

7.3 Background Data Frame

name [Background Data Frame]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	B1		Background Distribution Header		b
2	O1	B2		A Sequence of Background Data by Element		c
3	O2	B3		Extended Data (Background Data Frame)	(1)	c

(1) Extended Data (Background Data Frame)

If the value of size described in the basic data frame management record of main map data frame is larger than specification-defined size, the increased area is used as expansion fields. Follow the expansion method that is defined separately.

7.3.1 Background Distribution Header

name [Background Distribution Header]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	2	SWS	Size of Background Distribution Header		a
2	2	B1		A Sequence of Element Management Information	(1)	a
3	O1	B2		Extended Data (Background Distribution Header)	(2)	c

(1) A Sequence of Element Management Information

As element management information, a set of background data grouped by display class is managed. A maximum of 32 data items can be stored in element management information sequence. The detail will be defined in Chapter 32.

If a display class has no background data, 0xFFFF is assigned to the element unit offset field and 0 is assigned to the element unit size field for element management information.

The element management information sequence is set on the supposition that background is drawn, according to the sequence in which each element management information appears.

(2) Extended Data (Background Distribution Header)

This field is used for expansion.

Follow the expansion method that is defined separately.

7.3.1.1 Element Management Information

The element management information contains the storage location and size of the element unit background data for each element.

name [Element Management Information]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	2	D	Element Unit Offset	(1)	b
2	2	2	SWS	Element Unit Size	(2)	a

(1) Element Unit Offset

This field describes the displacement of the beginning of the particular element unit background from the beginning of the background data frame.

(2) Element Unit Size

This field describes the size of the particular element unit background. If there is no entity, 0 is assigned to the field.

7.3.2 Element Unit Background

The element unit background retains the real data per map background data element. Large-scale city map data can also be stored in this frame. If there is no entity (number of background types = 0), this frame itself does not exist.

name [Element Unit Background]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	2	N	Number of Background Types (n)	(1)	a
2	2	B1		A Sequence of Background Type Unit Header (#1 to #n)	(2)	a
3	O1	B2		A Sequence of Minimum Graphics Data List (#1 to #n)		a

(1) Number of Background Types (n)

This field describes the number of types of the background data contained in the particular element unit background frame (the number of minimum graphics data lists).

(2) Background Type Unit Header Sequence (#1 to #n)

The background type unit header sequence (#1 to #n) is set on the supposition that background is drawn, according to the sequence in which each background type unit header appears.

7.3.2.1 Background Type Unit Header

This header contains the storage location of data for each background type, the number of data, and shape classification, such as polygon, polyline, point, etc. The data exists as many as the number of background types registered in the element unit background frame. If there is no entity, this header itself does not exist.

name [Background Type Unit Header]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	2	D	Background Type Unit Offset	(1)	a
2	2	2	B:B::N	Shape Classification + Number of Minimum Graphics Data Records	(2)	a

(1) Background Type Unit Offset

This field describes the displacement of the beginning of the particular minimum graphics data list from the beginning of each element unit background.

(2) Shape Classification + Number of Minimum Graphics Data Records

No.	bit	Description			
1	15 to 14	Shape Classification	bit15	bit14	Meaning
			0	0	Point (symbol) data
			0	1	Line data
			1	0	Area data
			1	1	(RESERVED)
2	13	Height Information Flag (3) (Background Type Unit)	bit13	Meaning	
			0	No height information contained.	
			1	Height information contained.	
3	12	(RESERVED)			
4	11 to 0	Number of Minimum Graphics Data Records (4)			

(3) Height Information Flag

This flag indicates whether the appropriate minimum graphics data contains the set height information. This flag shall be set per background type. For line or area data, the flag indicates whether the height information record exists. For point data, the flag indicates whether the altitude data exists.

(4) Number of Minimum Graphics Data Records

This field describes the number of minimum graphics data records (polygon, polyline, and point) constituting the minimum graphics data list.

