S-131

IHO Marine Harbour Infrastructure (MHI) - Annex A Data Classification and Encoding Guide

Edition 2.0.0 – January 2026

IHO

International Hydrographic Organization

Published by the
International Hydrographic Organization
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1 Overview

1.1 Introduction

The “Data Classification and Encoding Guide” has been developed to provide consistent, standardized instructions for encoding S-100 compliant Marine Harbour Infrastructure (MHI) (S-131) data.

The purpose of the Data Classification and Encoding Guide is to facilitate S-131 encoding to meet IHO standards for the proper display of Marine Harbour Infrastructure information in an ECDIS and other electronic charting displays. This document describes how to encode information that the modeller considers relevant to a Marine Harbour Infrastructure data product. The content of a dataset is at the discretion of the producing authority provided that the conventions described within this document are followed. A “producing authority” is a Hydrographic Office (HO) or other organization authorized by a government, to produce definitive nautical information. The entire S-100 Universal Hydrographic Data Model, including the S-131 MHI Product Specification, is available at the following web site, https://iho.int.

1.2 Document Metadata

NOTE: This information uniquely identifies this Data Classification and Encoding Guide to the Product Specification and provides information about its creation and maintenance.

Table 1-1 — Document metadata

Metadata	Content
Title:	Marine Harbour Infrastructure, Data Classification and Encoding Guide
Version:	2.0.0
Date:	16 November 2025
Language:	English
Classification:	Unclassified
Contact:	International Hydrographic Organization 4 Quai Antoine 1er B.P. 445 MC 98011 MONACO CEDEX Telephone: +377 93 10 81 00 Fax: +377 93 10 81 40 URL: https://iho.int
Identifier:	S-131 Annex A Data Classification and Encoding Guide
Maintenance:	Changes to S-131 Annex A; Data Classification and Encoding Guide are coordinated by the IHO Nautical Information Provision Working Group (NIPWG) and must be made available via the IHO web site.

1.3 Terms and definitions

For terms and definitions, see the Marine Harbour Infrastructure Product Specification, Clause 1.4.2.

1.4 Abbreviated terms

For a list of abbreviations, see the Marine Harbour Infrastructure Product Specification, Clause 1.4.3.

1.5 Use of language

Within this document:

- “Must” indicates a mandatory requirement;
- “Should” indicates an optional requirement, that is the recommended process to be followed, but is not mandatory;
- “May” means “allowed to” or “could possibly”, and is not mandatory, or recommended.

1.6 Maintenance

Changes to the Data Classification and Encoding Guide must occur in accordance with the IHO Resolution 2/2007 as amended.

2 General

2.1 Introduction

This Data Classification and Encoding Guide (DCEG) contains rules and guidance for converting data describing the real world into data products that conform to the S-131 specification.

The S-131 specification contains an application schema (UML model) describing the conceptual domain model in terms of classes and relationships, and a Feature Catalogue (see S-131 Annex C) that specifies the data model, i.e., specifies the data model types and associations corresponding to the various classes and relationships in the application schema.

To simplify the DCEG text, the various data model types will be provided without the suffixes “class”, “type” or “instance”; e.g. the term “feature” should be understood as “feature class” or “feature type” or “feature instance” as best fits the immediate context in which it is used (and where there might be confusion, it is written out in full as feature class/type/instance).The model defines real world entities as a combination of descriptive and spatial characteristics (S-131 Product Specification clause 6).

This clause of the DCEG contains general information needed to understand the encoding rules and describes fundamental common rules and constraints. It also describes datasets and metadata. The data model object types used within S-131 and their encoding rules and guidelines are defined in detail in subsequent clauses of this document.

Within this document the features, information types, associations, and attributes appear in **bold text** or *italic text*, to distinguish them from surrounding words.

2.2 Descriptive characteristics

2.2.1 Feature

A feature contains descriptive attributes that characterize real world entities.

The word ‘feature’ as used in the ISO 191xx series and in S-100 based product specifications has two distinct but related senses – ‘feature type’ and ‘feature instance’. A feature instance is a single occurrence of the feature and is represented as an object in a dataset. The location of a feature instance on the Earth’s surface is indicated by a relationship to one or more spatial primitive instances. A feature instance may exist without referencing a spatial primitive instance.

2.2.1.1 Geographic feature class

Geographic (Geo) feature types carry the descriptive characteristics of a real world entity which is provided by a spatial primitive instance.

2.2.1.2 Meta feature class

Meta feature type contains information about other features.

2.2.1.3 Charted background feature

The data product would mostly be visualized as an overlay of an ENC or other GIS applications. Consequently, all necessary descriptive and spatial characteristics to provide a charted background should be provided by the underlying application.

2.2.1.4 Information type

An information type has no geometry and therefore is not associated to any spatial primitives to indicate its location.

An information type may have attributes and can be associated with features or other information types in order to carry information particular to these associated features or information types.

2.3 Spatial characteristics

2.3.1 Spatial primitives

The allowable spatial primitive for each feature is defined in the Feature Catalogue. Allowable spatial primitives are point, curve, and surface.

Within this document, allowable spatial primitives are included in the description of each feature. For easy reference, Table 2-1 below summarises the allowable spatial primitives for each feature. In the table, abbreviations are as follows: point (P), curve (C), surface (S), and none (N). Abstract features are excluded from this table since they cannot have feature instances in datasets.

Table 2-1 — Features and their spatial primitives

Feature	P	C	S	N
AnchorBerth	P		S	
AnchorageArea	P		S	
AutomatedGuidedVehicle	P	C	S	
Berth	P	C	S	
BerthPosition	P			
Bollard	P			
DockArea			S	
DryDock	P		S	
Dolphin	P		S	
DumpingGround	P		S	
FenderLine		C		
FloatingDock	P		S	
Gridiron	P		S	
HarbourAreaAdministrative	P		S	
HarbourAreaSection	P		S	
HarbourBasin			S	
HarbourFacility	P	C	S	
LockBasin	P		S	
LockBasinPart	P		S	
MooringBuoy	P			
MooringWarpingFacility	P			
OnshorePowerFacility	P			

Feature	P	C	S	N
OuterLimit		C	S	
PilotBoardingPlace	P		S	
SeaplaneLandingArea	P		S	
ShipLift	P		S	
StraddleCarrier	P		S	
Terminal	P		S	
TurningBasin			S	
WaterwayArea			S	
DataCoverage			S	
QualityOfNonBathymetricData			S	
SoundingDatum			S	
VerticalDatumOfData			S	
TextPlacement	P			

2.3.2 Capture density guideline

Coordinate density can have a significant impact on file size and system performance. A rule of thumb is to limit the coordinate density to 0.3 mm at maximum permitted display scale. For a scaleless product, the producer should keep in mind the expected scale range for typical use and the density of coordinates needed to suit the needs of the product.

The capture density will follow the recommendation of the S-101 (ENC) DCEG, which states curves and surface boundaries should not be encoded at a point density greater than 0.3 mm at permitted display scale.

A curve consists of one or more curve segments. Each curve segment is defined as a loxodromic line on WGS84, or as an arc or circle. Long lines may need to have additional coordinates inserted to cater for the effects of projection change.

The presentation of line styles may be affected by curve length. Therefore, the encoder must be aware that splitting a curve into numerous small curves may result in poor symbolization.

2.4 Attributes

Attributes may be simple type or complex type. Complex © attributes are aggregates of other attributes that can be simple type or complex type attributes. Simple (S) attributes are assigned to one of the types collected in clause 2.4.1.

The binding of attributes to a feature, the binding of attributes to attributes to construct complex attributes, and attribute multiplicity are all defined in the Feature Catalogue.

Within this document, the allowable attributes are included in the description of each feature, as well as the allowable values for enumeration type attributes.

2.4.1 Simple attribute types

Each simple attribute is assigned one of the attribute datatypes in Table 2-2:

Table 2-2 — Simple attribute types

Abbreviation	Attribute type	Description
BO	Boolean	A value representing binary logic. The value can be either *true* or *false*. The default state for Boolean type attributes (i.e. where the attribute is not populated for the feature) is *false*. NB: The XML schema specification states that a boolean data type can have the following legal literals: true, false, 1, 0.
CL	Code List	A type of flexible enumeration (see “EN” below). A code list type is a list of literals which may be extended only in conformance with specified rules. Attributes of a code list type may take values from the list or other values which are defined according to the rules. The rules should be part of the specification of the individual codelist type. A code list could either be closed (fixed) or open (extensible). A code list type has the following properties: 1. A description of the code list type, 2. The URI where the list could be found, and 3. An encoding instruction.
DA	Date	A date provides values for year, month and day according to the Gregorian Calendar. Example (XML/GML): 1998-09-18 (YYYY-MM-DD) S-131 uses only XML-based formats (including GML) and therefore the ISO “basic” format described in S-100 is not used.
DT	Date and Time	A DateTime is a combination of a date and a time type. Example (XML/GML): 1985-04-12T10:15:30 (YYYY-MM-DDThh:mm:ss) S-131 uses only XML-based formats (including GML) and therefore the ISO “basic” format described in S-100 is not used.
EN	Enumeration	A fixed list of valid identifiers of named literal values. Attributes of an enumerated type may only take values from this list.
IN	Integer	A signed integer number. The representation of an integer is encapsulation and usage dependent. Integer attribute values must not be padded by non-significant zeroes. For example, for a number of 19, the value populated for the attribute must be 19 and not 019. Examples: 29, -65547
RE	Real	A signed real (floating point) number consisting of a mantissa and an exponent. The representation of a real is encapsulation and usage dependent. Real attribute values must not be padded by non-significant zeroes. For example, for a signal period of 2.5 seconds, the value populated for the attribute signal period must be 2.5 and not 02.50. Examples: 23.501, -0.0001234, -23.0, 3.141296
TD	Truncated Date	One or more significant components of the modelling date are omitted. Example: A GML dataset would use a GML built-in type and encode it as `<gMonth>--02<gMonth>` S-131 uses only XML-based formats (including GML) and therefore the ISO “basic” format described in S-100 is not used.
TE	Free text	An arbitrary-length sequence of characters including accents and special characters from a repertoire of one of the adopted character sets.
TI	Time	A time is given by an hour, minute, and second. Time zone according to UTC is optional. Character encoding of a time is a string that follows the local time. Examples (XML/GML): 18:30:59Z; 18:30:59+01:00; 18:30:59
URL	URL	A uniform resource locator (URL) is a URI that provides a means of locating the resource by describing its primary access mechanism (RFC 3986). Example: https://registry.iho.int

Abbreviation	Attribute type	Description
URN	URN	A persistent, location-independent, resource identifier that follows the syntax and semantics for URNs specified in RFC 2141. Example: urn:mrn:iho:S-131:1:0:0:Regulations

2.4.2 Mandatory attributes

Some attributes are mandatory and must be populated for a given feature. There are some reasons why attribute values may be considered mandatory:

- They are fundamental to the definition of a feature;
- They are required to support the correct portrayal of a feature instance;
- Certain features make no logical sense without specific attributes;
- Some attributes are required for safety of navigation.

Within this document, mandatory attributes are those with a multiplicity of 1,1 or 1,n (n>1) or 1,*. The attribute multiplicity is identified in the description of each feature class.

2.4.3 Conditional attributes

The feature classes or information types do not contain conditional attributes.

Complex attributes which are assigned to feature classes or information types have at least one sub-attribute which is mandatory (or conditionally mandatory). Where the sub-attribute of a complex attribute is conditional, this is indicated in the Remarks sub-clause for the relevant feature class entries.

2.4.4 Missing attribute values

Where a value of a mandatory attribute is not known, the attribute must be populated with an empty (null) value, except in the bindings listed in Table 2-3 below. Nilling the attributes in Table 2-3 must be treated as an error in the dataset.

Table 2-3 — Attributes which cannot be nilled

Feature / Information type / Complex attribute	Un-nillable attribute(s)
SoundingDatum	verticalDatum
TextPlacement	textOffsetBearing textOffsetDistance textType
VerticalDatumOfData	verticalDatum
onlineResource	linkage
featureName	language name
graphic	pictorialRepresentation
periodicDateRange	dateStart dateEnd
vesselMeasurementsSpecification	comparisonOperator vesselsCharacteristics vesselsCharacteristicsValue
DataCoverage	maximumDisplayScale

Where the value of a non-mandatory attribute is not known, the attribute must not be included in the dataset.

2.4.5 Multiplicity

In order to control the number of allowed attribute values or sub-attribute instances within a complex attribute, S-100 uses the concept of multiplicity. This defines lower and upper limits for the number

of values, whether the order of the instances is significant, and if an attribute is mandatory. Common examples are shown in Table 2-4:

Format: MinOccurs, MaxOccurs (a * indicates that infinite instances are possible, the term (ordered) indicates that the order of the provided instances is significant)

Table 2-4 — Multiplicity of attributes

Multiplicity	Explanation
0,1	An instance is not required; if provided there must only be one instance.
1,1	An instance is required and there must only be one instance.
0,*	An instance is not required and there can be an infinite number of instances.
1,*	An instance is required and there can be an infinite number of instances.
1,* (ordered)	An instance is required and there can be an infinite number of instances, the order of which is significant.
2,2	Two instances are required and there must be no more than two.

2.4.6 Spatial attribute types

Spatial attribute types must contain a referenced geometry and may be associated with spatial quality attributes. Each spatial attribute instance must be referenced by a feature instance or another spatial attribute instance.

2.4.6.1 Quality of spatial attributes

The quality of spatial attributes in S-131 is described in a Quality of Non-Bathymetric Data meta-feature (clause 4.4). This meta-feature defines areas within which uniform assessment exists for the quality. It is described in detail later in this document.

If the spatial quality attributes for an individual instance of a spatial primitive differ from the quality indicated in the overlying Quality of Non-Bathymetric Data meta-feature, the quality attributes for that instance are carried in an information class called spatial quality. Only points and curves can be associated with spatial quality. S-131 does not use multi-points. Currently, no use case for associating surfaces with spatial quality attributes is known, therefore this is prohibited. Vertical uncertainty is prohibited for curves as this dimension is not supported by curves.

NOTE: S-131 does not make use of the S-101 Quality of Bathymetric Data meta-feature since depth range uncertainties are not needed. The Quality of Non-Bathymetric Data meta-feature has all the quality attributes needed by S-131.

The spatial quality of individual spatial primitives can be indicated using the SpatialQuality information type (clause 14.2) associated to the individual spatial primitive. Figure 2-1 depicts the conceptual model. This should only be used when it is necessary to override the quality indicated in a covering QualityOfNonBathymetricData feature.

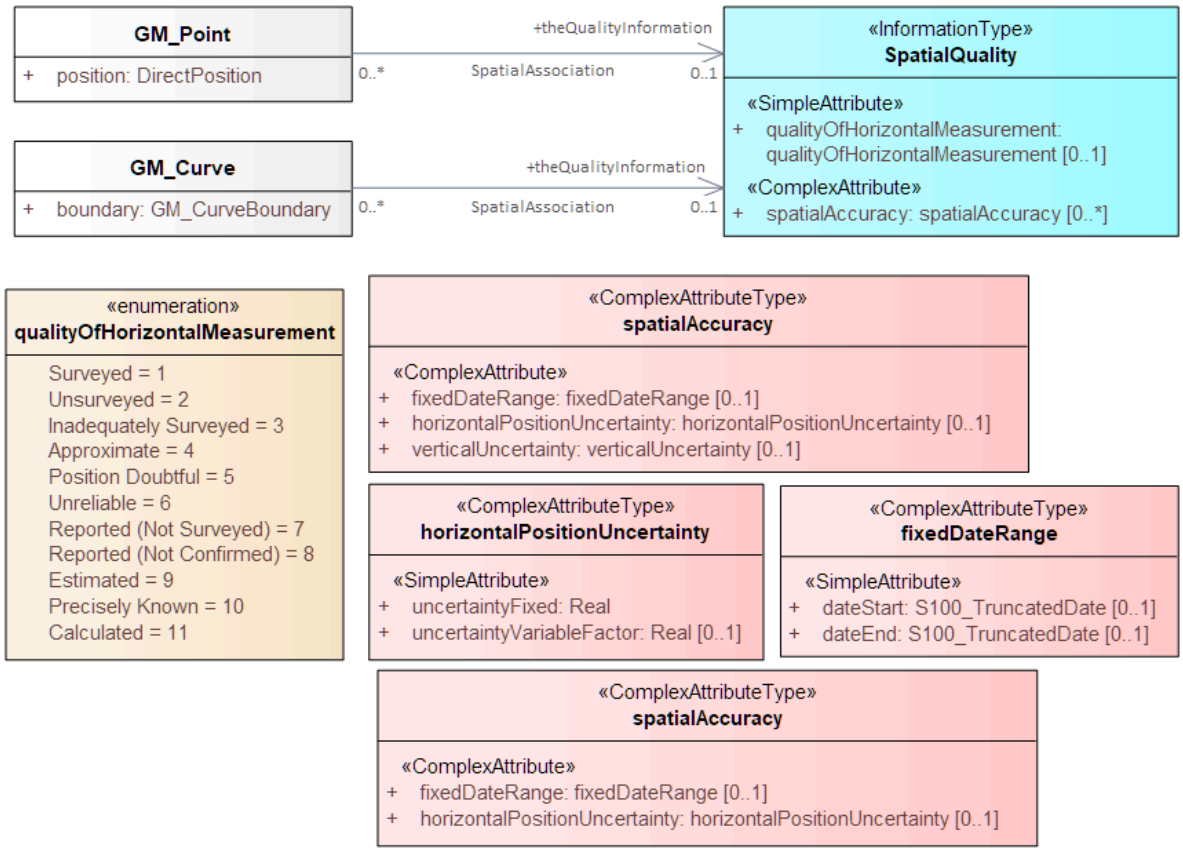

Figure 2-1 — Spatial quality for spatial primitives

2.4.7 Portrayal feature attributes

Marine Harbour Infrastructure data products will be used within ECDIS where ENC data is displayed based on the rules defined within the S-101 Portrayal Catalogue. While most ECDIS portrayal is based on attributes describing the instance of a particular feature in the real world, certain feature attributes are used in portrayal rules to provide additional functionality in the ECDIS. Table 2-5 provides a list of attributes which have specific influence on portrayal.

