 1]	M	BeijingQ58A77
Plate Number Type	PlateType	The type or category of the license plate.	Values follow GA 36-2018 and Plate Type Table.	[1, 1]	M	PLT001
Driving Status	DriveStatus	The operational state of the vehicle.	Values follow the Driving Status Table.	[0, 1]	O	ST001
Driving Speed	DriveSpeed	Speed of the vehicle during operation.	Numeric, unit: km/h	[0, 1]	O	12
Manufacturer	Manufacturer	The name of the vehicle manufacturer.	Free text	[0, 1]	O	Jiangnan Vehicle Plant
Years in Use	YearsUsed	Number of years elapsed since the vehicle was registered.	Numeric, unit: years	[0, 1]	O	4
Service Life	ServiceLife	The legally mandated lifespan for mandatory vehicle decommissioning.	Numeric, unit: years	[0, 1]	O	20
Total Mileage	TotalMiles	Total distance traveled by the vehicle since manufacturing.	Numeric, unit: km	[0, 1]	O	1122
Actual Load	ActualLoad	The actual number of passengers or weight of goods loaded in the vehicle.	Numeric, unit: items	[0, 1]	O	3
Approved Load	ApprovedLoad	The approved maximum number of passengers or weight of goods the vehicle can carry.	Numeric, unit: items	[0, 1]	O	8
Vehicle Usage Type	VehicleUsage	The primary purpose of the vehicle.	Complies with GA802-2019, values follow the Vehicle Usage Type Table.	[1, 1]	M	US001
Weight	Weight	The weight of the vehicle.	Numeric, unit: kg	[0, 1]	O	1000
Owner	Owner	The owner of the vehicle.	Free text	[1, 1]	M	Li Si
Time	Time	The time when the record was created.	Format: CCYY-MM-DD, per GB/T 7408.1-2023.	[1, 1]	M	2023-10-11

Supplementary Table 13. Traffic Geography Metadata

Name	ShortName	Definition	ValueRange	Frequency	Constraints	Examples
Geography	Geography	The name of the geographic entity	Free text	[1, 1]	M	Beijing Xueyuan Bridge, China
Geography Identifier	GeoID	A unique identifier for the geographic entity	Encoding format: Country + City + Function Type + Identifier (sorted)	[1, 1]	M	CN-BJ-BR-00005
Geography Type	GeoType	The functional type of the geographic entity	Refer to the Geography Type Code Table	[1, 1]	M	Bridge
Geography Construction Time	GeoConstructTime	The creation or naming date	Follows GB/T 7408.1-2023, format: CCYY-MM-DD	[1, 1]	M	2020-10-11
Geography Usage Time	GeoUseTime	The years of use for the geographic entity	Numerical, in years	[0, 1]	O	4
Geography Active Time	GeoActiveTime	The active hours or days of the geographic entity	Day, Night, All	[0, 1]	O	0
Geography Last Maintenance Time	GeoLastmaintime	The most recent maintenance date of the geographic entity	Follows GB/T 7408.1-2023, format: CCYY-MM-DD	[0, 1]	O	2023-10-11
Geography Location	GeoLocation	The spatial location of the geographic entity	Follows GCJ-02 coordinate system	[1, 1]	M	Longitude 115.7°–117.4°, Latitude 39.4°–41.6°
Geography Summary	GeoSummary	A brief description of the role and content of the geographic entity	Free text	[0, 1]	O	The Beijing Xueyuan Bridge has a long history

Supplementary Table 14. Traffic Indicator Metadata

Name	ShortName	Definition	ValueRange	Frequency	Constraints	Examples
Indicator Name	IndicatorName	The name of the indicator.	Free text	[1, 1]	M	Average traffic flow on Xueyuan Bridge Road
Indicator Type	IndicatorType	The classification or type of the indicator, reflecting its nature and usage.	Contains two elements, <Category, Specific Indicator>, according to GB/T 33171-2016, follows the indicator category table	[1, 1]	M	TMI001-Q
Evaluation Object	EvalObject	The object being measured or evaluated by the indicator. This could be a specific entity, event, process, or system.	According to GB/T 33171-2016, follows the evaluation object table	[1, 1]	M	IEO001
Indicator Size	IndicatorSize	The size or level of the indicator's value.	Numeric	[1, 1]	M	15
Time Information	TimeInfo	Time-related information about the indicator, including the time point or period of data collection.	According to GB/T 7408.1-2023, format CCYY-MM-DD	[1, 1]	M	2020-01-02
Location	Location	The geographical location of the indicator.	According to GCJ-02 coordinate system	[0, 1]	O	Longitude 115.7°–117.4°, Latitude 39.4°–41.6°
Indicator Summary	IndicatorSummary	A brief description of the indicator, providing background or additional explanation.	Free text	[0, 1]	O	Average traffic flow on Xueyuan Bridge reflects regional traffic pressure