7.3.2.2 Minimum Graphics Data List

The frame contains the sequence of minimum graphics data lists #1 to #n corresponding to the sequence of background type unit headers #1 to #n. The end number p of the minimum graphics data record sequence equals the number of minimum graphics data records retained by the background type unit header.

name [Minimum Graphics Data List]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0			A Sequence of Minimum Graphics Data Records (#1 to #p)	(1)	

(1) Minimum Graphics Data Record Sequence (#1 to #p)

The minimum graphics data record sequence (#1 to #p) is set on the supposition that background is drawn, according to the sequence in which each minimum graphics data record appears.

7.3.2.2.1 Minimum Graphics Data Record (for Line or Area Data)

name [Minimum Graphics Data Record (for Line or Area data)]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	2	B:B:B::SWS	Minimum Graphics Data Header	(0)	
2	2	2	B:B:B:B:B:N	Display Scale Flag + Number of Offset Coordinates Records	(1)	a
3	4	2	N	Type Code	(2)	a
4	6	2	B:B:B:B::N	Additional Background Information Type + Additional Background Information Flag + Multiplication Constant	(3)	a
5	8	B1		Element Point Coordinates Information		a
6	O1	B2		A Sequence of Height Information Record		c
7	02	2	D	Name Offset	(5)	c
8	03	2	N	Auxiliary Data	(6)	c
9	O4	B3		Additional Background Information Pointer		c
109	O5	8		Temporal Information	(10)	c
11	O6	B4		Extended Data (Line Data/Area Data)	(9)	c

(0) Minimum Graphics Data Header

No.	bit	Description
1	15	Delete Flag (Delete: 1/Not delete: 0) (0-1)
2	14	Temporal Information Flag (0: No setting, 1: Setting) (0-2)
3	13	Extended Data (Line or Area data) Flag (0: No extended data, 1: Extended data) (0-3)
4	12	(RESERVED)
5	11 to 0	Size of Minimum Graphics Data Record

(0-1) Delete Flag

This flag indicates whether the data is valid 0 or invalid 1. Normally, this flag is used in memory after being read from a medium.

(0-2) Temporal Information Flag

This flag indicates whether the minimum graphics data record (for line or area data) has "temporal information" or not.

(0-3) Extended Data (Line and Area Data) Flag

This flag indicates whether the minimum graphics data record (for line or area data) has the extension data or not.

(1) Display Scale Flag + Number of Offset Coordinates Records

This field set display scale flag, and describes the number of offset coordinates records that constitute the element point coordinates information in the minimum graphics data record.

No.	bit	Description
1	15	Display Scale Flag 1 (Permitted: 1/Not permitted: 0)
2	14	Display Scale Flag 2 (Permitted: 1/Not permitted: 0)
3	13	Display Scale Flag 3 (Permitted: 1/Not permitted: 0)
4	12	Display Scale Flag 4 (Permitted: 1/Not permitted: 0)
5	11	Display Scale Flag 5 (Permitted: 1/Not permitted: 0)
6	10 to 0	Number of Offset Coordinates Records

When all display scale flags 1 to 5 are 0 (not permitted), no display shall be made.

Display scale flag 1 is for the greatest scale. As flag number ascends, the scale associated with the flag becomes smaller. Display scale flag 4 is the smallest scale flag. Practical display scale associated with each flag is determined by the set value in the level management record.

(2) Type Code

The type code field describes a code corresponding to the type of an object to be recorded.

The correspondence between type codes and objects is defined by META [country: identification]

(3) Additional Background Information Type + Additional Background Information Flag + Multiplication Constant

No.	bit	Description		
1	15 to 14	Additional Background Information Type	bit15	bit14
			Meaning	
			0	0
			0	1
			1	0
			1	1
2	13	Additional Background Information Flag	bit13	Meaning
			0	No additional background information contained.
			1	Additional background information contained.
3	12	Name Flag (5)	bit12	Meaning
			0	No name offset information.
			1	There is name offset information.
4	11	Auxiliary Data Flag (6)	bit11	Meaning
			0	No auxiliary data contained.
			1	Auxiliary data contained.
5	10	Pen-up Flag (7)	bit10	Meaning
			0	No pen-up .
			1	Pen-up.
6	9	Underground Attribute Flag (8)	bit9	Meaning
			0	Not underground attribute.
			1	Underground attribute.
7	8 to 3	(RESERVED)		
8	2 to 0	Multiplication Constant (4)		

(4) Multiplication Constant

An X-coordinate offset and a Y-coordinate offset are used by multiplying each offset by two to the nth power, where n is a multiplication constant, provided ($0 \leq n \leq 7$: n is an integer).