Table 2-5 — Attributes which have effects on portrayal

Attribute	Effects on portrayal
fixedDateRange; periodicDateRange	Population of these complex attributes determines when the feature will be added (sub-attribute dateStart) and/or removed (sub-attribute *dateEnd*) from the display in some ECDIS display settings.
information	Population of this complex attribute will result in the display of the magenta information symbol to highlight additional information to the user.
nameUsage	This sub-attribute determines the priority and level of display (full display or Pick Report only) where multiple instances of the complex attribute feature name are encoded for a single feature instance, based on Mariner's selected ECDIS display settings.
pictorialRepresentation	The population of this Text attribute will result in the display of the magenta information symbol to highlight additional information to the user.
textContent	The population of this complex attribute will result in the display of the magenta information symbol to highlight additional information to the user.

2.4.8 Textual information

Textual information may provide additional information essential to understand the presence of the Marine Harbour Infrastructure and other features of an S-131 product. This information may also provide legal information pertaining to the S-131 product features.

The methods to provide textual information vary from the simple provision of short text, to the more structured provision of extensive text. The length of the text determines the method and the attribute selection, see clause 2.4.8.2.

2.4.8.1 Specialized information types for common kinds of textual information

The information types Restrictions, Recommendations, Regulations, or NauticalInformation must be used to encode text information when the DCEG allows them to be associated to the feature or information type and the information is of the appropriate kind (a restriction, regulation, etc.).

In exceptional circumstances and only if the use of the information types Restrictions, Recommendations, or Regulations is not sufficient, NauticalInformation can be used to encode additional textual information associated to a feature or a group of features.

In some cases, there may be a specialized attribute that is specifically intended for the data in question. If an appropriate specialized attribute is available, it must be used in preference to information or *textContent*. For example, feature names will generally be encoded in the name sub-attribute of complex attribute featureName, instead of information→text.

2.4.8.2 Textual information attributes

Textual information which is not appropriate for any of the Text-type attribute (or sub-attribute) allowed for the feature/information type should be encoded using either *information* or *textContent* complex attributes. Generally, either information or *textContent* is allowed, but not both.

2.4.8.3 Languages

Both *information* and *textContent* define a language sub-attribute for specifying the language in which the text is encoded.

The exchange language for textual information should be English; therefore it is not required to populate the sub-attribute language for an English version of textual information.

Languages other than English may be used as a supplementary option, for which language must be populated with an appropriate value to indicate the language.

When a national language is used in the textual attributes, the English translation must also exist.

The specification of the language attribute in the IHO GI registry states “The language is encoded by a 3 character code following ISO 639-2/T.” These codes and the corresponding language names may be obtained from the codelist S100_MD_LanguageCode in the S-100 codelists file, which is part of the S-100 schemas distribution, at the URLs below:

- XML file: https://schemas.s100dev.net/schemas/S100/5.2.0/resources/Codelists/cat/codelists.xml
- Web list: https://schemas.s100dev.net/schemas/S100/5.2.0/resources/Codelists/cat/codelists.html

2.4.8.4 Minimal use of generalized text attributes

The complex attributes *information* and *textContent* must not be used when it is possible to encode the information by means of any other attribute. The population of these attributes provides symbols on an ECDIS screen. Therefore producers should carefully consider use of these attributes as the symbol may contribute significantly to ECDIS screen clutter and text attributes should be populated only when the content conveys useful information.

2.4.8.5 Short textual information

The *text* sub-attribute of complex attribute *information* should generally be used for short notes or to transfer information which cannot be encoded by other attributes, or to give brief information about a feature. The use of the complex attribute *information* as a stand-alone complex attribute is intentionally limited to the information types **ContactDetails**, **Applicability**, **NonStandardWorkingDay**, and **ServiceHours**, which do not need the additional attributes defined in *textContent*. The reason for the limited use of *information* as a stand-alone complex attribute is to provide a structured and harmonised approach to textual information within the S-131 product data sets.

The text populated in *text* attributes must not exceed 300 characters. Character strings contained in *text* attributes must be UTF-8 character encoding.

If the *text* sub-attribute of *information* is populated, the *fileReference* and *fileLocator* sub-attributes must not be populated.

2.4.8.6 Complex or lengthy textual information

More complex encodings of text may use either *information* or *textContent*. The feature catalogue and the feature/information type definitions in this DCEG indicate whether *information* or *textContent* is allowed.

The complex attribute *textContent* also has *information* as a complex sub-attribute. If a short note must be encoded in a feature or information type which has only *textContent* as an attribute, it should be encoded as *textContent→information→text*.

Complex text information, such as text longer than 300 characters, formatted text, or HTML extracts from shipping regulations, must be encoded in a file named in either information→fileReference or *textContent→information→fileReference*. The construction *textContent→information→fileReference* should be used if the feature/information type provides *textContent* as complex attribute.

The complex attribute *information* defines an optional sub-attribute *headline* which may be used for a short title not exceeding 60 characters. The content should be short but informative – if the textual information is divided into sections, the most relevant section header from the referenced content may be a good choice for *headline*.

Multiple levels of headings are permitted when the upper bound of *headline* multiplicity is > 1. Multi-level headings must be encoded according to the heading level structure, that is, the highest level heading must be first, then the second level, then the third, and so on.

The complex attribute *textContent* defines an optional sub-attribute *categoryOfText* for indicating whether the text is the full text from the source, an extract from the source, or a summary prepared by the encoder. Populating *categoryOfText* is recommended whenever the textual information is taken or summarised from a law or regulation.

If it is considered necessary to include a description of the source of the textual information, the sub-attribute *sourceIndication* of *textContent* must be used. Encoding a description of the source is strongly recommended for textual information whose source is considered as information the end-user must have, e.g., because the date of issue must be conveyed or because it cites official regulations which are frequently updated.

NOTE: Some government documents are frequently updated, e.g., the U.S. Electronic Code of Federal Regulations, which is currently updated every working day even though a particular section may be stable for years.

2.4.9 Attributes referencing external files

2.4.9.1 Predefined derived types

Table 2-6 presents the following predefined derived types which are described in S-100 (clause 1-4.6):

Table 2-6 — Predefined derived types

Name	Description	Derived from
URI	A uniform resource identifier which character encoding shall follow the syntax rules as defined in RFC 3986. EXAMPLE https://registry.iho.int	CharacterString
URL	A uniform resource locator (URL) is a URI that provides a means of locating the resource by describing its primary access mechanism (RFC 3986). EXAMPLE https://registry.iho.int	URI
URN	A persistent, location-independent, resource identifier that follows the syntax and semantics for URNs specified in RFC 2141. EXAMPLE urn:iho:s101:1:0:0:AnchorageArea	URI

2.4.9.2 Reference to textual files

The files referenced by complex attribute *information* and its sub-attribute *fileReference* must be .TXT or .HTM files, and may contain formatted text. It is up to the Producing Authority to determine the most suitable means of encoding a particular piece of text (as text or HTML). The format of the reference to the file should be a “file URI” (S-100 1-4.6).

Besides being bound to certain types, the complex attribute information is also a sub-attribute of the complex attribute *textContent*. This means that any type that binds *textContent* as an attribute can also contain a reference to a textual file via an *information* sub-attribute. In S-131, there are several features, information types, and complex attributes that bind either *textContent* or *information*.

The exchange language for textual information should be English. The sub-attribute language must be populated with an appropriate value to indicate the language used. Languages other than English may be used as a supplementary option. Generally this means, when a national language is used in the textual attributes, the English translation must also exist.

Files must only use UTF-8 character encoding even when the sub-attribute language is populated with a language other than English.

If it is necessary to indicate a specific section within a large text file, this may be done by encoding the location in the fileLocator sub-attribute of *information*, as described in Table 2-7.

Producers and application developers should note that the use of the fileLocator attribute enables a single support file to contain separate chunks of text referenced from different features, information types, or complex attribute. Adopting this practice enables producers to reduce the number of external files needed with a dataset.

Table 2-7 — Locators for external files

Format	File extension	Content of fileLocator
Text	TXT	Locators to text files are not permitted; the file should be split into separate text files or an HTML file used instead.
HTML	HTM	The HTML fragment identifier, i.e., the value of the HTML name or id attribute of the target (as defined in the relevant HTML specification).

2.4.9.3 Reference to external sources

References to Internet sources should be encoded using the onlineResource sub-attribute of *textContent*. Encoders should be aware that systems may not be able to access the Internet, so onlineResource should be used only for non-essential information. Only sources that can be certified as secure and free from malicious downloads should be provided.

2.4.9.4 Reference to graphics

If it is required to indicate a graphic, the complex attribute graphic must be used. The sub-attribute *pictorialRepresentation* must be used to indicate the file name (without the path) of the external graphical file. Graphic files that form part of the data product must be content with the characteristics collected in Table 2-8.

Table 2-8 — Graphics characteristics

Characteristics	Values
Recommended Resolution	96 DPI
Minimum Size x,y	200,200 pixels
Maximum Size x,y	800,800 pixels
Bit Depth	8 Bit Indexed Colour
Compression	LZW

Characteristics	Values
Format	Tiff 6.0

File sizes should consider the maximum permitted sizes of datasets and exchange sets.

Additional information about the graphic file may be encoded in other sub-attributes of attribute graphic, as described in clause 2.4.12.

2.4.10 Dates

Dates may be need to be encoded as complete or truncated values, depending on available information and allowed format for the particular attribute. The definition of the attribute will indicate if it must take a complete value (type Date or DA) or is allowed to take a truncated value (type S100_TruncatedDate or TD). Complete and truncated dates are different value types (see S-100 1-4.5.2 Table 1-2).

For attributes that use the complete date type (type Date or DA), all their components (year, month, and day) must be specified.

For attributes that use the truncated date type (type S100_TruncatedDate or TD), zero, one, or two of the year/month/day components may be omitted. If the year component is included, it must be specified using exactly 4 digits.

2.4.10.1 Complete dates

Dates (except truncated dates, see the following clause) must be encoded in conformance with the Date format as specified in S-100 Clause 1-4.5.2 which is the same as the DA format in Table 2-2 in this document. The data values have to be provided in accordance with the Gregorian Calendar starting with four digits for the year, two digits for the month and two digits for the day.

Example: The date 18 September 2010 is encoded as follows:

In the GML format: <date>2010-09-18</date>

Note that since both discovery metadata and GML datasets are XML files, both will use the “GML format” above.

2.4.10.2 Truncated dates

In Truncated Dates one or more components (year, month, or day) of the date is not specified. Truncated date values must be encoded in conformance with the S100_TruncatedDate format or equivalent as specified in S-100 (clauses 1-4.5.2 and 3-9) which is the same as the TD format in Table 2-2 in this document. If encoding attributes which can take truncated date values (e.g., fixedDateRange, periodicDateRange, reportedDate) and no specific year, month, or day is required, the values must be encoded in conformance with the truncated date format as specified in S-100 (clauses 1-4.5.2 and 3-9), using the format-specific type for XML/GML.

To encode partial dates in the XML/GML data format:

Table 2-9 — Date encoding format in XML and GML

Description	ISO 8211	GML
No specific year, same day each year	`----MMDD`	`<gMonthDay>--MM-DD</gMonthDay>`
No specific year, same month each year	`----MM--`	`<gMonth>--MM</gMonth>`
No specific day	`YYYYMM--`	`<gYearMonth>YYYY-MM</gYearMonth>`
No specific month and no specific day	`YYYY----`	`<gYear>YYYY</gYear>`
NOTE: YYYY = calendar year; MM = month; DD = day.		

The dashes (-) indicating that the year, month, or date which is not specified must be included in the encoding (with no space between the dashes).

2.4.10.3 Start and end of ranges

In accordance with S-100 clause 3-8, the start and end instants of a range or period are included in the range or period.

EXAMPLE 1: If the beginning of a date range is encoded as the complete date 01 January 2016, the period begins at 00:00:00 on 1 January 2016, and the whole of New Year's Day is included in the period. If the end of the date range is encoded as 01 January 2016, the period ends at 24:00:00 on 1 January 2016, i.e., again the whole of New Year's Day is included in the period.

EXAMPLE 2: If the beginning of a period is encoded in truncated date format as `----01--` (i.e., year and day not specified), the period begins at 00:00:00 on 1 January each year. If the end of the period is encoded as `----01--`, the period ends at 24:00:00 on 31 January each year.

NOTE (1): Particular care should be taken if the start or end date is 28 or 29 February. S-100 3-8.3 explains the implications for end of February. For example, the truncated date `----02--` will be interpreted as 29 February in leap years and 28 February in non-leap years, while `----0228` will be interpreted as 28 February in every year.

NOTE (2): In accordance with ISO practice at the time S-100 date and time formats were defined, the time `00:00:00` means midnight at the start of a day and `24:00:00` means midnight at the end of a day. This continues to be S-100 usage.

2.4.10.4 Schedules

Weekly service schedules of a feature can be comprehensively described by using the information types ServiceHours and NonStandardWorkingDay.

EXAMPLE: A feature service is available under normal operation status 24 hours/day on Monday and Wednesday and from 08:00 to 16:00 LT from Thursday to Saturday. The service is available by pre-arrangement on public holidays and the 5th of August of each year when they fall on days which would otherwise be normal working days.

```
ServiceHours
 scheduleByDayOfWeek
  categoryOfSchedule =1 (normal operation)
  timeIntervalsByDayofWeek
   dayOfWeek = 2(Monday), 4(Wednesday)
   dayOfWeekIsRange = 0 (false)
  timeIntervalsByDayofWeek
   dayOfWeek = 5(Thursday), 7(Saturday)
   dayOfWeekIsRange = 1 (true)
   timeOfDayStart = 08:00:00
   timeOfDayEnd = 16:00:00
NonStandardWorkingDay
 dateFixed = ---08-05 (5 August)
 dateVariable = public holidays
 information.text = "By pre-arrangement"
```

The above example can be encoded as follows:

```
    <S131:ServiceHours gml:id="(GML ID of ServiceHours)">
        <scheduleByDayOfWeek>
            <categoryOfSchedule code="1">Normal Operation</categoryOfSchedule>
            <timeIntervalsByDayOfWeek>
                <dayOfWeek code="2">Monday</dayOfWeek>
                <dayOfWeek code="4">Wednesday</dayOfWeek>
                <dayOfWeekIsRange>0</dayOfWeekIsRange>
                <timeOfDayStart>00:00:00</timeOfDayStart>
                <timeOfDayEnd>24:00:00</timeOfDayEnd>
            </timeIntervalsByDayOfWeek>
            <timeIntervalsByDayOfWeek>
                <dayOfWeek code="5">Thursday</dayOfWeek>
                <dayOfWeek code="7">Saturday</dayOfWeek>
                <dayOfWeekIsRange>1</dayOfWeekIsRange>
                <timeOfDayStart>08:00:00</timeOfDayStart>
                <timeOfDayEnd>16:00:00</timeOfDayEnd>
```

```
            </timeIntervalsByDayOfWeek>
        </scheduleByDayOfWeek>
        <partialWorkingDay xlink:href="(reference to NonStandardWorkingDay)"/>
    </S131:ServiceHours>

    <S131:NonStandardWorkingDay gml:id="(GML ID of NonStandardWorkingDay)">
        <dateFixed><gMonthDay>--08-05</gMonthDay></dateFixed>
        <dateVariable>public holidays</dateVariable>
        <information><text>By pre-arrangement</text</information>
        <theServiceHours_nsdy xlink:href="(reference to ServiceHours)"/>
    </S131:NonStandardWorkingDay>
```

If the days of week are known but the hours of availability are unknown, there is no time attribute. Twenty-four availability is indicated by encoding the availability period as 000000-240000. Special cases such as unknown can be explained in the *textContent* or *information* attribute of ServiceHours. To encode two or more periods within the same day, repeat the timeOfDayStart and timeOfDayEnd attributes. If one of the times is not known, it may be nilled as described in clause 2.4.4.