Supplementary Table 15. Traffic Road Metadata

Name	ShortName	Definition	ValueRange	Frequency	Constraints	Examples
Road Name	RoadName	The name of the road, used to identify a specific road or section.	Free text, refer to "Shenzhen Road Naming Rules"	[1,1]	M	Beijing Zoo Road
Road Grade	RoadGrade	The classification of the road within the urban road system.	value follows the road grade coding table.	[1,1]	M	RC001
Road Type	RoadType	Classification based on the road's function, purpose, and design standards.	Refer to "Urban Integrated Transport Planning Standards" 12.2, value follows the road type coding table.	[0,1]	M	RT001
Number of Lanes	NumLanes	The number of lanes in the road. The number of lanes affects the road's capacity and traffic flow.	Numeric, unit is "lanes"	[1,1]	M	3
Design Speed	DesignSpeed	The intended safe driving speed for the road when designed.	Numeric, unit is km/h	[0,1]	O	12
Minimum Clearance Height	MinClearHeight	The minimum vertical clearance height above the road.	Numeric, unit is meters	[1,1]	M	4
Allowed Vehicle Types	AllowedVehicles	The types of vehicles allowed to travel on the specific road.	Refer to the vehicle type table	[0,1]	O	VC001
Pavement Structure Type	PavementType	The type of the road surface structure.	Value follows the pavement structure type table	[0,1]	O	MT001
Basic Traffic Capacity	BasicTrafficCap	The number of vehicles the road can accommodate per hour under ideal conditions.	Numeric, unit is pcu/h	[1,1]	O	1650
Design Traffic Capacity	DesignTrafficCap	The maximum number of vehicles the road can safely and effectively accommodate under specific design conditions.	Numeric, unit is pcu/h	[0,1]	O	1300
Lane Width	LaneWidth	The width of a single lane.	Numeric, unit is meters	[1,1]	M	3
Traffic Facility Level	TrafficFacilityLevel	The standard and quality level of auxiliary facilities on the road.	Refer to GB 50688-2011 4.2, value follows the traffic facilities table	[1,1]	O	A

Supplementary Table 16. Traffic Facility Metadata

Name	ShortName	Definition	ValueRange	Frequency	Constraints	Examples
Facility Name	FacilityName	The specific name of the facility used to uniquely identify it.	Free text	[1, 1]	M	Beijing Chaoyang District Traffic Signal Light
Facility Identifier	FacilityID	A code or number used to uniquely identify the specific facility.	Coding rule: Type + Production Time + Sequence	[1, 1]	M	TS20201011001
Facility Category	FacilityCategory	Classification based on the facility's function or type.	Follows facility category coding table	[1, 1]	M	TF001
Production Time	ProductionTime	The time when the facility was produced or associated event occurred.	Follows GB/T 7408.1-2023, format CCYY-MM-DD	[1, 1]	M	2019-10-11
Installation Time	InstallationTime	The date the facility was first installed or put into use.	Follows GB/T 7408.1-2023, format CCYY-MM-DD	[1, 1]	M	2020-10-11
Latest Maintenance Time	LastMaintenanceTime	The date of the facility's most recent maintenance, repair, or inspection.	Follows GB/T 7408.1-2023, format CCYY-MM-DD	[0, 1]	O	2023-10-11
Service Life	ServiceLife	The number of years since the facility was installed and put into use.	Numeric, unit in years	[1, 1]	M	20
Facility Location	FacilityLocation	The geographic location of the facility.	Follows GCJ-02 coordinate system	[1, 1]	M	E115.7°—117.4°, N39.4°—41.6°
Facility Summary	FacilitySummary	A brief description of the facility, outlining its main function, use, or characteristics.	Free text	[0, 1]	O	Intersection traffic signal control equipment