(5) Name Flag, Name Offset

The name flag indicates "there is name offset information" when name data associated with the minimum graphics data exists.

When the name flag indicates there is name offset information, name offset is created, pointing to the storage position of the name data record associated with the minimum graphics data. The name offset represents the displacement of the beginning of the particular name data record from the beginning of the name data frame.

When the name flag indicates there is no name offset information, the name offset is deleted.

(6) Auxiliary Flag, Auxiliary Data

The auxiliary data flag indicates whether auxiliary data exists.

For an address location polygon, set a prefecture code or a city/ward /town/village code, according to the polygon type.

Prefecture codes shall end with three zeros. Example: Aichi prefecture = 23000

(7) Pen-up Flag

The pen-up flag indicates whether the offset coordinates record of the background data has pen-up information.

(8) Underground Attribute Flag

This flag indicates whether the target data (line or area) concerns underground. Example: subways, underground railway stations, etc.

(9) Extended Data (Line or Area Data)

When the extended data (line or area data) flag is "1: Extended data," expansion fields shall be able to be used.

Follow the expansion method that is defined separately.

(10) Temporal Information

See subsection 7.2.2.1.1.7, "Temporal information."

7.3.2.2.1.1 Element Point Coordinates Information

name [Element Point Coordinates Information]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	2	N:NZ	Starting X-coordinate (Longitude)	(1)	a
2	2	2	N:NZ	Starting Y-coordinate (Latitude)	(2)	a
3	4	B1		A Sequence of Offset Coordinates Records		a

(1) Starting X-coordinate (Longitude)

No.	bit	Description
1	15 to 13	Relative Position within an Integrated Parcel
2	12 to 0	Starting X-coordinate

When the current parcel is formed by integrating multiple parcels, relative positions within the integrated parcel are expressed by taking the sub-parcel at left bottom of the integrated parcel as being 0. Numbers 0 to 7 express eight divisions in X direction.

X-coordinate values are on the longitudinal coordinate within a parcel.

X-coordinate values within a parcel are determined differently, according to the parcel type.

Separate parcel: X-coordinate values are used as is (the relative position within an integrated parcel is set to 0). However, the range of the X coordinate is limited, according to the size of the parcel formed by dividing the area.

Integrated parcel: Based on the relative position of a sub-parcel within the integrated parcel, the offset of the sub-parcel from the coordinate origin is calculated. The X coordinate within the parcel is expressed by adding the offset to the X coordinate of the sub-parcel. Max. $4096 \times 8 = 32768$ (8000(16))

(2) Starting Y-coordinate (Latitude)

No.	bit	Description
1	15 to 13	Relative Position within an Integrated Parcel
2	12 to 0	Starting Y-coordinate

When the current parcel is formed by integrating multiple parcels, relative positions within the integrated parcel are represented by taking the sub-parcel at left bottom of the integrated parcel as being 0.

Starting Y-coordinate is on the latitudinal coordinate within a parcel.

7.3.2.2.1.1.1 Offset Coordinates Record

name [Offset Coordinates Record]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	1	I	X-coordinate Offset	(1)	a
2	1	1	I	Y-coordinate Offset	(2)	a

(1) X-coordinate Offset

This field describes the offset of the X coordinate of the particular element point. from the X coordinate of its just preceding element point.

(2) Y-coordinate Offset

This field describes the offset of the Y coordinate of the particular element point from the Y coordinate of its just preceding element point.