For example, to encode open hours of 8 a.m. to 12 noon and 1 p.m. to 5 p.m. on Thursdays and Saturdays:

```
timeIntervalsByDayofWeek
 dayOfWeek =5(Thursday), 7(Saturday)
 dayOfWeekIsRange =1 (true)
 timeOfDayStart = 08:00:00
 timeOfDayStart = 13:00:00
 timeOfDayEnd = 12:00:00
 timeOfDayEnd = 17:00:00
```

The order of repeated timeOfDayStart and timeOfDayEnd attributes is significant, since intervals are specified by matching them pairwise in order.

UTC is indicated by the Z suffix. The absence of the Z suffix indicates local time.

The absence of any additional information other than date (fixed or variable) in NonStandardWorkingDay should be interpreted as closure on the specified days. Non-standard working days do not need to be associated with ServiceHours instances categorized as “closure” (categoryOfSchedule=Closure) because the closure is already indicated in the ServiceHours instance.

2.4.10.5 Times

If it is required to provide information of the start time and end time of an active period of a feature, it must be encoded using the attributes timeOfDayStart and timeOfDayEnd. The order has significance.

2.4.11 Combination of date schedules and times

Schedule information can also include time of day. The complex attribute timeIntervalsByDayofWeek also includes timeOfDayStart and timeOfDayEnd attributes to encode the daily start and end times of service. Complete instructions on how to encode schedules are described in clause 2.4.10.4.

2.4.12 Graphic information

A graphic file should be appropriate for the purpose and should supplement the information in terms of navigational relevance. Preferably, the graphic should provide perspective relevant to the view of the mariner. Graphics should be such that all the information in the graphic is legible in the application display. Graphic information must be encoded using the complex attribute graphic. The simple sub-attribute pictureInformation should be used to provide credits to the picture creator, copyright owner etc. Assuming that graphic information provides a coastal view, mariners are interested in knowing from which point on sea that graphic has been taken. The complex attribute bearingInformation (see clause 2.4.12.1) provides all necessary information.

2.4.12.1 Bearing information

The most accurate information should be provided if it is necessary to indicate a position from where a picture has been taken. *information* is a sub-complex attribute of bearingInformation and should be used to specify that no bearing information can be provided whenever such is the case. The sub-attributes sectorBearing and orientation can be used to describe a certain level of inaccuracy in the position determination.

2.5 Associations

2.5.1 Introduction

An association expresses a relationship between two classes — features, information types, or a feature and an information type. Objects in the dataset (instances of feature/information types) are related only if the link between them is encoded in the dataset. An association end may have a multiplicity which describes how many instances the feature or information type instance at the other end is allowed to link to.

EXAMPLE: An **Authority** information type provides the responsible authority information to the **Terminal** feature via an association inherited from the abstract **SupervisedArea** feature. An association named **ServiceControl** is used to relate the two instances (of **Terminal** and **Authority**); roles are used to convey the meaning of the relationship. The association is inherited by subclasses of **SupervisedArea** and is thereby available to **Terminal** by inheritance via the abstract class **Layout**.

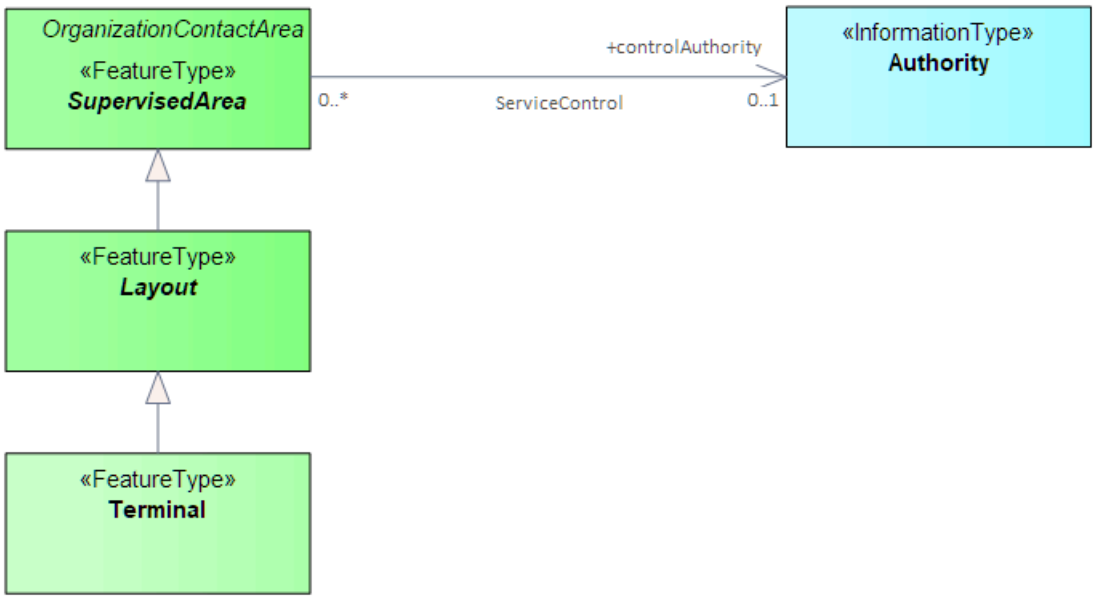

Figure 2-2 — Information association relating a feature to an information type

2.5.2 Association names

The association name is normally provided by the UML diagram at the middle of the connection line/ arrow between the two involved classes and can be obtained from the feature and information type tables provided in this document). Association names may be omitted in the UML diagrams for the following reasons: a) the association is defined by an association class, see clause 2.5.4 (the name of the association class is used); b) to avoid cluttering the diagram – however, the name is always documented in the feature/information type tables.

2.5.3 Association roles

Either or both association ends can have a name (role). Roles may be also omitted from the diagram to reduce clutter – again, the role name is documented in the feature/information type tables.

NOTE: Instead of documenting every single role, Product Specifications may describe rules for defining default roles.

2.5.4 Association classes

Association classes allow relationships to be characterized by one or more attributes. The attributes of the association class belong to the association itself, not to any of the features or information types it connects. An association class is both an association and a class. Within an S-131 product the association classes Permission Type and Inclusion Type may be used for relating vessel classes to feature and information types.

2.5.4.1 Permission Type

This association class specifies the relationship of the vessel class to a feature, e.g., whether access to a feature (or use of a facility) is prohibited or permitted for a specified class of vessel. The class of vessel is described by the simple and complex attributes of the information type Applicability such as length, cargo, etc. The attributes of the association class describe the nature of the relationship, i.e., whether access to an area is permitted or prohibited, or whether use of a service is required or recommended.

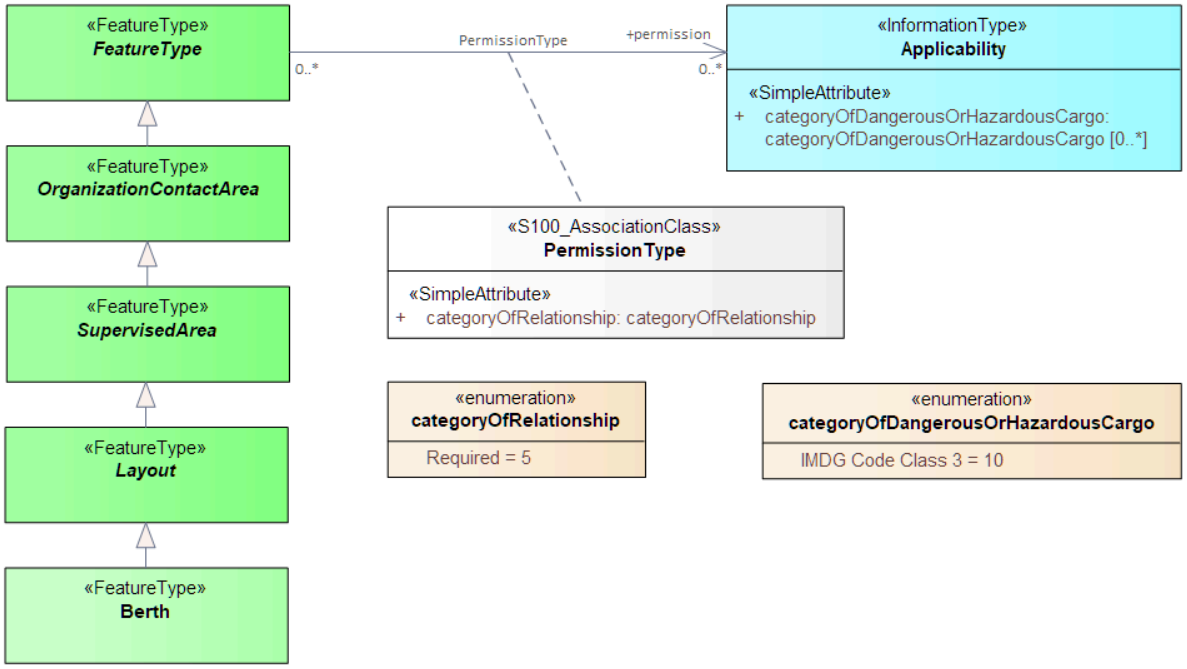

Figure 2-3 — Association class for hypothetical requirement for use of a berth by a vessel carrying hazardous cargo

EXAMPLE: An association between an **Applicability** instance with attribute *categoryOfDangerousOrHazardousCargo* = IMDG Code Class 3 and an instance of feature Berth, with Permission Type's attribute *categoryOfRelationship* = *Prohibited*, means that vessels carrying flammable liquids (hazardous cargo type class 3 in the IMDG Code) must use a particular berth. Note that in this case the relationship is inherited by the **Berth** instance from the abstract class **FeatureType** through **OrganizationContactArea**, **SupervisedArea** and **Layout**.

2.5.4.2 Inclusion Type

This association class defines whether a specified customer (class of vessels, as described by **Applicability**) is excluded or included from a particular regulation, recommendation, etc. Again, the attributes of the association class describe the nature of the relationship; in this case whether the vessel is included or excluded from the regulation, etc.

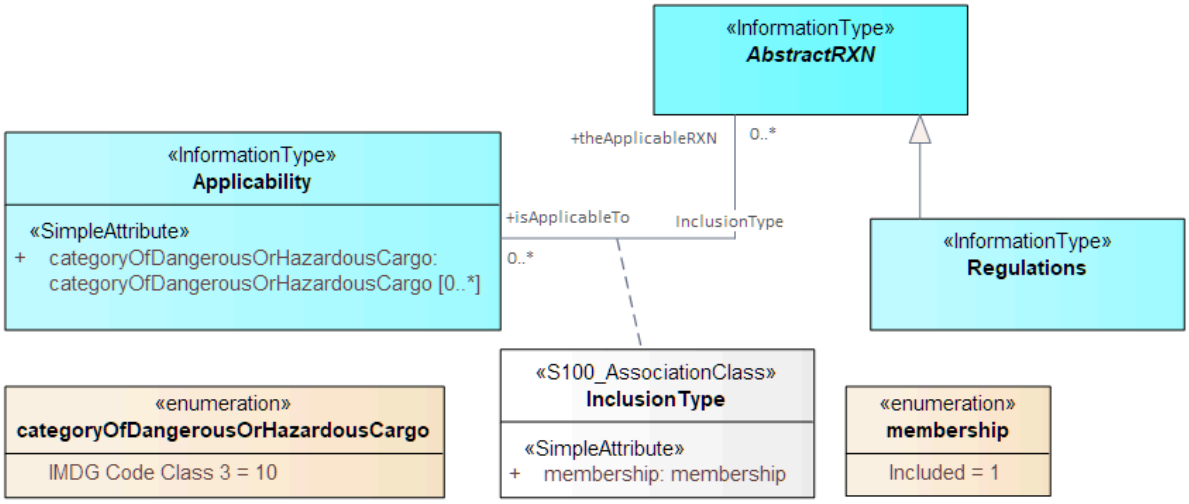

Figure 2-4 — Association class for inclusion of vessel types in regulations

EXAMPLE: An association between an **Applicability** instance with attribute *categoryOfDangerousOrHazardousCargo* = IMDG Code Class 3, with Inclusion Type's attribute *membership* = included, and an association of a **Regulations** instance to the same **InclusionType**, means that the information provided by the **Regulations** (a sub-type of **AbstractRxN**) applies to vessels carrying flammable liquids (hazardous cargo type class 3 in the IMDG Code).

NOTE (1): Since **AbstractRxN** is an abstract type, it cannot have direct instances in the dataset. Only instances of its (non-abstract) sub-types can be used.

NOTE (2): Specific tools may use different presentations in their user interfaces, e.g., as two associations (as described in the text of the example), or one association with an association class also shown (as shown in Figure 2-4).

2.5.5 Use of various associations

2.5.5.1 General

In general, associations must be encoded whenever the relationship is useful for navigation, monitoring, voyage or route planning, or reporting purposes, or any other purpose for which the dataset is intended. The multiplicity lower bound of "0" at an association end means only that the absence of a link to the relevant instance does not invalidate the dataset. The encoding instructions for individual feature and information types describe what associations are allowed and whether they are required or optional.

2.5.5.2 Generic association for uncategorized additional information

Unless other associations are specified, information types are associated to the relevant features using the association name AdditionalInformation and the role *theInformation*.

2.5.5.3 Associations to Restrictions, Recommendation, Regulations, and Nautical Information

The Restrictions, Recommendation, Regulations, Nautical Information are associated to the relevant features using the association named AssociatedRxN (inherited from their common abstract super-type). The roles at the ends of this association are appliesInLocation and theRxN (the Restriction, Regulation etc.). If the regulation applies only to a specific class, or if it mentions an exempt class, an additional association to an Applicability object is encoded using the InclusionType association class.

2.5.5.4 Conventional Association

Certain features and information types may be permitted or required to have associations to other feature or information types. The allowed or mandatory associations for a feature/information type are shown in the application schema (clause 4 of the Product Specification) and listed in the documentation for individual types in this Annex (clauses 4 — 14). Definitions of the associations and roles are also given in the DCEG.

2.5.5.5 Where to Encode Associations

The presentation and management of associations will be determined by the user interface of the encoding software tools. Since S-100 permits feature-information associations to be encoded only from the geographic feature to the information type and not vice versa, the information-to-feature link might be unavailable or treated differently from the feature-to-information link.

2.5.5.6 Required Encoding for Associations

Associations must be encoded with the *gml:id* of the target feature or information instance in an *xlink:href* attribute and the alpha code of the association (as given in the Feature Catalogue) of the association in an *xlink:title* attribute.

For example:

```
<S131:theCollection xlink:href="#PILDST.0018" xlink:title=
"PilotageDistrictAssociation"/>
```

to encode a **PilotageDistrictAssociation** link from a **PilotBoadingPlace** instance to a **PilotDistrict** instance where the *gml:id* of the target **PilotDistrict** instance is *PILDST.0018*.

For InclusionType and PermissionType associations (which are association classes and have association attributes) the attribute must also be included. For example, to link to the Regulations instance with *gml:id = R01*:

```
<S131:theApplicableRxN xlink:href="#R01" xlink:title="InclusionType">
    <S131:InclusionType>
        <S131:membership code="1">Included</S131:membership>
    </S131:InclusionType>
</S131:theApplicableRxN>
```

2.6 Datasets

2.6.1 Types of Datasets

A dataset is a grouping of features, attributes, geometry and metadata which comprises a specific coverage. Table 2-10 shows the types of datasets which may be produced and contained within an exchange set:

Table 2-10 — Dataset types

Dataset	Explanations
New dataset	Data for an area different (in coverage and/or extent) to existing datasets.
New Edition of a dataset	A re-issue plus new information which has not been previously distributed by Updates. Each New Edition of a dataset must have the same name as the dataset that it replaces and should have the same spatial extents.
Update dataset	Updated or new information. Contains information about objects being added, modified, or deleted.
Re-issue	Includes all the updates applied to the original dataset up to the date of the re-issue.
Cancellation	There is no cancellation dataset. Cancellations are done by means of discovery metadata records in exchange catalogue files.