Supplementary Table 17. Traffic Role Metadata

Name	ShortName	Definition	Value Range	Frequency	Constraints	Examples
Role Name	RoleName	The name of the role or individual, used to identify and address the specific role.	Free text	[1,1]	M	Zhang San
Role Identifier	RoleID	A code or number used to uniquely identify a specific role.	ID card	[1,1]	M	360722198402244510
Role Category	RoleCategory	A classification based on the role's function or identity.	Refer to the role category coding table	[1,1]	M	TR001
Role Gender	RoleGender	The gender information of the role or individual.	Refer to the role gender coding table	[1,1]	M	F
Age	Age	The age of the role or individual, usually in years.	Numeric, unit: years	[1,1]	M	23
Height	Height	The height of the role.	Numeric, unit: meters	[0,1]	O	1.85
Weight	Weight	The weight of the role.	Numeric, unit: kilograms	[0,1]	O	70
Role Occupation	RoleOccupation	The organization, department, or unit the role belongs to.	Free text	[1,1]	M	Driver at a manufacturing plant
Contact Information	ContactInfo	The contact information for the role or individual, including phone, email address, and postal address.	Includes three elements: <Phone Number>, <Email Address>, <Postal Address>	[1,1]	M	13800138000, xxx@xx.com, Beijing
Role Summary	RoleSummary	A brief description of the role.	Free text	[0,1]	O	Freight driver at a logistics company

Supplementary Table 18. Traffic Policy Metadata

Name	ShortName	Definition	Value Range	Frequency	Constraints	Examples
Document Title	DocTitle	The name of the document, summarizing its main content or topic in concise language.	Free text, consisting of issuing authority name, reason, and document type	[1, 1]	M	Notice on Traffic Development Planning
Document Number	DocNumber	The unique identifier for the document, used to distinguish and locate the document.	Consists of issuing authority code, year, and sequence number	[1, 1]	M	JYF2023144
Confidentiality Level	ConfLevel	The confidentiality level of the document.	according to GB/T 7156-2003, using the classification table.	[1, 1]	M	GK
Confidentiality Expiry	ConfExpiry	The expiry date of the document's confidentiality status.	According to GB/T 7408.1-2023 format: CCYY-MM-DD	[0, 1]	O	2025-10-23
Issuing Authority	IssuingAuthority	The government department, agency, or organization responsible for drafting and issuing the document.	Free text	[1, 1]	M	Ministry of Transport
Main Recipient	MainRecipient	The primary recipients or organizations that need to execute or refer to the document's content.	Free text	[1, n]	M	Municipal Government
Policy Type	PolicyType	The policy type of the document, classifying the nature and purpose of the document.	According to GB/T 33476.1-2016, using the document type classification table	[1, 1]	M	Government General (GG)
Document Drafting Time	DocDraftTime	The date when the document is formally drafted and signed, marking the completion of its content and readiness for release.	According to GB/T 7408.1-2023 format: CCYY-MM-DD	[1, 1]	M	2023-11-26
Publication Time	PubTime	The date when the document is officially published or sent to relevant units, marking the document's effective date.	According to GB/T 7408.1-2023 format: CCYY-MM-DD	[1, 1]	M	2023-12-01
Effective Time	EffectiveTime	The date when the document's contents officially take effect and are executed.	According to GB/T 7408.1-2023 format: CCYY-MM-DD	[1, 1]	M	2024-01-01

Supplementary Table 19. Weather Information Metadata

Name	ShortName	Definition	Value Range	Frequency	Constraints	Examples
Site Name	SiteName	The name used to identify a specific observation site.	Free text	[1, 1]	M	Beijing Observatory
Site ID	SiteID	A unique identification code assigned to each observation site.	Encoding rule: Site name code + latitude + longitude + altitude	[1, 1]	M	BJGXT ₃ 9.9N ₁ 16.3E ₄ M
Site Location	SiteLocation	The geographic coordinates or actual physical location of the observation site.	Follow GCJ-02 coordinate system	[1, 1]	M	39.9N, 116.3E
Date and Time	DateTime	The specific time the data is recorded.	Time format	[1, 1]	M	2023-11-26T15:00:00
Weather Condition	WeatherCondition	A description of the overall weather condition at the site at a particular moment.	Free text	[1, 1]	M	Cloudy
Visibility	Visibility	The maximum distance at which objects can be clearly recognized under the current weather conditions.	Numeric, unit in meters	[1, 1]	M	5000
Temperature	Temperature	An indicator of the heat level of the air.	Numeric, unit in °C	[1, 1]	M	25.0
Relative Humidity	RelHumidity	The percentage value of the actual water vapor content in the air relative to the maximum water vapor the air can hold at the same temperature.	Numeric, unit in %	[1, 1]	M	60
Wind Speed	WindSpeed	The speed of air movement.	Numeric, unit in km/h	[1, 1]	M	15
Wind Direction	WindDirection	The direction from which the wind is blowing.	Numeric, unit in °	[0, 1]	O	270
Gusts	Gusts	A sudden increase in wind speed, typically accompanied by a sharp change in direction.	Numeric, unit in km/h	[0, 1]	O	30
Atmospheric Pressure	AtmosPressure	The pressure exerted by the atmosphere on a unit area.	Numeric, unit in hPa	[1, 1]	M	1010
Solar Radiation	SolarRad	The energy radiated by the sun to the Earth's surface.	Numeric, unit in W/m ²	[1, 1]	M	750
Precipitation	Precipitation	The amount of water falling on the ground during a specific time period.	Numeric, unit in mm	[0, 1]	O	2
Cloud Cover	CloudCover	The extent of the sky covered by clouds, represented in tenths.	Refer to GB/T 35222-2017, tenths system	[1, 1]	M	10