X-coordinate and Y-coordinate offsets are obtained by dividing each offset value on the corresponding coordinate within a parcel by two to the nth power (n is a multiplication constant). The range of the obtained value is from -128 to 127. For area data, data string origin point and end point shall be positioned at the same coordinates. This can be expressed as

$$X1 + X2 + \dots + Xp = 0, \quad Y1 + Y2 + \dots + Yp = 0.$$

If the shape classification is line data, the representation of line segments (specifying the display of divisions of one line data) is deactivated, after both X- and Y-coordinate offsets are set to 00(16) (indicating pen-up) before the next time they are set to 00(16) (indicating pen-down). If the shape classification is area data, only the representation of polygon shape frame lines is deactivated, after both X- and Y-coordinate offsets are set to 00(16) (indicating pen-up) before the next time they are set to 00(16) (indicating pen-down). For polygon shapes, offsets shall be handled, regarded as being significant even during the state of pen-up.

All coordinates points of area data are arranged counterclockwise and all sides of the area shape shall not cross. When painting an area shape, it is contoured on the supposition that it is drawn with an internal space paint algorithm.

7.3.2.2.1.2 Height Information Record

name [Height Information Record]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	2	:N	Altitude Information Size	(1)	a
2	2	2	:I	Altitude Information	(3)	a

(1) Altitude Information Size

No.	bit	Description
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1	15 to 12	(RESERVED)
2	11 to 0	Consecutive Element Points (2)

(2) Consecutive Element Points

This field describes the number of element points with same altitude information among a group of element points sequenced from the starting element point. A total of the consecutive element points equals the number of element points that constitute one unit of minimum graphics data (the number of offset coordinates records + 1). The value range is from 1 to 4094.

(3) Altitude Information

No.	bit	Description
1	15 to 14	(RESERVED)
2	13 to 0	Altitude Value (4)

(4) Altitude Value

This field describes an altitude from -4095 to +12287 with the offset of 4096. The units are meters. Thus, the field contains the sum of an actual altitude value and 4096 meters.

7.3.2.2.1.3 Additional Background Information Pointer

This pointer exists only when the additional background information flag indicates the presence of such information.

This pointer does not exist if there is no additional background information.

7.3.2.2.1.3.1 Additional Background Information Offset
(When additional background information type is specified 'Contained in Data Frame A or B' in the minimum graphics data record)

The additional background offset points to the storage position of the additional data associated with the minimum graphics data.

The offset represents the displacement of the beginning of the particular additional data record from the beginning of additional data frame A or B.

name [Additional Background Information offset]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	4	D	Additional Background Information Offset		a

7.3.2.2.1.3.2 Building ID
(When additional background information type is specified 'Building ID' in the minimum graphics data record)

The building ID points at the ID for nearby search of facility associated with the minimum graphics data.

See search data (building information search) in Guidance and Index Data (Chapter 11).

name [building ID]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	4	D	Building ID		a

7.3.2.2.2 Minimum Graphics Data Record (for Point (Symbol) Data)

name [Minimum Graphics Data Record (for Point (Symbol) Data)]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	2	B:B:B::SWS	Minimum Graphics Data Header	(0)	
2	2	2	B:B:B:B:B:	Display Scale Flag	(1)	a
3	4	2	N	Type Code	(2)	a
4	6	2	B:B:B:B::N	Additional Background Information Type + Additional Background Information Flag	(3)	a
5	8	4		Element Point Coordinates Information		a
6	12	2	I	Altitude Information	(4)	c
6	01	2	D	Name Offset	(6)	c
7	02	2	N	Auxiliary Data	(7)	c
8	03	B1		Additional Point/Symbol Information Pointer		c
9	04	8		Temporal Information	(9)	
10	05	B2		Extended Data (Point (Symbol) Data)	(8)	c

(0) Minimum Graphics Data Header

No.	bit	Description
1	15	Delete Flag (Delete: 1/Do not delete: 0)
2	14	Temporal Information Flag (0: No setting, 1: Setting)
3	13	Extended Data (Point/Symbol data) Flag (0:No extended data, 1: Extended data)
4	12	(RESERVED)
5	11 to 0	Size of Minimum Graphics Data Record

(1) Display Scale Flag

This field contains display scale flag setting. Flag usage is the same as for line or area data.