2.6.2 Overlay data sets

S-131 datasets are intended to be used together with S-101 ENC (or similar data products) which will act as a base layer. The base layer is expected to provide navigational and visual context. Generally, an overlay dataset like S-131 does not provide “skin of the earth” coverage and there will be large areas with no data coverage because the S-131 application schema does not include any feature for designating a region as “other”, or “not an S-131 area” (i.e., there is no S-131 feature equivalent to the S-101 Unsurveyed Area). Further, an overlay dataset does not include features that provide auxiliary information such as bathymetry within a routeing measure area.

2.6.3 Data coverage

A Marine Harbour Infrastructure dataset can contain one or more **DataCoverage** features (see clause 4.3). The data boundary is defined by the extent of the DataCoverage meta features. Data must only be present within **DataCoverage** meta features. When a feature extends across datasets of overlapping scale ranges, its geometry must be split at the boundaries of the DataCoverage features and its complete attribute description must be repeated in each dataset. An Update dataset must not extend the data coverage for the base dataset to which it applies. Where the extent of the data coverage for a base dataset is to be changed, this must be done by issuing a New Edition of the dataset.

2.6.4 Discovery metadata

Discovery metadata is intended to allow applications to find out important information about datasets and accompanying support files to be examined without accessing the data itself (or without reading the support file). Discovery metadata includes, but is not limited to:

- information identifying the product specification and encoding format;
- edition and version numbers, production/release date, and other details of data creation and updating;
- data coverage of the dataset;
- summary descriptions of content, purpose, use, and limitations;
- identification and contact information for the producer and distributor of the dataset.

Discovery metadata is encoded in the exchange catalogue. S-131 uses the same classes and attributes for discovery metadata as S-100, but adds certain product-specific restrictions. The classes and attributes for generic discovery metadata are defined in S-100 Part 17. Constraints and restrictions specific to S-131 are defined in the S-131 Product Specification. The schema for the exchange catalogue file (CATALOG.XML) for S-131 is available from the schema server (https://schemas.s100dev.net).

2.6.5 Dataset header metadata

Dataset header metadata contains structural and discovery metadata that apply to the whole dataset and are encoded in the dataset file. The elements are described in S-100 Part 10b.

2.6.6 Dataset units

The depth, height and positional uncertainty units in a dataset must be metres.

2.6.7 Dataset Coverage

Marine Harbour Infrastructure datasets are spatially limited.

In areas which include neighbouring producer nations, producing agencies should co-operate to agree on dataset boundaries and ensure no data overlap. Where possible, adjoining nations should agree on common data boundaries within a technical arrangement based on cartographic convenience and benefit to the mariner.

If an MHI feature extends outside the product coverage and the adjoining object does not exist, e.g. due to delay in the production of the neighbouring HO product, an indication should be placed at the outer edge of the product.

2.6.8 Overlaps

The DataCoverage features within a dataset must not overlap, however DataCoverage features from different datasets may overlap if they have differing maximum display scales or the datasets are for different ports.

MHI does not envisage multiple datasets for the same port, and does not anticipate overlapping datasets for a single port.

Overlapping datasets are possible in the case where there are two or more ports in close proximity (which may, for example, have overlapping approaches). In the latter case, consideration should be given to creating a single dataset that covers all the ports in the region in question, but overlapping datasets may be created as necessary. In case of overlapping datasets, the ECDIS should display an indicator and allow the user to select one dataset for display.

2.6.9 Feature Object Identifiers

Each feature and information instance within a dataset must have a unique universal Feature Object Identifier [FOID]. This is mapped to the gml:id attribute of the feature in the dataset (FOID and gml:id may not be identical due to XML restrictions on the format of gml:id attributes). Where a real-world feature has multiple geometric elements within a single dataset due to the dataset scheme, the same FOID may be used to identify multiple instances of the same feature. Since gml:id attributes in the same file must be unique, the mapping between FOID and gml:id must allow for a one-to-many mapping if needed. Features within a dataset may carry multiple geometries. Features split across multiple datasets may be identified by the same FOID. Features repeated in different scale ranges may be identified by the same FOID. FOID must not be reused, even when a feature has been deleted. However, the same feature can be deleted and added again later using the same FOID.

NOTE (1) (informative): The current format of FOID is defined in S-101 as a concatenation of subfields Producing Agency, Feature Identification Number and Feature Identification Subdivision. The identifier is currently formatted as a string value. The identifier may eventually be replaced with an identifier adhering to the scheme for Maritime Resource Names (MRN) which is based on the format of URNs.

NOTE (2): S-131 uses gml:id as a proxy representing FOID. S-131 does not define a rule for the structure or generation of gml:id values or their relation to identifiers in S-57, S-101 or other sources. Producers may generate gml:id values according to any desired scheme or schemes

2.6.10 180° Meridian of Longitude

Datasets must not cross the 180° meridian of longitude.

2.7 Geographic names

2.7.1 Feature names

If it is required to encode an international or national geographic name, it must be done using complex attribute featureName.

If it is required to encode a geographic name for which there is no existing feature, an appropriate area feature must be created. In order to minimise the data volume, these features should, where possible, use the geometry of existing features.

Geographic names should be encoded with the complex attribute featureName. The complex attribute featureName consists of the simple sub-attributes language, name and a Boolean type to indicate whether that particular name is the displayName or not.

National geographic names can be left in their original national language in a non-English iteration of the complex attribute featureName (but only if the national language can be expressed using lexical level 0 or 1), or transliterated or transcribed and used in an English iteration of the complex attribute featureName, in which case the national name should be populated in an additional iteration of the featureName with sub-attribute language populated with the relevant national language value in accordance with ISO 639-2/T.

All area and point features within a Marine Harbour Infrastructure product should be encoded using featureName if a name is available.

A group of features, associated with a particular geographic name, should have the name encoded using featureName on an aggregation feature (of type surface or point, or no geometry, as appropriate). The name should not be encoded on the individual hydrographic features.

A group of service or forecast areas with the same attribute values associated with the same name should be encoded as spatial attributes of the same feature (so there would be only one feature with multiple spatial attributes for location).

Named features listed in Hydrographic Office’s Sailing Directions or other documents that may assist in locating service information should be encoded using feature name on the relevant feature (e.g. WaterwayArea). In all instances, if the exact extent of the feature to be named is known, a feature must be created. If the exact extent is not known, or the area is too small, an existing or specifically encoded point feature should be used to encode the geographic name.

2.7.2 Text placement

The cartographic feature **TextPlacement** (see clause 8.2) is used specifically to place text cartographically. The properties of the **TextPlacement** feature are described as follows:

- Geometry (point) – the spatial point location of the text string.
- text type – the classification of the text being placed based on attribution of the target feature(s) (mandatory).
- text offset bearing and text offset distance – the bearing and distance (in millimetres in the ECDIS display) used to position the text relative to the feature.

The TextPlacement feature is associated to the feature which carries the text being placed. The mandatory attribute text type identifies the text string(s) to be placed. The TextPlacement feature may provide functionality such that, as an ECDIS screen rotates from its optimum position in “north up” display mode (for example, if display is set to “course up”) text can remain readable, or clear other important charted information.

The TextPlacement feature is associated to the feature which carries the text being placed. The attribute textType determines which text string is to be displayed if more than one is present. The TextPlacement feature ensures that as the screen rotates from “north up” (e.g. if display is set to “course up”) text can remain readable, or clear other important charted information.

2.8 Scale policy

2.8.1 General policy

Marine Harbour Infrastructure data must be compiled in the best applicable scale.

2.8.2 Usage of scale attributes in displays (informative)

The attributes scaleMinimum and scaleMaximum define the range of display scales within which features will be portrayed on the display if these scale minimum/maximum functions are enabled in the ECDIS or another GIS device. A geo feature with one or more spatial attributes can utilize the scaleMinimum and scaleMaximum attributes on the link to the spatial object (see the S-100 General Feature Model, S-100 Part 3, Figure 3-1 and 3-5.3.5). There are essentially two ways in which these attributes may be used.

- A producer may decide to use only a *scaleMinimum* value. This option is employed when the data producer wishes to turn off the display of a feature above certain scales. This is particularly useful in areas with high data density, and when it is expected that the data will be used a larger scale where data clutter might become an issue. Features are therefore encoded with an applicable value, which represents the scale at which the producer wishes to turn off the feature.
- A producer may decide to provide several pairs of *scaleMinimum* and *scaleMaximum* values. This decision may be based on the fact that for one particular feature different spatial instances in different scale ranges should be provided to supply this particular feature with more detailed geographic representation at larger scales.

An example can be a building which has two spatial objects associated, first one with only scale minimum value encoded at 21999, and the second spatial object encoded with scaleMaximum at 22000 and scaleMinimum encoded with 999999. These values would enable the use of a highly-detailed geometry at larger scales than 22000, and a less detailed geometry at scales of 22000 and less, while the building would be turned off at scales of 999999 and less.

A similar strategy can be followed to enable boundaries to conform to a scale-dependent geometry such as a coastline. Conformance at different scales can achieved by using minimum/maximum scales on spatial attributes to indicate which particular geometry should be used at a given scale.

The meta feature DataCoverage (clause 4.3) is used to provide ECDIS with the scale information needed for the determination of dataset loading and unloading in relation to the user-selected viewing scale of the ECDIS. The mandatory attribute maximumDisplayScale is used to indicate the largest intended viewing scale for the data. The mandatory attribute minimumDisplayScale is used to indicate the smallest intended viewing scale for the data.

S-131 does not prescribe specific values for maximumDisplayScale and minimumDisplayScale. Instead, producers should refer to the S-101 DCEG for values, and use values appropriate to the S-101 ENCs underlying the S-131 dataset.

2.8.3 Scale minimum values

Scale minimum values must be chosen from the list in S-101 to ensure visual compatibility between comparable underlying S-101 ENCs and S-131 data products. The scale minimum values used in the actual comparable underlying ENCs should be used, and in case of differences with the list below, the values in the actual ENCs prevail. “Comparable” ENCs for the purpose of this requirement means ENCs of scales large enough to distinguish berths, terminals, and other features that are part of a port. These will generally have navigationPurpose=port in discovery metadata (see S-100 Part 17) and have maximum and minimum display scales values in the lower end of the scale ranges (i.e., be the larger scale ENCs).

Table 2-11 — Scale minimum values

Scale
19999999
9999999
4999999
3499999
1499999
999999
699999
499999
349999
259999
179999
119999
89999
59999
44999
29999
21999
17999
11999
7999
3999
2999
1999
999

All data within a dataset must have the same minimum display scale, but portions of a dataset can have a different maximum display scale, depending on the best scale required in an area for the operational purpose of the data.

2.8.4 Scale policy for feature types

Unlike S-101, S-131 does not define scale minimum values or steps for individual feature types.

2.9 Masking

Since a MHI dataset will cover the entire extent of a port, masking at cell boundaries is not required.

2.10 Linear surface features

If it is required to encode a linear feature when the only allowable primitive for the relevant feature type is surface (e.g. a service area along a track, or channel), a very narrow surface should be encoded. The suggested extent is 0.3mm wide at viewing scales (keeping in mind that S-100 permits different spatial attributes at different scales.) An edge of this surface should correspond to the position of the line. All other edges should be masked.

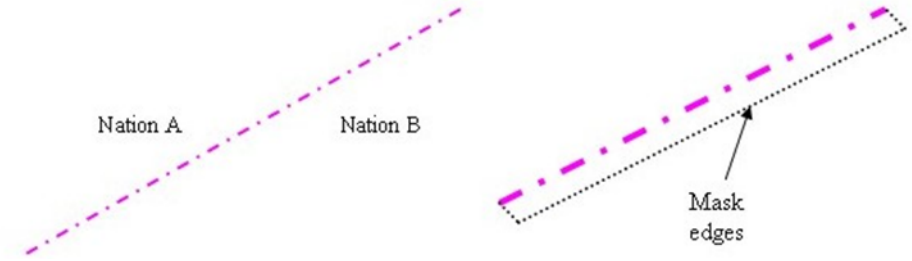

Figure 2-5 — Linear features

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3 Description of table format for feature and information types

The tables describing feature and information types are based on the template below.

X.X Feature Name

IHO Definition: (Definition) (followed by Remarks if any)				
S-131 [Geo Feature/Information Type]: S-1XX Feature or Information Type (followed by (Abstract) if abstract type)				
Super Type: (supertype)				
Primitives: (allowed spatial primitives)				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
(Reserved)	*(Reserved)*	*(Reserved)*		
S-1XX Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
(This section lists the allowabe **local** attributes)		(Allowed values for enumeration and codelist attributes)		
Inherited Attributes				
S-1XX Attribute	**Inherited From**		**Type**	**Multiplicity**
(attribute)	(supertype where defined)			

Feature/information associations (permitted associations)				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
Role of target class	Name of the Association if inherited, "(Inherited from …)"	Name of the target (the feature or information type referenced by the link)	aggregation / composition / aggregation	(How many target instances a single source instance can link to.)
If the association is listed in only one of the feature or information types in the asspciation, it means the association is unidirectional, that is, the binding for the association is only in one of the participating features or information types. This is sometimes the case for information associations that link a feature to an information type — the feature type has a binding to the information type, but not vice versa. Associations to or from any type are inherited by all sub-types of the type at any level unless explicitly prohibited in the relevant encoding instructions. Hyphens in roles and association names (camel-case codes) are only for document formatting and should be ignored for production purposes.				

INT 1 Reference (optional): The INT 1 location(s) of the Feature – by INT1 Section and Section Number.

(Encoding instructions are provided in sub-clauses following the table.)

X.X.X General

General guidance for encoding.

Introductory remarks. Includes information regarding the real world entity/situation requiring the encoding of the Feature in the product, and where required nautical cartographic principles relevant to the Feature to aid the compiler in determining encoding requirements.

X.X.X.X Sub-clause heading(s) (if needed) If applicable — S-4 reference

Additional encoding guidance relevant to the feature.

Clauses related to specific encoding scenarios for the Feature (if required).

X.X.X Remarks

Guidance for encoding specific attributes.

Remarks:

S-131 Attribute: Indentation of attributes indicates sub-attributes of complex attributes. Complex attributes may also be sub-attributes of complex attributes. Complex sub-attributes are generally not expanded to show their own sub-attributes, because expanding sub-attributes produces tables of inordinate length, but if expansion is done, further levels of indentation are applied to the sub-attributes. Inherited attributes are shown separately from locally defined attributes. Inherited complex attributes are not expanded to show their sub-attributes.

Allowable Encoding Value: For (EN) type attributes, the enumerates listed are only those allowable for the particular occurrence of the attribute relevant to the feature. Allowable values may vary for the attribute depending on the feature to which the attribute is bound. Such bindings are defined in the S-131 Feature Catalogue. The full list of enumerates that may be assigned to an attribute in S-131 can be found in the Simple Attributes section of the printed feature catalogue document.

Type: The prefix **C** indicates that the attribute is a complex attribute. Complex attributes are aggregates of other attributes that can be simple type or complex type. The prefix **S** indicates that the attribute is a sub-attribute of a complex attribute. Complex attributes that are sub-attributes of a complex attribute, and their sub-attributes, are indicated by indentation of the attribute name in the S-131 Attribute column.

Introductory clauses may depict associations using a UML diagram showing the relationships that apply to the class and its super-classes (generalizations). Relationships which are inherited from super-classes are shown by including the super-classes and their associations in the diagram.

The usual UML conventions apply. For explanations of standard UML notations, see S-100 Part 1.

Association ends and multiplicities: A lower bound of 0 in the multiplicity at any end of an association indicates only that the association is not mandatory for any particular instance of the feature at the other end (i.e., it is not mandatory for an instance of “that” feature type to have an association to a feature of “this” type). A lower bound of “1” means that if an instance of “that” type exists, it must be associated to an instance of “this” type. If the association is actually encoded then it amounts to saying that “this relationship exists between these two instances” and there must be an appropriate feature instance at both ends. Associations that are not mandatory should be encoded if and only if they convey useful information.