Supplementary Table 20. Land Planning Metadata

Name	ShortName	Definition	Value Range	Frequency	Constraints	Examples
Area Name	AreaName	The name used to identify a specific geographic area.	Free text	[1, 1]	M	Haidian District, Beijing
Total Area	TotalArea	The total land area of a specific geographic area.	Numeric, unit in km ²	[1, 1]	M	430.8
Total Building Area	TotalBuildingArea	The total floor area of all buildings within a specific area.	Numeric, unit in m ²	[1, 1]	M	3,500,000
Building Density	BuildingDensity	The proportion of land area covered by buildings.	Numeric, unit in %	[0, 1]	O	35
Floor Area Ratio	FloorAreaRatio	The ratio of total building area to the total land area.	Numeric, no units	[0, 1]	O	1.5
Residential Land	ResidentialLand	Land primarily used for residential purposes, such as housing or residential communities.	Numeric, unit in ha	[0, 1]	O	120
Public Facility Land	PublicFacilityLand	Land used for public service facilities such as schools, hospitals, government buildings, etc.	Numeric, unit in ha	[0, 1]	O	30
Industrial Land	IndustrialLand	Land used for industrial activities such as production, processing, and manufacturing.	Numeric, unit in ha	[0, 1]	O	50
Storage Land	StorageLand	Land used for the storage of goods, materials, or commodities, including warehouses and logistics centers.	Numeric, unit in ha	[0, 1]	O	25
External Traffic Land	ExternalTrafficLand	Land used for transportation between regions, including railways, highways, airports, ports, etc.	Numeric, unit in ha	[1, 1]	M	100
Road and Square Land	RoadSquareLand	Land used for city roads, streets, squares, and public transportation hubs.	Numeric, unit in ha	[1, 1]	M	50
Municipal Utility Land	MunicipalUtilityLand	Land used for municipal infrastructure, such as water supply, drainage, electricity, and gas facilities.	Numeric, unit in ha	[0, 1]	O	20
Green Space	GreenSpace	Land used for urban parks, green belts, lawns, etc., aimed at improving urban ecology and providing recreational spaces for residents.	Numeric, unit in ha	[0, 1]	O	80
Special Use Land	SpecialUseLand	Land used for specific purposes, such as military bases or research areas.	Numeric, unit in ha	[0, 1]	O	15
Water or Other Land	WaterOtherLand	Land that includes rivers, lakes, oceans, and other water bodies, or land that cannot be classified under other types.	Numeric, unit in ha	[0, 1]	O	10

3 The coding table

Supplementary Table 21. Traffic Accident Classification Metadata

No.	Code	Name	Description
1	ACC001	Property damage accident	A traffic accident involving only material property damage, with no injuries or fatalities.
2	ACC002	Injury accident	A traffic accident resulting in injuries but no fatalities.
3	ACC003 - I	General fatal accident	A traffic accident resulting in fatalities, with the following severity levels: 1 person.
4	ACC003 - II	Major fatal accident	A traffic accident resulting in fatalities, with the following severity levels: 2 - 3 people.
5	ACC003 - III	Serious fatal accident	A traffic accident resulting in fatalities, with the following severity levels: 4 - 9 people.
6	ACC003 - IV	Extremely serious fatal accident	A traffic accident resulting in fatalities, with the following severity levels: 10 or more people dead.