No.	bit	Description
1	15	Display Scale Flag 1 (Permitted: 1/Not permitted: 0)
2	14	Display Scale Flag 2 (Permitted: 1/Not permitted: 0)
3	13	Display Scale Flag 3 (Permitted: 1/Not permitted: 0)
4	12	Display Scale Flag 4 (Permitted: 1/Not permitted: 0)
5	11	Display Scale Flag 5 (Permitted: 1/Not permitted: 0)
6	10 to 0	(RESERVED)

When all display scale flags 1 to 5 are 0 (not permitted), no display shall be made.

(2) Type Code

The type code field contains a code corresponding to the type of an object to be recorded.

The correspondence between type codes and objects is defined by META [country of application: region identification]

(3) Additional Background Information Type + Additional Background Information Flag

No.	bit	Description			
1	15 to 14	Additional Background Information Type	bit15	bit14	Meaning
			0	0	To be contained in additional data frame A
			0	1	To be contained in additional data frame B
			1	0	(RESERVED)
			1	1	(RESERVED)
2	13	Additional Point/Symbol Information Flag	bit13	Meaning	
			0	There is no additional point/symbol information.	
			1	There is additional point/symbol information.	
3	12	Name Flag (6)	bit12	Meaning	
			0	There is no name offset information.	
			1	There is name offset information.	
4	11	Auxiliary Data Flag (7)	bit11	Meaning	
			0	There is no auxiliary data.	
			1	There is auxiliary data.	
5	10	(RESERVED)			
6	9	Underground Attribute Flag	bit9	Meaning	
			0	Indicates non-underground attribute.	
			1	Indicates underground attribute.	
7	8 to 0	(RESERVED)			

(4) Altitude Information

No.	bit	Description
1	15 to 14	(RESERVED)
2	13 to 0	Altitude Value (5)

(5) Altitude Value

This value represents an altitude from -4095 to +12287 with the offset of 4096. The units are meters. Thus, the field contains the sum of an actual altitude value and 4096 meters.

(6) Name Flag, Name Offset

The name flag indicates "there is name offset information" when name data associated with the minimum graphics data exists.

When the name flag indicates there is name offset information, name offset is created, pointing to the storage position of the name data record associated with the minimum graphics data. The name offset represents the displacement of the beginning of the particular name data record from the beginning of the name data frame.

When the name flag indicates there is no name offset information, the name offset is omitted.

(7) Auxiliary Flag, Auxiliary Data

The auxiliary flag indicates whether auxiliary data exists.

Set a 3-D symbol code.

(8) Extended Data (Point (Symbol) Data)

When the extended data (point (symbol) data) flag is "1: Extended data," expansion fields shall be able to be used.

Follow the expansion method that is defined separately.

(9) Temporal Information

This is similar to the description of Subsection 7.2.2.1.1.7, "Temporal information."

7.3.2.2.2.1 Element Point Coordinates Information

name [Element Point Coordinates Information]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	2	N:NZ	X Coordinate (Longitude)	(1)	a
2	2	2	N:NZ	Y Coordinate (Latitude)	(2)	a

(1) X Coordinate (Longitude)

No.	bit	Description
1	15 to 13	Relative Position within an Integrated Parcel
2	12 to 0	X Coordinate

When the current parcel is formed by integrating multiple parcels, relative positions within the integrated parcel are expressed by taking the sub-parcel at left bottom of the integrated parcel as being 0.

X-coordinate values are on the longitudinal coordinate within a parcel.

(2) Y Coordinate (Latitude)

No.	bit	Description
1	15 to 13	Relative Position within an Integrated Parcel
2	12 to 0	Y Coordinate

When the current parcel is formed by integrating multiple parcels, relative positions within the integrated parcel are expressed by taking the sub-parcel at left bottom of the integrated parcel as being 0.

Y-coordinate values are on the latitudinal coordinate within a parcel.

7.3.2.2.2 Additional Point/Symbol Information Pointer

This pointer exists only when the additional point/symbol information flag indicates the presence of such information (does not exist if there is no additional point/symbol information).

The additional point/symbol information offset points to the storage of the additional point/symbol information associated with the minimum graphics data.

The format of the additional point/symbol information pointer is the same as the additional background information pointer format.