4 Meta-Features

4.1 Introduction

Meta-features are used to reduce the need to code quality and datum attributes in individual features, as well as to delimit the extent of data in the dataset. In a base dataset, some meta-features are mandatory (clause 4.2).

Horizontal and vertical uncertainties that apply to the majority of features are encoded as attributes of one or more **QualityOfNonBathymetricData** features together covering the same extent as the spatial union of the **DataCoverage** features in the dataset. (Typically, there would be one **DataCoverage** feature and one **QualityOfNonBathymetricData** feature, having the same spatial extent.) Exceptional horizontal and vertical uncertainties are encoded in a **SpatialQuality** information type associated to particular spatial primitives.

4.2 Mandatory meta features

The mandatory meta features are:

- DataCoverage
- QualityOfNonBathymetricData
- SoundingDatum
- VerticalDatumOfData

4.3 Data Coverage

IHO Definition: A geographical area that describes the coverage and extent of spatial objects.				
S-131 Geo Feature: DataCoverage				
Super Type:				
Primitives: surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Maximum Display Scale			IN	1,1
Minimum Display Scale			IN	1,1
Optimum Display Scale			IN	0,1
Interoperability Identifier			URN	0,*

Inherited Attributes			
S-131Attribute	**Inherited From**	**Type**	**Multiplicity**
No inherited attributes			

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

4.3.1 General

The meta feature **DataCoverage** encodes the area covered by the dataset. In S-131, this feature is also used to harmonize dataset loading and unloading in relation to the underlying ENC(s).

DataCoverage features must cover at least the total extent of all geographic features in the dataset, and must not overlap.

4.3.2 Scale attributes

The use of S-127 data is scale-dependent. The values of maximum and minimum display scales should be harmonized with comparable base layer S-101 datasets. (See clause Clause 2.8.3 for the definition of “comparable”.) This serves to harmonize the loading strategy of S-131 port information with that for the underlying ENCs. However, use of the same values as S-101 datasets is not mandatory in S-131.

The attribute *optimumDisplayScale* is used to indicate the intended viewing scale for the data. The value populated for *optimumDisplayScale*, therefore, provides a reference for the user selected viewing scale in the ECDIS at which the overscale warning will be displayed as the Mariner continues to zoom in if there is no larger optimum display scale MHI dataset available.

The mandatory attribute *maximumDisplayScale* is used to indicate the largest intended viewing scale for the data.

The mandatory attribute *minimumDisplayScale* is used to indicate the smallest intended viewing scale for the data.

The values of maximum and minimum display scales should be harmonized with comparable base layer S-101 datasets (Table 4-1[1]). This serves to harmonize the loading strategy of MHI information with that for the underlying ENCs. However, use of the same values as S-101 datasets is not mandatory in S-131.

Table 4-1 — Maximum, optimum and minimum display scale values (from S-101 Ed. 2.0.0 DCEG)

maximum display scale	optimum display scale	minimum display scale
Any value	10,000,000	empty (null)
	3,500,000	10,000,000
	1,500,000	3,500,000
	700,000	1,500,000
	350,000	700,000

[1] The current S-101 DCEG should be consulted to take into account any revisions to S-101 since the preparation of this Product Specification.

	180,000	350,000
	90,000	180,000
	45,000	90,000
	22,000	45,000
	12,000	22,000
	8,000	12,000
	4,000	8,000
	3,000	4,000
	2,000	3,000
	1,000	2,000

NOTE: The selection of values for *maximumDisplayScale* and *minimumDisplayScale* for any selected *optimumDisplayScale* are at the discretion of the Data Producer. That is, any value listed for *maximumDisplayScale* and *minimumDisplayScale* above may be selected from any of the listed values, with the only restriction being that *maximumDisplayScale* must be a smaller value than/equal to *optimumDisplayScale* which must be a smaller value than *minimumDisplayScale* (or any value if *minimumDisplayScale* is populated with an empty (null) value).

Given that S-131 data will overlay ENC and possibly other datasets, the conditions described in the S-101 DCEG “Data Coverage” clause for displaying overscale warnings and setting the viewing scale may be overridden by interoperability constraints or the presence of higher-priority datasets. The specification of such behaviour is out of scope for this document (the S-100 interoperability specification should address it for ECDIS).

4.3.3 Number of feature instances

There must be a minimum of one **DataCoverage** feature in a dataset.

Typically, only a single **DataCoverage** feature should be used in a dataset. However, if the *optimumDisplayScale* is different for discrete areas within a single dataset, this must be indicated by encoding separate, non-overlapping **DataCoverage** features, each having a different value populated for *optimumDisplayScale*. Producing Authorities are to note, however, that excessive use of multiple **DataCoverage** features having different values of *optimumDisplayScale* within a single dataset should be avoided. Where different values of *optimumDisplayScale* are used, this should be restricted only to data compiled in order to achieve the intended navigational usage for the entire dataset.

4.3.4 Compatibility of scale values

Datasets must have the same value for *minimumDisplayScale* for all **DataCoverage** features in the dataset. Datasets may have different values populated for *maximumDisplayScale* for the **DataCoverage** features in the dataset; these values are typically populated as the value corresponding to 2 x the scale (or half the denominator) value populated for *optimumDisplayScale*, but are at the discretion of the data producer. For example, the value for *maximumDisplayScale* may be set to the same value as *optimumDisplayScale* to have the “grossly overscaled” warning appear at any larger user selected viewing scale than *optimumDisplayScale*; or populated as the value corresponding to the *minimumDisplayScale* value for the next largest scale dataset(s) in the ENC portfolio.

Where a series of differing *optimumDisplayScale* datasets are compiled covering the same geographic area, the smallest scale value populated for *optimumDisplayScale* for **DataCoverage** feature(s) in the dataset should correspond to the *minimumDisplayScale*, where populated, for the next largest *optimumDisplayScale* dataset. The largest scale value populated for *optimumDisplayScale* for **DataCoverage** feature(s) in the dataset must not be a larger scale value than the *optimumDisplayScale* for the next largest *optimumDisplayScale* dataset, where such a dataset exists.

4.3.5 Remarks

- This meta feature is intended to support an indication of coverage and facilitate the loading and rendering (display) of datasets in the end-user system.
- S-131 being intended as an overlay for S-101 data, an S-131 dataset, when initially loaded, will be displayed in the ECDIS at the current setting for display scale.
- If the dataset is not loaded an an overlay, and more than one **DataCoverage** feature exists for a dataset, the dataset, when initially loaded, will be displayed in the ECDIS at a display scale corresponding to the largest scale value populated for *optimumDisplayScale*.
- Where a dataset consists of only one **DataCoverage** feature, the value for the *maximumDisplayScale* populated in the dataset discovery metadata must be the same as the value populated for *maximumDisplayScale* on the **DataCoverage**.
- For any **DataCoverage** feature, *maximumDisplayScale* < *minimumDisplayScale*.
- Except for the largest scale dataset coverage, datasets with multiple **DataCoverage** features must not have excessive differences in the values populated for *optimumDisplayScale* between the Data Coverage features. Typically, this should be interpreted as there being no more than one scale step value as defined in Table 4-1 above between the optimum display scale values in a single dataset.
- S-131 does not use the NULL value, which is permitted in S-101 for *minimumDisplayScale* when *maximumDisplayScale* = 10,000,000. An appropriate greater value may be used instead.

4.4 Quality of Non-Bathymetric Data

IHO Definition: An area within which a uniform assessment of the quality of the non-bathymetric data exists.				
S-131 Geo Feature: QualityOfNonBathymetricData				
Super Type:				
Primitives: surface				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Temporal Variation		1: Extreme Event 2: Likely to Change and Significant Shoaling Expected 3: Likely to Change But Significant Shoaling Not Expected 4: Likely to Change 5: Unlikely to Change 6: Unassessed	EN	0,1
Horizontal Distance Uncertainty			RE	0,1
Horizontal Position Uncertainty			C	0,1
Uncertainty Fixed			(S) RE	1,1
Uncertainty Variable Factor			(S) RE	0,1
Orientation Uncertainty			RE	0,1
Interoperability Identifier			URN	0,*
Source Indication			C	0,1
Category of Authority		2: Border Control 3: Police	(S) EN	0,1

		4: Port 5: Immigration 6: Health 7: Coast Guard 8: Agricultural 9: Military 10: Private Company 11: Maritime Police 12: Environmental 13: Fishery 14: Finance 15: Maritime 16: Customs		
Country Name			(S) TE	0,1
Source			(S) TE	0,1
Source Type		1: Law or Regulation 2: Official Publication 7: Mariner Report, Confirmed 8: Mariner Report, Not Confirmed 9: Industry Publications and Reports 10: Remotely Sensed Images 11: Photographs 12: Products Issued by HO Services 13: News Media 14: Traffic Data	(S) EN	0,1
Reported Date			(S) TD	0,1
Feature Name			(S) C	0,*
Survey Date Range			C	0,1
Date Start			(S) TD	0,1
Date End			(S) TD	1,1
Vertical Uncertainty			C	0,1
Uncertainty Fixed			(S) RE	1,1
Uncertainty Variable Factor			(S) RE	0,1
Information			C	0,*
File Locator			(S) TE	0,1
File Reference			(S) TE	0,1
Headline			(S) TE	0,* (ordered)
Language			(S) TE	0,1
Text			(S) TE	0,1

Inherited Attributes			
S-131Attribute	**Inherited From**	**Type**	**Multiplicity**
No inherited attributes			

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

4.4.1 General

The meta feature Quality of Non-bathymetric Data may be used to provide an indication of the overall uncertainty of position for all non-bathymetric features. It must not be used to provide the uncertainty of bathymetric information.

The attribute horizontal position uncertainty may be applied to any spatial type, in order to qualify the location of a feature.

Horizontal distance uncertainty and horizontal position uncertainty must not be applied to the spatial type of any geo feature if they are identical to the horizontal distance uncertainty and position uncertainty values of the underlying meta feature.

Position uncertainty on the Quality of Non-bathymetric Data applies to non-bathymetric data situated within the area, while position uncertainty on the associated spatial types qualifies the location of the Quality of Non-bathymetric Data feature itself.

4.4.2 Remarks

- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *information* is present at least one of its sub-attributes must be populated.

4.5 Sounding Datum

IHO Definition: The horizontal plane or tidal datum to which soundings have been reduced. Also called datum for sounding reduction.				
S-131 Geo Feature: SoundingDatum				
Super Type:				
Primitives: surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Vertical Datum		1: Mean Low Water Springs 2: Mean Lower Low Water Springs 3: Mean Sea Level 4: Lowest Low Water 5: Mean Low Water 6: Lowest Low Water Springs	EN	1,1

		7: Approximate Mean Low Water Springs 8: Indian Spring Low Water 9: Low Water Springs 10: Approximate Lowest Astronomical Tide 11: Nearly Lowest Low Water 12: Mean Lower Low Water 13: Low Water 14: Approximate Mean Low Water 15: Approximate Mean Lower Low Water 19: Approximate Mean Sea Level 22: Equinoctial Spring Low Water 23: Lowest Astronomical Tide 24: Local Datum 25: International Great Lakes Datum 1985 26: Mean Water Level 27: Lower Low Water Large Tide 44: Baltic Sea Chart Datum 2000		
Information			C	0,*
File Locator			(S) TE	0,1
File Reference			(S) TE	0,1
Headline			(S) TE	0,* (ordered)
Language			(S) TE	0,1
Text			(S) TE	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
No inherited attributes				

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

4.5.1 General

There must be only one **SoundingDatum** feature in an S-131 dataset, providing the datum for all depth values encoded in any feature. Given the relatively small extent of S-131 datasets and the importance of uniform datums in the same port, it is not anticipated that depths in different features will be referred to different datums; however, if this is the case in the sources, values must be converted to the same datum before encoding in the dataset.

4.5.2 Remarks

- If the complex attribute *information* is present at least one of its sub-attributes must be populated.

4.6 Vertical Datum of Data

IHO Definition: Any level surface (for example Mean Sea Level) taken as a surface of reference to which the elevations within a data set are reduced. Also called datum level, reference level, reference plane, levelling datum, datum for heights.				
S-131 Geo Feature: VerticalDatumOfData				
Super Type:				
Primitives: surface				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Vertical Datum		3: Mean Sea Level 13: Low Water 16: Mean High Water 17: Mean High Water Springs 18: High Water 19: Approximate Mean Sea Level 20: High Water Springs 21: Mean Higher High Water 24: Local Datum 25: International Great Lakes Datum 1985 26: Mean Water Level 28: Higher High Water Large Tide 29: Nearly Highest High Water 30: Highest Astronomical Tide 44: Baltic Sea Chart Datum 2000	EN	1,1
Information			C	0,*
File Locator			(S) TE	0,1
File Reference			(S) TE	0,1
Headline			(S) TE	0,* (ordered)
Language			(S) TE	0,1
Text			(S) TE	0,1

Inherited Attributes			
S-131Attribute	**Inherited From**	**Type**	**Multiplicity**
No inherited attributes			

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

4.6.1 General

There must be only one **VerticalDatumOfData** feature in an S-131 dataset, providing the datum for all elevation values encoded in any feature. Given the relatively small extent of S-131 datasets and the importance of uniform datums in the same port, it is not anticipated that elevations in different features will be referred to different datums; however, if this is the case in the sources, values must be converted to the same datum before encoding in the dataset.

4.6.2 Remarks

- If the complex attribute *information* is present at least one of its sub-attributes must be populated.

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5 Abstract Geo Features

5.1 Introduction

This clause describes abstract feature types. The abstract types cannot be used directly, but define attributes and associations inherited by their sub-types. The encoding remarks in the description of each abstract feature apply to its sub-types but may be overridden by remarks in the sub-type.

The abstract feature types are depicted in Figure 5-1. At the root is the type named **FeatureType**, from which all feature types except cartographic and meta-features inherit several attributes. This means that any Geo feature in S-131 can have any of the several attributes in the **FeatureType** box. This type also has information associations to three information types, and a feature association to **TextPlacement** which, as for attributes, allows any S-131 Geo feature to have the same associations. The feature types **OrganizationContactArea** and **SupervisedArea** define no local attributes but inherit the attributes of **FeatureType**, however each adds an additional information association which is inherited by their respective sub-types.

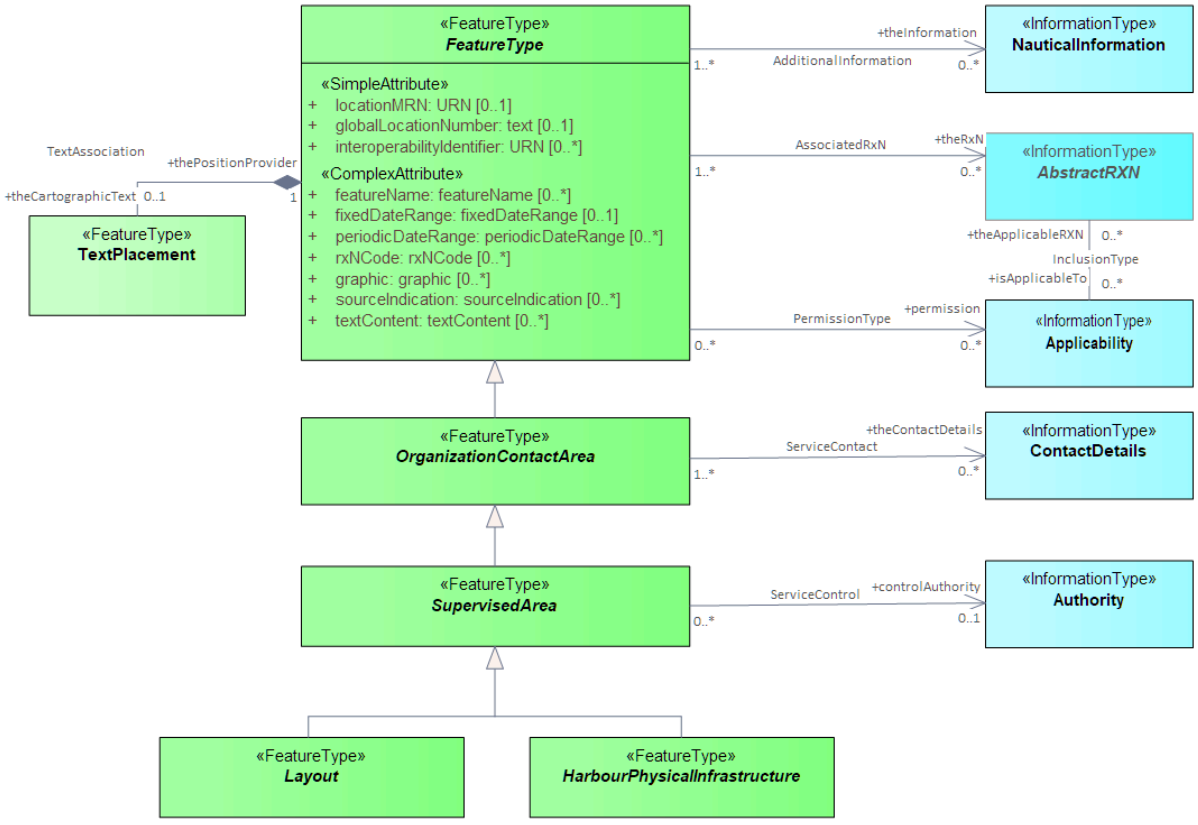

Figure 5-1 — Abstract feature hierarchy

The abstract feature hierarchy in S-131 is intentionally harmonised with the abstract hierarchy in other nautical publications Product Specifications, specifically S-127 (Marine Traffic Management), which has a more complex structure than S-131 necessitating the use of the abstract types **OrganizationContactArea** and **SupervisedArea** (in S-131, unlike S-127, these classes do not have separate sub-hierarchies). The abstract types **Layout** and **HarbourPhysicalInfrastructure** distinguish S-131 features describing harbour layout from those describing infrastructure.