Supplementary Table 22. Vehicle Types Classification Metadata

No.	Code	Name	Description
1	VEH001	Bicycle	A two-wheeled vehicle powered by human effort, often used for transportation or recreation.
2	VEH002	Motorcycle	A two-wheeled motor vehicle, typically used for individual transportation.
3	VEH003-PASI	Large Passenger car	A passenger car classified based on the maximum number of passengers: 20 or more people.
3	VEH003-PASII	Medium Passenger car	A passenger car classified based on the maximum number of passengers: 10 - 19 people.
3	VEH003-PASIII	Small Passenger car	A passenger car classified based on the maximum number of passengers: 9 or fewer people.
3	VEH003-CARI	Heavy Cargo vehicle	A cargo vehicle classified based on cargo capacity: 12,000 kg or more.
3	VEH003-CARII	Medium Cargo vehicle	A cargo vehicle classified based on cargo capacity: 4,500 kg to 12,000 kg.
3	VEH003-CARIII	Small Cargo vehicle	A cargo vehicle classified based on cargo capacity: 4,500 kg or less.
4	VEH004- I	Heavy Trailer	A trailer classified based on total weight: 12,000 kg or more.
4	VEH004- II	Medium Trailer	A trailer classified based on total weight: 4,500 kg to 12,000 kg.
4	VEH004- III	Small Trailer	A trailer classified based on total weight: 4,500 kg or less.

Supplementary Table 23. Plate Number Types Classification

No.	Code	Name	Description
1	PLT001	Large Vehicle License Plate	For medium (including) or larger passenger, freight vehicles, and special operation vehicles (excluding large new energy vehicles); trams.
2	PLT002	Trailer License Plate	For trailers as defined by GA802.
3	PLT003	Large New Energy Vehicle Plate	For medium (including) or larger new energy vehicles as defined by GA802.
4	PLT004	Small Vehicle License Plate	For medium and smaller passenger, freight vehicles, and special operation vehicles (excluding small new energy vehicles).
5	PLT005	Small New Energy Vehicle Plate	For medium and smaller new energy vehicles as defined by GA802.
6	PLT006	Embassy Vehicle License Plate	For vehicles as specified by Foreign Affairs Notice [2017] No. 10.
7	PLT007	Consulate Vehicle License Plate	For vehicles of foreign consulates in China.
8	PLT008	Hong Kong/Macau Border Vehicle Plate	For vehicles entering or exiting mainland China from Hong Kong or Macau.
9	PLT009	Training Vehicle License Plate	For vehicles used for training.
10	PLT010	Police Vehicle License Plate	For police cars.
11	PLT011	Regular Motorcycle License Plate	For two-wheeled motorcycles, sidecar motorcycles, and tricycles as defined by GA802.
12	PLT012	Light Motorcycle License Plate	For two-wheeled light motorcycles and tricycles as defined by GA802.
13	PLT013	Embassy Motorcycle License Plate	For motorcycles as specified by Foreign Affairs Notice [2017] No. 10.
14	PLT014	Consulate Motorcycle License Plate	For motorcycles of foreign consulates in China.
15	PLT015	Training Motorcycle License Plate	For motorcycles used for training.
16	PLT016	Police Motorcycle License Plate	For police motorcycles.
17	PLT017	Low-Speed Vehicle License Plate	For low-speed freight vehicles, three-wheeled vehicles, and wheeled special purpose vehicles as defined by GA802.
18	PLT018	Temporary Vehicle License Plate	For temporarily used motor vehicles, test vehicles, and special-purpose vehicles.
19	PLT019	Temporary Inbound Vehicle License Plate	For temporarily imported vehicles.
20	PLT020	Temporary Inbound Motorcycle License Plate	For temporarily imported motorcycles.
21	PLT021	Tractor License Plate	For tractors used on the road.

Supplementary Table 24. Vehicle Driving Status Classification

No.	Code	Name	Description
1	ST001	Stationary	The vehicle is in a completely stopped state and not moving.
2	ST002	Normal Driving	The vehicle is driving on the road at the prescribed speed and following the rules.
3	ST003	Speeding	The vehicle is driving over the speed limit, posing a traffic safety risk.

Supplementary Table 25. Vehicle Usage Nature Classification

No.	Code	Name	Description
1	US001	Commercial Use	Refers to motor vehicles used by individuals or organizations for profit.
2	US002	Non-commercial Use	Refers to motor vehicles used by individuals or organizations not for profit.
3	US003	Student Transport	Vehicles specifically used for transporting students, such as school buses.

Supplementary Table 26. Geographic Types Classification

No.	Code	Name	Description
1	GEO001	Ramp	A road used to connect the main road and auxiliary road on urban expressways.
2	GEO002	Unit	A specific traffic service unit, such as a toll station or service area.
3	GEO003	Bridge	A structure used to span a road or other obstacle.
4	GEO004	Urban Tunnel	An underground passage, primarily used for vehicle traffic.
5	GEO005	Transport Hub	A node where multiple modes of transportation intersect, such as bus stations, train stations, etc.
6	GEO006	Intersection	An area where different roads meet or diverge, allowing vehicles and pedestrians to pass through.
7	GEO007	Under-bridge Space	The space beneath a bridge, typically used for parking, storage, or other functions.