This top-level hierarchy of types in S-131 means than any S-131 Geo feature can have any or all of the five information associations in Figure 5-1, and also an associated **TextPlacement** cartographic feature to position text. Cartographic and meta-features are not derived from this abstract hierarchy and do not inherit these attributes and associations.

5.2 Feature Type

IHO Definition: Generalized feature type which carries all the common attributes.				
S-131 Geo Feature: FeatureType (Abstract)				
Super Type:				
Primitives: noGeometry				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Location Maritime Resource Name			URN	0,1
Global Location Number			TE	0,1
Interoperability Identifier			URN	0,*
Feature Name			C	0,*
Language			(S) TE	1,1
Name			(S) TE	1,1
Name Usage		1: Default Name Display 2: Alternate Name Display 3: No Chart Display	(S) EN	0,1
Fixed Date Range			C	0,1
Date Start			(S) TD	0,1
Date End			(S) TD	0,1
Periodic Date Range			C	0,*
Date Start			(S) TD	1,1
Date End			(S) TD	1,1
RxN Code			C	0,*
Category of RxN		1: Navigation 2: Communication 3: Environmental Protection 4: Wildlife Protection 5: Security 6: Customs 7: Cargo Operation 8: Refuge 9: Health 10: Natural Resources or Exploitation 11: Port 12: Finance 13: Agriculture	(S) CL	0,1
Action or Activity		1: Navigating With a Pilot 2: Entering Port 3: Leaving Port 4: Berthing 5: Slipping 6: Anchoring 7: Weighing Anchor	(S) CL	0,1

		8: Transiting 9: Overtaking 10: Reporting 11: Working Cargo 12: Landing 13: Diving 14: Fishing 15: Discharging Overboard 16: Passing 17: Ballast Water Exchange 18: Hull Cleaning 19: Scientific Research 20: Tourism 21: Education 22: Infrastructure Maintenance		
Headline			(S) TE	0,* (ordered)
Graphic			C	0,*
Pictorial Representation			(S) TE	1,*
Picture Caption			(S) TE	0,1
Source Date			(S) DA	0,1
Picture Information			(S) TE	0,1
Bearing Information			(S) C	0,1
Source Indication			C	0,*
Category of Authority		2: Border Control 3: Police 4: Port 5: Immigration 6: Health 7: Coast Guard 8: Agricultural 9: Military 10: Private Company 11: Maritime Police 12: Environmental 13: Fishery 14: Finance 15: Maritime 16: Customs	(S) EN	0,1
Country Name			(S) TE	0,1
Source			(S) TE	0,1
Source Type		1: Law or Regulation 2: Official Publication 7: Mariner Report, Confirmed 8: Mariner Report, Not Confirmed 9: Industry Publications and Reports 10: Remotely Sensed Images 11: Photographs 12: Products Issued by HO Services 13: News Media 14: Traffic Data	(S) EN	0,1
Reported Date			(S) TD	0,1

Feature Name			(S) C	0,*
Text Content			C	0,*
Category of Text		1: Abstract or Summary 2: Extract 3: Full Text	(S) EN	0,1
Information			(S) C	0,*
Online Resource			(S) C	0,1
Source Indication			(S) C	0,*
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
No inherited attributes				

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
permission	PermissionType	Applicability	association	0,*
theRxN	AssociatedRxN	AbstractRxN	association	0,*
theInformation	AdditionalInformation	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
theCartographicText	TextAssociation	TextPlacement	association	0,1

5.2.1 General

Where a complex attribute has all its sub-attributes optional (e.g., multiplicity 0..1 or 0..*), at least one of the sub-attributes must be populated if the complex attribute is present.

The *featureName* attribute in complex attribute *sourceIndication* is intended for the name of the source.

The **AdditionalInformation** association to a **NauticalInformation** object can be used to attach an additional chunk of information to an information type, and there is no applicable specific information type or association. This should be used sparingly if at all.

The **PermissionType** association is used to encode permission information (e.g., whether use or entry is prohibited, etc) for vessels with different characteristics, if such permissions or requirements exist for a feature.

The **AssociatedRxN** association allows (mostly) textual information pertaining to regulations, etc., to be associated to features.

As an abstract type, instances of **FeatureType** cannot be directly encoded in datasets. However, the encoding instructions for this type apply to all its sub-types unless explicitly overriden in the encoding instructions for any particular sub-type.

5.2.2 Remarks

- The complex attribute *rxNCode* when bound to a feature allows features to be tagged with keywords that make it easier for software queries to search for features relevant to particular subjects or to particular kinds of vessel operations. See clause 9 for guidance on encoding values of *rxNCode* sub-attributes.

- Regulations, recommendations, restrictions, or general nautical information must be encoded in the appropriate associated information type (see clauses 9.2 and Section 10). The ability to encode *rxNCode* and *textContent* as attributes of features must not be used to avoid encoding instances of **Regulations**, **Restrictions**, **Recommendations**, or **NauticalInformation**, because encoding the same type of information using different methods or different structures in the same dataset or data product makes it more difficult for the mariner to find information.
- Regulations, recommendations, restrictions, or general nautical information must be encoded in the appropriate associated information type (see clauses 9.2 and 10). The ability to encode *textContent* as attributes of features must not be used to avoid encoding instances of **Regulations**, **Restrictions**, **Recommendations**, or **NauticalInformation**, because encoding the same type of information using different methods or different structures in the same dataset or data product makes it more difficult for the mariner to find information.
- When encoding text information in the complex attribute *textContent*, it is not necessary to encode the entire content in a single instance of the information sub-attribute. Instead, the information should be organized so that each instance of information deals with a distinct topic or sub-topic, each with an appropriate heading in the headline attribute. This will make it easier for readers to find a topic. Part, chapter, section and sub-section headings in the source material may be used in either verbatim or condensed form, ordered according to the hierarchy in the source.
- Multiple instances of *textContent* should be used when the encoded material bears different relationships to the source (abstract/extract vs. summary vs. full text).
- Multiple instances of *textContent* may be used to distinguish information available purely as an external reference (in the *onlineResource* sub-attribute) from information encoded within the dataset (in the *information.text* sub-attribute or in a support file).
- In general, encoders may use the multiplicities of *textContent* and its sub-attributes to organize textual information so as to facilitate structuring text by topic, avoid flooding end-user screens with large blocks of unorganized text, and improve its accessibility to the mariner.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

5.3 Organization Contact Area

IHO Definition: A feature often associated with contact information for an organization that exercises a management role or offers a service in the location. Remarks: It is not a requirement that every instance of the feature be associated with a management, reporting, or service organization.				
S-131 Geo Feature: OrganizationContactArea (Abstract)				
Super Type: FeatureType				
Primitives: noGeometry				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1

Global Location Number	FeatureType	TE	0,1
Interoperability Identifier	FeatureType	URN	0,*
Feature Name	FeatureType	C	0,*
Fixed Date Range	FeatureType	C	0,1
Periodic Date Range	FeatureType	C	0,*
RxN Code	FeatureType	C	0,*
Graphic	FeatureType	C	0,*
Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
theContactDetails	ServiceContact	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

5.3.1 General

This type adds the **ServiceContact** association to **ContactDetails** for any sub feature class.

If it is necessary to encode contact information related to a particular feature, without encoding information about a supervising or controlling authority, it should be done using an associated **ContactDetails** information type. This can be used when:-

- information about the supervising authority is unavailable, or,
- when the contact information pertains to a particular feature, but not to all features supervised by the authority. For example, if contact details for different terminals are different though they are operated by the same operator, the **ServiceContact** association can be used to link particular contact information to particular terminal features.

As an abstract type, instances of **OrganizationContactArea** cannot be directly encoded in datasets. However, the encoding instructions for this type apply to all its sub-types unless explicitly overriden in the encoding instructions for any particular sub-type.

5.3.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - — If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

5.4 Supervised Area

IHO Definition: A location which may be supervised by a responsible or controlling authority. Remarks: It is not a requirement that every feature instance be associated with an authority. Note that having AbstractService as well as SupervisedArea allows the subclasses to link to CONDET both directly and via AUTORI, which may not be desirable because it gives encoders two ways to reach almost the same result.				
S-131 Geo Feature: SupervisedArea (Abstract)				
Super Type: OrganizationContactArea				
Primitives: noGeometry				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
controlAuthority	ServiceControl	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

5.4.1 General

This type adds the **ServiceControl** association to **Authority** for any sub feature class.

If it is necessary to encode information a controlling authority or organization for a particular location, it should be done using an associated **Authority** information type. Contact details for the organization should be encoded in a **ContactDetails** associated to the **Authority**.

For example, information about terminal operators may be encoded in an **Authority** information type associated to the feature via a **ServiceControl** association. The Harbourmaster's office should be encoded as an **Authority** associated to the whole port area, represented by a **HarbourAreaAdministrative** feature

As an abstract type, instances of **SupervisedArea** cannot be directly encoded in datasets. However, the encoding instructions for this type apply to all its sub-types unless explicitly overriden in the encoding instructions for any particular sub-type.

5.4.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

5.5 Harbour Physical Infrastructure

IHO Definition: The physical installations and facilities that support operations in a port or harbour. Remarks: This generic type can serve as a super-class or aggregation type for classes defining specific feature types.				
S-131 Geo Feature: HarbourPhysicalInfrastructure (Abstract)				
Super Type: SupervisedArea				
Primitives: noGeometry				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*

Fixed Date Range	FeatureType	C	0,1
Periodic Date Range	FeatureType	C	0,*
RxN Code	FeatureType	C	0,*
Graphic	FeatureType	C	0,*
Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure	HarbourAreaSection Terminal	association	0,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

5.5.1 General

This feature type is the immediate supertype for all physical infrastructure features and defines a single optional attribute for the clearance value.

The **Infrastructure** association to the **Terminal** feature type is intended for encoding the infrastructure (represented by the sub-types of **HarbourPhysicalInfrastructure**) available in a **Terminal**. For example, if it is necessary to indicate that a particular terminal has dry dock facilities, it should be done by encoding a **DryDock** feature and associating it to the **Terminal** feature by the **Infrastructure** association.

5.5.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

5.6 Layout

IHO Definition: The spatial arrangement of areas and other types of locations that are designated for specified purposes or otherwise distinguished from other areas and locations.				
S-131 Geo Feature: Layout (Abstract)				
Super Type: SupervisedArea				
Primitives: noGeometry				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

5.6.1 General

Layout features describe the layout of the harbour area. The **Layout** abstract type serves as the supertype for all the layout features in S-131.

5.6.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

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6 Harbour layout

6.1 Introduction

Layout features describe the layout of the harbour area. They include terminal, mooring facilities, special areas within the harbour, berths, designation of the positioning of specific berths along a wharf or quay, dock areas, and a **HarbourAreaSection** feature for subdividing harbour areas into sub-sections.

Note that the current model includes some features which would ideally be merged into *categoryOfPortSection* attributes of other features, due to GI Registry conceptual limitations on re-use of concepts.

Port sections in S-131 include both water and land sections.

The most common water sections in ports are:

- Anchorage: An area in which vessels anchor or may anchor (NP100)
- Fairway: The main navigable channel in the approaches to, or within, a river or harbour. Sometimes called the Ship Channel (NP100)
- Turning basin: An area of water or enlargement of a channel in a port, where vessels are enabled to turn, and which is kept clear of obstructions such as buoys for that purpose (NP100)
- Basin: A sheltered body of water available for port operations connecting either with the sea, with an outer port or with another basin. Generally an almost land locked area leading off an in inlet, firth or sound. Also, an area of water limited in extent and nearly enclosed by structures alongside which vessels can lie (IHO S-32)
- Berth Pocket: Body of water at the berth or anchor berth with sufficient footprint to allow the vessel to make fast to the shore or mooring buoys or to anchor (NP100).

Land or mixed land/water sections include:

- Terminals: A number of berths grouped together and provided with facilities for handling cargo (IHO S-32)
- Berths, quays, wharfs, and mooring facilities: Places where vessels may make fast for the purpose of loading or unloading cargo, embarking or disembarking passengers, etc.
- Service locations: Dock areas, locations for removal of pollutants, fueling, repairs, etc.

Different sections may under the immediate control of different organizations or served by different operators. Terminal facilities are often owned and/or operated by private companies. The overall harbour area is therefore generally divisible into different sections, each of which may be further divided into sub-sections or contain specific types or areas or facilities.

Figure 6-1 depicts the logical hierarchy of layout feature types in S-131, showing what attributes are bound to each type along with their supertypes, from which they inherit attributes and associations.

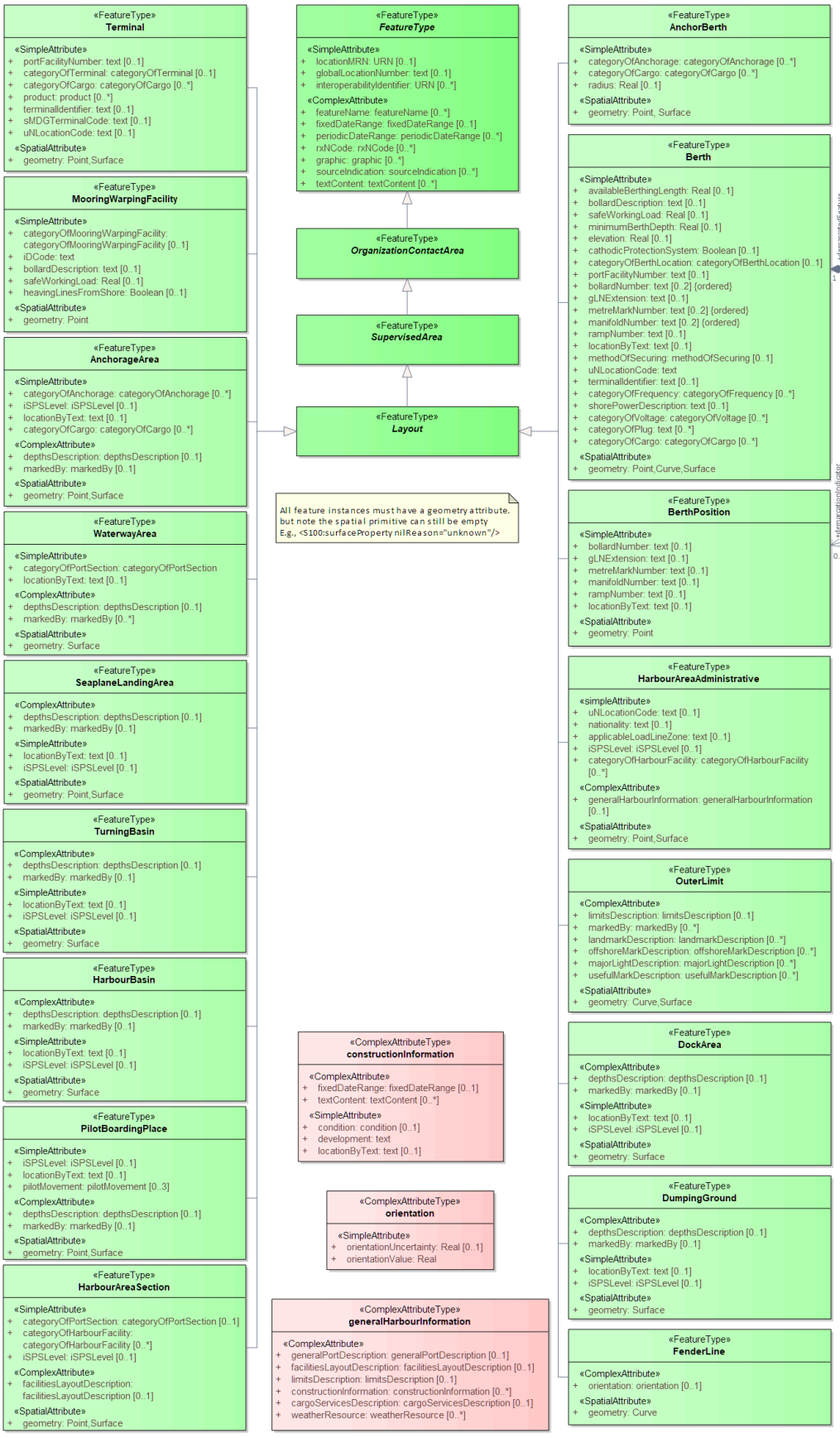

Figure 6-1 — Layout Features and attributes

6.2 Layout container associations

Figure 6-2 depicts the containment (spatial) hierarchy, with containment relationships between layout feature types indicating which features are spatially contained within and part of a larger feature. **HarbourAreaAdministrative** is the main feature that covers the whole port area. It is subdivided into zero or more sections modelled by **HarbourAreaSection** features (the **LayoutDivision**) aggregation. **HarbourAreaSection** can be further subdivided into **WaterwayArea**, **Terminal**, **Berth**, **AnchorageArea**, **DockArea**, etc. The **Terminal** feature can also be subdivided into **Berth** features using the same association. **HarbourAreaSection** can also be subdivided into further features of the same class (the SubUnit self-association role). Note that **HarbourAreaSection** features can contain other **HarbourAreaSection** features. Note also that a **Terminal** can contain any number of **Berth** features