Supplementary Table 27. Active Times Classification

No.	Code	Name	Description
1	0	Day	Refers to the period of daylight, typically associated with city expressways connecting main and auxiliary roads.
2	1	Night	Refers to specific traffic service units, such as toll stations or service areas, operational at night.
3	2	24 Hours	Refers to structures like roads or bridges that are functional or in use 24 hours a day.

Supplementary Table 28. Indicator Categories Classification

No.	Code	Name	Description
1	TMI001-Q	Average Traffic Flow (Q)	The number of vehicles passing through a road section per unit of time.
2	TMI001-FS	Free-Flow Speed	The ideal speed of vehicles under conditions without any interference.
3	TMI001-V	Average Trip Speed (V)	The total travel distance divided by total travel time, reflecting traffic efficiency.
4	TMI001-NAV	Average Trip Speed of Roads and Road Networks	The average speed across an entire area or road network.
5	TMI002-TTI	Travel Time Index (TTI)	The ratio of actual travel time to free-flow travel time, indicating congestion levels.
6	TMI002-DTP	Delay Time Proportion (DTP)	The proportion of total travel time attributed to delays.
7	TMI002-DP	Proportion of Mileage in Operational Status Levels (DP)	The share of road mileage under different operational efficiency levels.
8	TMI002-NDP	Characteristic Indicators of Roads and Road Networks	Includes metrics like traffic density and capacity utilization.
9	TMI003	Urban Traffic Performance Index	Mainly used to evaluate the operational efficiency and congestion conditions of road networks.

Supplementary Table 29. Indicator Evaluation Objects Classification

No.	Code	Name	Description
1	IEO001	Section	Represents a specific road segment or the section between two points.
2	IEO002	Road	Represents a complete road, consisting of multiple segments.
3	IEO003	Road Network	A complete transportation network consisting of multiple roads.
4	IEO004	Urban Area Road Network	A road network within a specific area of a city.

Supplementary Table 30. Road Grades Classification

No.	Code	Name	Description
1	RC001	Expressway	The Highest Grade in Main Roads.
2	RC002	Main Road	The Roads Serving as Major Traffic Passage in the City.
3	RC003	Secondary Main Road	The Roads Connecting to Main Roads in the Distribution Network.
4	RC004	Branch Road	The Lowest Grade in the Distribution Roads.

Supplementary Table 31. Road Types Classification

No.	Code	Name	Description
1	RT001	Mixed-use lane	Lane for both motor vehicles and non-motor vehicles.
2	RT002	Dedicated lane for small passenger cars	Dedicated lane for small passenger cars.
3	RT003	Non-motorized vehicle lane	Dedicated lane for non-motor vehicles like bicycles and electric vehicles.
4	RT004	Sidewalk	Pedestrian-only road, no vehicle entry.

Supplementary Table 32. Allowed Vehicle Types for Lanes

No.	Code	Name	Description
1	VC001	Bicycle	A lightweight vehicle suitable for single-person riding.
2	VC002	Tricycle	A three-wheeled vehicle that can carry people or goods.
3	VC003	Small Car	A car suitable for family or small group travel, typically accommodating up to 5 people.
4	VC004	Large Bus	A public transportation vehicle that can carry more passengers.
5	VC005	Articulated Bus	A bus composed of two sections connected by a hinge.

Supplementary Table 33. Road Surface Structure Types

No.	Code	Name	Description
1	MT001	Soil	Used for simple roads, low cost but limited load-bearing capacity, easily affected by weather and environment.
2	MT002	Block Pavement	Composed of bricks, stones, etc., commonly used for pedestrian streets, squares, or light traffic sections, with higher durability.
3	MT003	Cement Concrete	High strength, good durability, commonly used for highways and urban main roads.
4	MT004	Asphalt	The most common road surface material, flexible, suitable for city streets and highways.