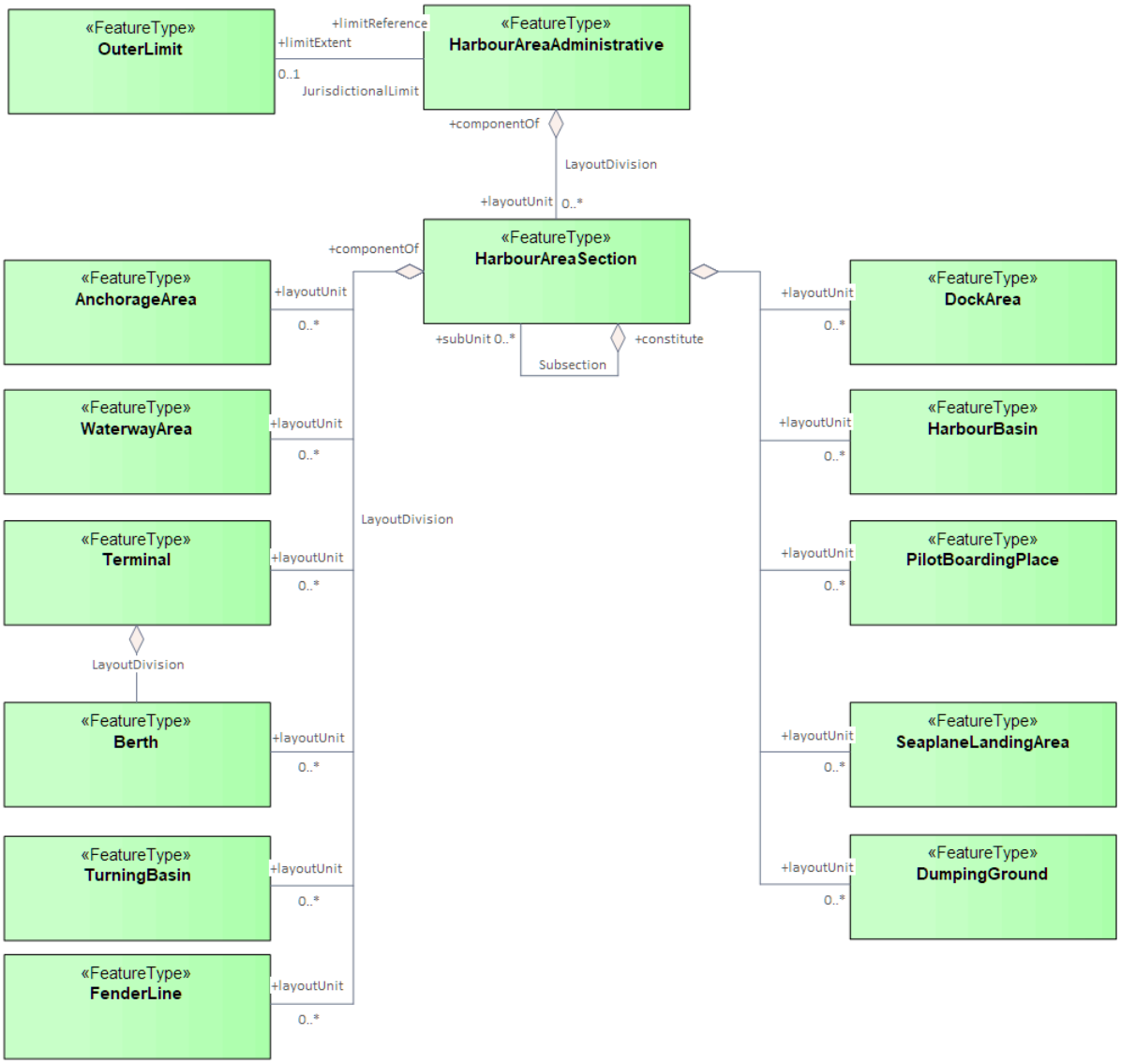

Figure 6-2 — Containment hierarchy of layout features

6.3 Positioning in berths

Positions in a berth can be indicated by means of the **BerthPosition** feature. Mooring facilities for anchor berths or at particular positions can be linked with either **AnchorBerth** or **BerthPosition** features with the **PrimaryAuxiliaryFacility** association. These relationships are depicted in Figure 6-3.

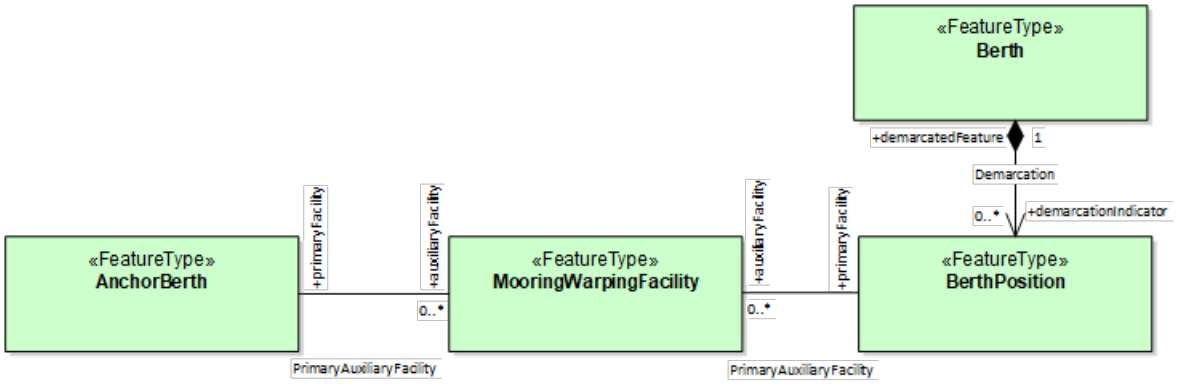

Figure 6-3 — Positions within berths and mooring facilities

6.4 Associations for layout features

Figure 6-4 depicts all associations between layout features.

Nominal positions of berths can be indicated by associating a **BerthPosition** feature to **Berth** using the **Demarcation** association.

Berth positions and Anchor berths can be linked to a mooring facility using the **PrimaryAuxiliaryFacility** association.

The outer limit of the whole harbour area can be associated to **HarbourAreaAdministrative** feature using a **JurisdictionalLimit** association.

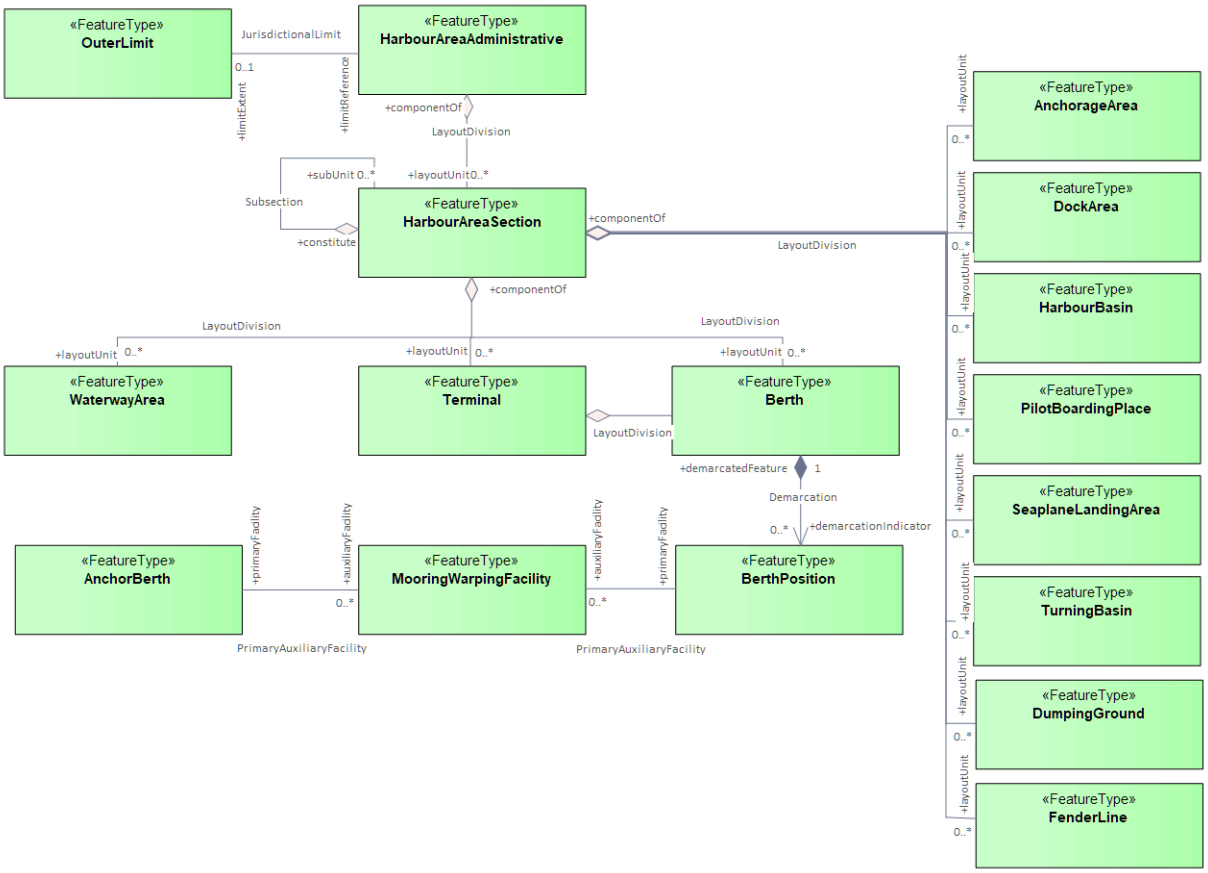

Figure 6-4 — Feature associations for non-abstract layout features

6.5 Associations between layout and physical infrastructure features

Physical infrastructure features in a **Terminal** or **HarbourAreaSection** feature should be linked to a containing **Terminal** or **HarbourAreaSection** by an **Infrastructure** association (Figure 6-5). If there is an hierarchy of features containing the infrastructure only the feature at the lowest level of the hierarchy should be linked to the infrastructure feature.

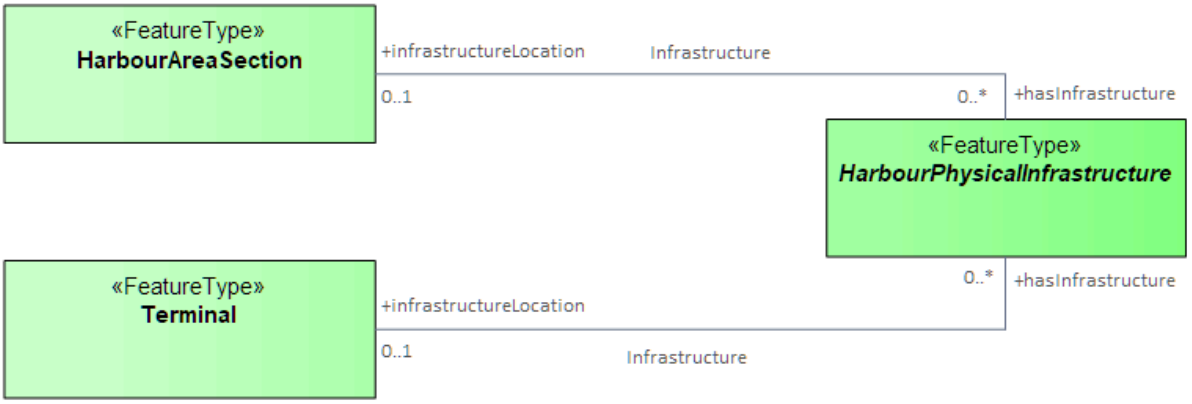

Figure 6-5 — Feature associations for infrastructure

6.6 Inheritance of TextAssociation by all layout and physical infrastructure features

In addition, all layout and physical infrastructure features inherit a **TextAssociation** to the cartographic feature **TextPlacement** (Figure 6-6).

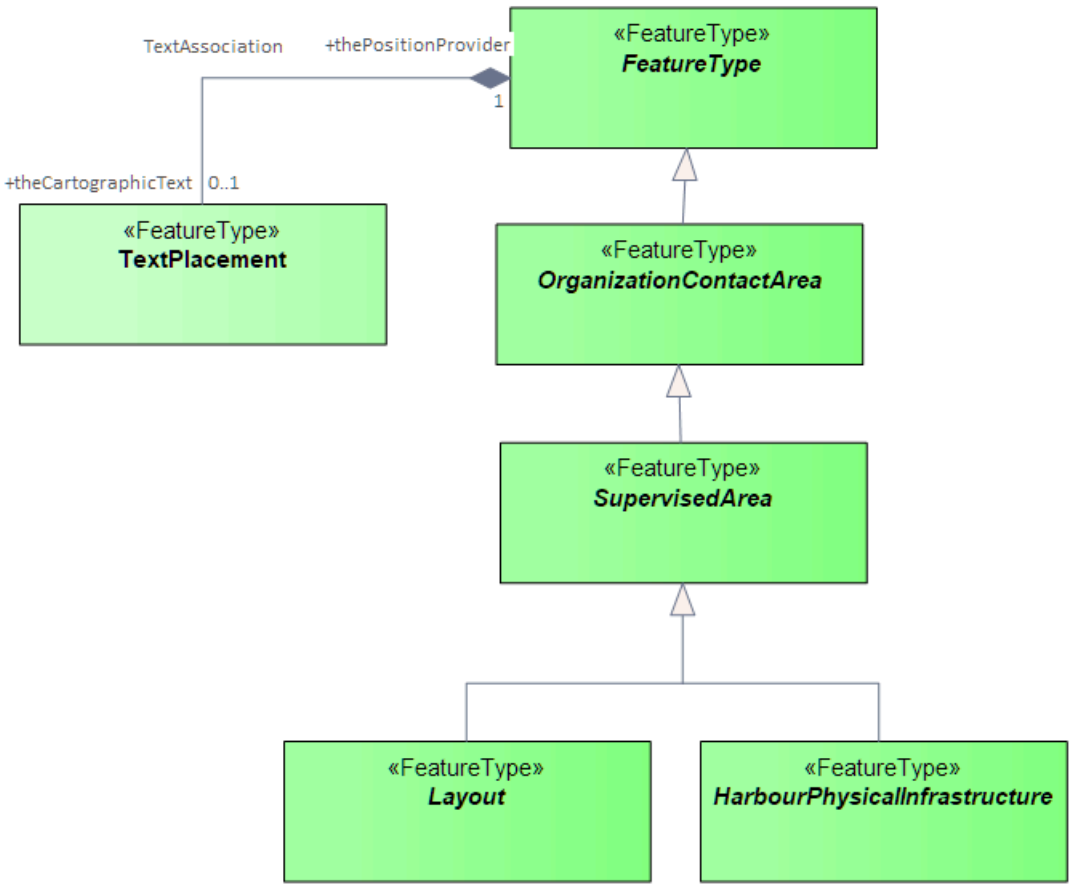

Figure 6-6 — Inherited TextAssociation

6.7 Anchor Berth

IHO Definition: A designated area of water where a vessel, sea plane, etc., may anchor. Remarks: In general the anchor berth is defined by the centre point and a swinging circle radius.				
S-131 Geo Feature: AnchorBerth				
Super Type: Layout				
Primitives: point surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Anchorage		1: Unrestricted Anchorage 2: Deep Water Anchorage 3: Tanker Anchorage 5: Quarantine Anchorage 6: Seaplane Anchorage 7: Small Craft Anchorage 9: Anchorage for Periods Up To 24 Hours 10: Anchorage for a Limited Period of Time 14: Waiting Anchorage	EN	0,*
Category of Cargo		1: Bulk 2: Container	EN	0,*

		3: General 4: Liquid 5: Passenger 6: Livestock 7: Dangerous or Hazardous 8: Heavy Lift 9: Ballast 10: Dry Bulk Cargo 11: Liquid Bulk Cargo 12: Reefer Container Cargo 13: Ro-Ro Cargo 14: Project Cargo 15: Break Bulk Cargo		
Radius			RE	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
serviceDescriptionReference	ServiceAvailability	AvailablePortServices	association	0,1
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
auxiliaryFacility	PrimaryAuxiliaryFacility	MooringWarpingFacility	association	0,*
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.7.1 General

The **AnchorBerth** feature in S-131 omits several of the attributes of the S-101 equivalent.