Supplementary Table 34. Traffic Facility Levels

No.	Code	Name	Description
1	A	Traffic Facility Grade A	Follow the classification of settings in section 4.2 of GB 50688-2011 'Design Specifications for Urban Road Traffic Facilities'.
2	B	Traffic Facility Grade B	-
3	C	Traffic Facility Grade C	-
4	D	Traffic Facility Grade D	-

Supplementary Table 35. Traffic Facility Categories

No.	Code	Name	Description
1	TF001	Traffic Sign	A sign used to indicate, warn, or guide traffic.
2	TF002	Traffic Markings	Lines drawn on the road surface.
3	TF003	Protective Facilities	Facilities designed to protect pedestrians and vehicles.
4	TF004	Traffic Signal Lights	Signal devices controlling traffic flow at intersections.
5	TF005	Traffic Monitoring System	A system used for real-time monitoring of traffic flow and accidents.
6	TF006	Service Facilities	Auxiliary facilities provided for drivers and passengers.
7	TF007	Road Lighting and Power Distribution	Facilities providing nighttime lighting and power distribution.
8	TF008	Management Offices and Equipment	Offices and equipment used for traffic management and coordination.

Supplementary Table 36. Traffic Role Categories

No.	Code	Name	Description
1	TR001	Pedestrian	A person walking on the road or other traffic areas without using a vehicle.
2	TR002	Motor Vehicle Driver	A person driving a motor vehicle.
3	TR003	Non-motor Vehicle Driver	A person driving a non-motor vehicle.
4	TR004	Passenger	A person riding in a vehicle without directly participating in driving.
5	TR005	Traffic Management Personnel	Personnel responsible for managing, monitoring, and coordinating traffic, such as traffic police and dispatchers.
6	TR006	Traffic Service Personnel	Personnel providing traffic-related services, such as toll collectors and maintenance workers.
7	TR007	Logistics and Freight Personnel	Personnel engaged in cargo transportation and logistics work, such as truck drivers and dispatchers.
8	TR008	Emergency Rescuers	Personnel providing assistance in accidents or emergencies, such as firefighters and paramedics.
9	TR009	Other	Any other participants or roles in special circumstances not listed above.

Supplementary Table 37. Classification Levels

No.	Code	Name	Description
1	GK	Open Level	Applicable to information that is publicly released and accessible to anyone.
2	XZ	Restricted Level	Information accessible only to a specific range of people or organizations.
3	MM	Secret Level	Information that requires specific authorization, involving more sensitive details.
4	JM	Confidential Level	Information related to national or institutional important interests, kept strictly confidential.
5	UM	Top Secret Level	Information involving national core interests, with the highest level of confidentiality.

Supplementary Table 38. Document Types

No.	Code	Name	Description
1	ZY	Resolution	Applicable to major decisions made through discussion in meetings.
2	JD	Decision	Applicable to decisions on important matters, deployment, rewards and punishments for units and personnel, changes, or revocation of inappropriate decisions made by lower-level authorities.
3	ML	Order	Applicable to the promulgation of administrative regulations and rules, announcement of major mandatory measures, approval of grants and promotions, and commendation of relevant units and personnel.
4	GB	Bulletin	Applicable to the announcement of important decisions or major matters.
5	GG	Announcement	Applicable to announcing important matters or legal matters both domestically and internationally.
6	TG	Notice	Applicable to the publication of matters that should be obeyed or known within a certain scope.
7	YJ	Opinion	Applicable to presenting views and handling methods on important issues.
8	TZ	Notice	Applicable to issuing and conveying requirements for lower authorities to execute and for relevant units to be aware of or execute, forwarding or transmitting documents.
9	TB	Circular	Applicable to recognizing advancements, criticizing errors, conveying important policies, and informing about important situations.
10	BG	Report	Applicable to reporting work to higher authorities, reflecting situations, and responding to inquiries from higher authorities.
11	QS	Request	Applicable to requesting instructions or approval from higher authorities.
12	PF	Approval	Applicable to responding to requests made by lower authorities.
13	YA	Proposal	Applicable to the proposals made by people's governments at all levels to the same-level people's congress or standing committee for deliberation according to legal procedures.
14	H	Letter	Applicable to negotiations, inquiries, and responses between non-subordinate authorities, requests for approval, and responses to approval matters.
15	JY	Minutes	Applicable to recording the main details and decisions made during a meeting.

Supplementary Table 39. Relationship definitions among the nine traffic-data entities

Relation code	Meaning	Source (Domain)	Target (Range)	Cardinality	Notes / Constraint hints
occurs_on	occurs on (road)	TRAFFIC_INCIDENT	TRAFFIC_ROAD	1..n → 1	Each incident links to ≥ 1 road segment; enforce via ID/IDREF.
involves	involves vehicle	TRAFFIC_INCIDENT	TRAFFIC_VEHICLE	0..n → 1..n	Multi-vehicle incidents common; optional join table for role/damage.
detected_by	detected / captured by	TRAFFIC_INCIDENT	TRAFFIC_FACILITY	0..n → 1..n	Cameras/loops may detect many incidents; an incident may have multiple sources.
participated_by	participated by (role)	TRAFFIC_INCIDENT	TRAFFIC_ROLE	0..n → 1..n	Roles: driver, officer, etc.; can add attributes (duty, liability).
described_in	described / recorded in	TRAFFIC_INCIDENT	TRAFFIC_INFORMATION	0..n → 0..n	News, microblogs, police reports; store URL/text if needed.
influenced_by	influenced by (factor)	TRAFFIC_INCIDENT	TRAFFIC_RELATED_INFO	0..n → 0..n	Weather, construction, events; attach influence strength.
equipped_with	equipped with (facility)	TRAFFIC_ROAD	TRAFFIC_FACILITY	0..n → 1..n	A road segment can host multiple facilities; facility usually ties to road/geo.
measured_by	measured by (indicator)	TRAFFIC_ROAD	TRAFFIC_INDICATOR	0..n → 0..n	Indicators such as speed or flow; specify period and method.
located_in	located in / belongs to	TRAFFIC_ROAD	TRAFFIC_GEOGRAPHY	1..n → 1	Every road segment must belong to one geo unit.
operated_by	operated / owned by	TRAFFIC_VEHICLE	TRAFFIC_ROLE	0..n → 0..n	Roles include driver, owner, operator.
contributes_to	contributes to indicator	TRAFFIC_VEHICLE	TRAFFIC_INDICATOR	0..n → 0..n	Vehicle-level trajectories aggregated into indicators.
generates	generates indicator	TRAFFIC_FACILITY	TRAFFIC_INDICATOR	0..n → 0..n	Facilities output raw data, which form indicators.
hosts	hosts / deploys	TRAFFIC_GEOGRAPHY	TRAFFIC_FACILITY	0..n → 0..n	Intersections or areas deploy multiple facilities.
referenced_by	referenced by information	TRAFFIC_GEOGRAPHY	TRAFFIC_INFORMATION	0..n → 0..n	Textual info often mentions place names / coordinates.
defines_or_reports_cites	defines or reports (metric) cites (related factor)	TRAFFIC_INFORMATION	TRAFFIC_INDICATOR	0..n → 0..n	Reports/specs define or publish indicator values.
		TRAFFIC_INFORMATION	TRAFFIC_RELATED_INFO	0..n → 0..n	Information external factors via citation/data reference.
affects	affects indicator	TRAFFIC_RELATED_INFO	TRAFFIC_INDICATOR	0..n → 0..n	Weather/events impact speed, flow, etc.

Supplementary Table 40. RowKey Design Patterns and Access Scenarios

Resource Type	Typical Query Pattern	RowKey Template	Key Field Semantics	Hotspot Mitigation	Example RowKey
Road	Exact lookup by road_id; rare updates	ROAD<road_id>	road_id: unique code of a road/segment	Not needed (low write rate)	ROADG6_001_BJ_NORTH
Indicator	Scan by road_id + time range; newest first	IND<road_id> <rev_ts><src> <salt>	rev_ts: reversed timestamp = Long.MAX - ts; src: data source; salt: hash bucket	salt = crc32(road_id)%N or prefix buckets; natural dispersion by road_id	INDG6_0019223372036854...cam0230F
Incident	City/road + time-range retrieval; direct by incident_id	INC<city_id> <rev_ts> <incident_id>	city_id: city/administrative code; incident_id: event UID	city_id distributes first; rev_ts keeps time order; optional CRC prefix on incident_id	INCBJ9223372036854...A20250722_000123
Facility	Batch scan by spatial grid; point lookup by fac_id	FAC<grid_id> <fac_id>	grid_id: GeoHash/grid code; fac_id: device UID	Spatial hashing (GeoHash) naturally spreads load; grid_id guides region splits	FACwx4g0bCÂMERA_023
Unstructured Meta	Locate raw files by source + date; auditing/backtracking	RAW<src><dt> <file_hash>	src: source identifier; dt: date (YYYYMMDD); file_hash: checksum	Different src values disperse; dt partitions scans; hash avoids collisions	RAWkafka_tsp202507229f3ab2...
Derived Agg	Fast read/write by object + granularity (H/D/W)	AGG<obj_id> <gran><rev_ts>	obj_id: target object (road_id/region); gran: granularity (H/D/W)	obj_id prefix scatters writes; add salt if needed; rev_ts for reverse time scan	AGGG6_001H9223372036854...