The positions or limits of anchor berths may be defined by a regulatory authority (for example harbour authority).

6.7.2 Anchor berths with limitations or restrictions on their use

If it is required to encode an anchorage with conditions on its use related to the characteristics of a vessel or its cargo, it must be done using an associated **Applicability** information type.

If it is required to encode an anchorage with other types of limitations on its use (not pertaining to vessel or cargo characteristics), for example an anchorage which may be used for a limited period of time, it must be done using an associated **Restrictions** information type. The specific limitation must be encoded in one or more attributes of the **Restrictions** object.

6.7.3 Remarks

- The inherited complex attribute *featureName*, sub-attribute *name* is used to encode the name and/or number of the anchor berth.
- Unlike S-101, S-131 does not include Sea Area/Named Water Area feature types, so the name of a group of anchor berths known by a single common name, must be encoded in each **AnchorBerth**.
- If an anchor berth is defined by a centre point and a swinging circle, it should be encoded as a point spatial primitive, with the radius of the swinging circle encoded using the attribute *radius*.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.8 Anchorage Area

IHO Definition: An area in which vessels or seaplanes anchor or may anchor.				
S-131 Geo Feature: AnchorageArea				
Super Type: Layout				
Primitives: point surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Anchorage		1: Unrestricted Anchorage 2: Deep Water Anchorage 3: Tanker Anchorage 5: Quarantine Anchorage 6: Seaplane Anchorage	EN	0,*

		7: Small Craft Anchorage 9: Anchorage for Periods Up To 24 Hours 10: Anchorage for a Limited Period of Time 14: Waiting Anchorage 15: Reported Anchorage		
ISPS Level		1: ISPS Level 1 2: ISPS Level 2 3: ISPS Level 3	EN	0,1
Category of Cargo		1: Bulk 2: Container 3: General 4: Liquid 5: Passenger 6: Livestock 7: Dangerous or Hazardous 8: Heavy Lift 9: Ballast 10: Dry Bulk Cargo 11: Liquid Bulk Cargo 12: Reefer Container Cargo 13: Ro-Ro Cargo 14: Project Cargo 15: Break Bulk Cargo	EN	0,*
Location by Text			TE	0,1
Depths Description			C	0,1
Category of Depths Description		1: Shoal 2: General Depth 3: Controlling Depth	(S) EN	1,1
Text Content			(S) C	1,*
Marked By			C	0,1
Text Content			(S) C	1,*

Inherited Attributes

S-131Attribute	**Inherited From**	**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType	URN	0,1
Global Location Number	FeatureType	TE	0,1
Interoperability Identifier	FeatureType	URN	0,*
Feature Name	FeatureType	C	0,*
Fixed Date Range	FeatureType	C	0,1
Periodic Date Range	FeatureType	C	0,*
RxN Code	FeatureType	C	0,*
Graphic	FeatureType	C	0,*
Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
componentOf	LayoutDivision	HarbourAreaSection	aggregation	1,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.8.1 General

The **AnchorageArea** feature in S-131 omits several of the attributes of the S-101 equivalent.

The complex attribute *featureName*, sub-attribute *name* is used to encode the name and/or number of the **AnchorageArea**.

The complex attribute *textContent* may be used to provide information about the category of anchorage, where required.

Individual recommended anchorages without defined limits should be encoded as **AnchorageArea** features with point spatial primitives.

Areas with numerous small craft moorings may be encoded as **AnchorageArea** features of type surface.

6.8.2 Regulations, depth information, and general textual information

General port regulations about anchorage areas in the port area may be encoded in an associated **Regulations** information type.

The complex attribute *depthsDescription* must be used for encoding information about the depth of the anchorage, including for example the nature of the seabed, shoaling, etc.

Other general textual information may be encoded in an associated **NauticalInformation** information type, if pertaining to more than one feature, or in the *textContent* attribute, if pertinent to a particular anchorage.

6.8.3 Anchorages with limitations or restrictions on their use

If it is required to encode an anchorage with conditions on its use related to the characteristics of a vessel or its cargo, it must be done using an associated **Applicability** information type.

If it is required to encode an anchorage with other types of limitations on its use (not pertaining to vessel or cargo characteristics), for example an anchorage which may be used for a limited period of time, it must be done using an associated **Restrictions** information type. The specific limitation must be encoded in one or more attributes of the **Restrictions** object.

6.8.4 Remarks

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.9 Berth

IHO Definition: A place, generally named or numbered, where a vessel may moor or anchor.				
S-131 Geo Feature: Berth				
Super Type: Layout				
Primitives: point curve surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Available Berthing Length			RE	0,1
Bollard Description			TE	0,1
Safe Working Load			RE	0,1
Minimum Berth Depth			RE	0,1
Elevation			RE	0,1
Cathodic Protection System			BO	0,1
Category of Berth Location		1: Wharf Reference Metre Mark 2: Wharf Reference Position 3: Pier (Jetty) 4: Multi-Buoy Mooring Berth	EN	0,1
Port Facility Number			TE	0,1
Bollard Number			TE	0,2 (ordered)
GLN Extension			TE	0,1
Metre Mark Number			TE	0,2 (ordered)
Manifold Number			TE	0,2 (ordered)
Ramp Number			TE	0,1
Location by Text			TE	0,1
Method of Securing		1: Bow to Seaward 2: Stern to Seaward	EN	0,1

		3: Mediterranean Mooring 4: Baltic Mooring 5: Running Mooring 6: Standing Mooring 7: Single Point Mooring 8: Multi-Buoy Mooring 9: Ship-to-Ship Mooring 10: Spider Buoy Mooring		
UN Location Code			TE	1,1
Terminal Identifier			TE	0,1
Shore Power Description			TE	0,1
Category of Frequency		1: 50Hz 2: 60Hz	EN	0,*
Category of Voltage		1: 230V 2: 400V 3: 120V 4: 120V or 240V 5: 208V 6: 440V 7: 440V or 690V 8: 480V 9: 690V 10: 6600V 11: 6600V or 11000V 12: 11000V 13: 22000V 14: 380V 15: 11000V or 22000V	EN	0,*
Category of Plug			TE	0,*
Category of Cargo		1: Bulk 2: Container 3: General 4: Liquid 5: Passenger 6: Livestock 7: Dangerous or Hazardous 8: Heavy Lift 9: Ballast 10: Dry Bulk Cargo 11: Liquid Bulk Cargo 12: Reefer Container Cargo 13: Ro-Ro Cargo 14: Project Cargo 15: Break Bulk Cargo	EN	0,*

Inherited Attributes

S-131Attribute	**Inherited From**	**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType	URN	0,1
Global Location Number	FeatureType	TE	0,1
Interoperability Identifier	FeatureType	URN	0,*
Feature Name	FeatureType	C	0,*
Fixed Date Range	FeatureType	C	0,1
Periodic Date Range	FeatureType	C	0,*

RxN Code	FeatureType	C	0,*
Graphic	FeatureType	C	0,*
Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
serviceDescriptionReference	ServiceAvailability	AvailablePortServices	association	0,1
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
demarcationIndicator	Demarcation	BerthPosition	association	0,*
componentOf	LayoutDivision	HarbourAreaSection Terminal	aggregation	1,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.9.1 General

The berth encodes the named place where a vessel can be moored adjacent to a shoreline construction.

6.9.2 Spatial primitives

The spatial primitive for a **Berth** feature are, in order of preference:

1) A surface feature whose boundaries include the berth pocket as well as land-side extents of facilities for the berth.
2) If the surface extents cannot be determined to the necessary precision, a curve feature may be encoded at the shoreline (wharf, quay, shoreline construction, etc.) as discerned from the largest scale ENC available or information vouched for by the port authority.
3) If neither surface not curve coordinates are available to a level of precision considered to be sufficient, a point spatial primitive may be used at a nominal position. Such nominal positions may be available in the relevant ENCs, noting that the ENC may encode the nominal position as being on land and might displace it slightly for cartographic reasons.

6.9.3 Safe working load of vessel attachment points

The attribute *safeWorkingLoad* should be used to encode the safe working load (SWL) of the attachment points (e.g., bollards) for vessels at the berth, as supplied by the port. If all attachment points have the same SWL that value should be encoded, if there are known to be variations, the lowest SWL should be encoded as the value of *safeWorkingLoad* and a note about variations added in *textContent*.

6.9.4 Berth usage

If a berth is designated or reserved for a particular type of cargo, the cargo should be encoded using the *categoryOfCargo* attribute.

6.9.5 Shore power availability

If shore power is available at a berth, its availability and known characteristics should be indicated using the optional attributes *shorePowerDescription*, *categoryOfFrequency*, *categoryOfVoltage* and *categoryOfPlug*.

6.9.6 Remarks

- The complex attribute *featureName* is used to encode the name or number of the berth.
- Population of more than one of the attributes bollard number, metre mark number, manifold number, and ramp number is allowed but should be reviewed to ensure that it reflects the reality of what is used at the berth.
- The attribute *safeWorkingLoad* must not be used to encode the berth loading limit (the maximum weight for wharves or other onshore berth structures). If providing this information is considered necessary, the berth loading limit may be given in attribute *textContent* or associated **NauticalInformation** information type accompanied by text distinguishing it from the safe load for vessel attachment points.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.10 Berth Position

IHO Definition: A specific position within a berth where a vessel may be moored or anchored. Remarks: Within a Berth, Anchor Berth or Multiple Buoy Mooring berth, there may be many possible Berth Positions. The space required to berth the vessel may vary depending on its type and size.				
S-131 Geo Feature: BerthPosition				
Super Type: Layout				
Primitives: point				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Bollard Number			TE	0,1 (ordered)
GLN Extension			TE	0,1
Metre Mark Number			TE	0,1 (ordered)
Manifold Number			TE	0,1 (ordered)

Ramp Number			TE	0,1
Location by Text			TE	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
demarcatedFeature	Demarcation	Berth	composition	1,1
auxiliaryFacility	PrimaryAuxiliaryFacility	MooringWarpingFacility	association	0,*
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.10.1 General

The **BerthPosition** feature is used to designate a position along a line of a **Berth**.

6.10.2 Centre position for manifolds

The jetty manifold centre position is the designated location on a jetty where a ship's manifold aligns with the shore-based loading arms or pipelines for cargo transfer. The "centre position" of the manifold on the jetty is the point of reference for connecting the loading equipment and ensuring proper alignment with the various ship manifolds that the jetty is designed to accommodate.

6.10.3 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.11 Dock Area

IHO Definition: An artificially enclosed area within which ships may moor and which may have gates to regulate water level.				
S-131 Geo Feature: DockArea				
Super Type: Layout				
Primitives: surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Depths Description			C	0,1
Category of Depths Description		1: Shoal 2: General Depth 3: Controlling Depth	(S) EN	1,1
Text Content			(S) C	1,*
Location by Text			TE	0,1
Marked By			C	0,1
Text Content			(S) C	1,*
ISPS Level		1: ISPS Level 1 2: ISPS Level 2 3: ISPS Level 3	EN	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1

Periodic Date Range	FeatureType	C	0,*
RxN Code	FeatureType	C	0,*
Graphic	FeatureType	C	0,*
Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
serviceDescriptionReference	ServiceAvailability	AvailablePortServices	association	0,1
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
componentOf	LayoutDivision	HarbourAreaSection	aggregation	1,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.11.1 General

Dock areas in S-101 ENCs that are not navigable at the maximum display scale of the ENC data, are encoded in S-101 ENCs using the S-101 feature **DockArea**. Except for Gate, the boundaries of the dock are not encoded as separate features in S-101.

Dock areas in S-101 ENCs that are navigable may be encoded as the S-101 features Depth Area, Dredged Area or Unsurveyed Area (see the S-101 DCEG), with the geo features making up the dock limits encoded using appropriate features such as Coastline, Shoreline Construction or Gate.

S-131 datasets may encode both types of S-101 ENC dock features according to their primary use as a dock areas, using the S-131 feature type **DockArea**. The *depthsDescription* attribute must be used for textual descriptions of the depths in the area.

The variety of features used in S-101 ENCs to encode different types of dock areaa and their adjuncts may be converted to S-101 **DockArea** features for S-131 purposes. If so converted, the optional attribute *interoperabilityIdentifier* should be used to encode the provenance of such S-131 **DockArea** features in relation to the source S-101 ENC features by setting its value to the same as the *interoperabilityIdentifier* value for the ENC source feature.

If an encoded **DockArea** has a date dependency, this should be indicated using the complex attributes *fixedDateRange* or *periodicDateRange*.

- The complex attribute horizontal clearance fixed is used to encode the size of the entrance to the dock area, where required. This attribute is not included in S-131, but should be in the underlying ENC. If not, it may be encoded as text information in a *textContent* attribute.
- The attributes horizontal clearance length and horizontal clearance width are used to encode the regulatory length and width of the navigable part of the dock area as declared by a competent authority, where known. These attributes are not included in S-131, but should be in the underlying ENC. If not, it may be encoded as text information in a *textContent* attribute
- S-101 guidance is that "[in] a non-tidal basin (wet dock), depths may refer to a sounding datum different from that in open waters. If this area is navigable at the maximum display scale of the ENC data, the value of this datum must be encoded using the meta feature **SoundingDatum**, with attribute vertical datum = 24 (local datum), co-incident with the area covered by the dock." For S-131, depths must be converted to the single sounding datum meta-feature and a note regarding the conversion must be included in the *depthsDescription* complex attribute.

6.11.2 Remarks

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.12 Dumping Ground

IHO Definition: A sea area where dredged material or other potentially more harmful material, for example explosives, chemical waste, is deliberately deposited.				
S-131 Geo Feature: DumpingGround				
Super Type: Layout				
Primitives: surface point				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Depths Description			C	0,1
Category of Depths Description		1: Shoal 2: General Depth 3: Controlling Depth	(S) EN	1,1
Text Content			(S) C	1,*
Location by Text			TE	0,1
Marked By			C	0,1
Text Content			(S) C	1,*
ISPS Level		1: ISPS Level 1 2: ISPS Level 2 3: ISPS Level 3	EN	0,1

Inherited Attributes			
S-131Attribute	**Inherited From**	**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType	URN	0,1
Global Location Number	FeatureType	TE	0,1
Interoperability Identifier	FeatureType	URN	0,*
Feature Name	FeatureType	C	0,*
Fixed Date Range	FeatureType	C	0,1
Periodic Date Range	FeatureType	C	0,*
RxN Code	FeatureType	C	0,*
Graphic	FeatureType	C	0,*
Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
componentOf	LayoutDivision	HarbourAreaSection	aggregation	1,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.12.1 General

As an overlay to S-101 ENCs, S-131 does not include the full S-101 model of dumping ground features, but assumes that there will be an underlying S-101 ENC with fuller information on the dumping ground than S-131 contains.

S-101 guidance states that dumping of harmful materials is unlikely to affect depths substantially and such dumping grounds are encoded primarily as a warning against anchoring, trawling or other submarine operations. However, dumping grounds within or intersecting the extent of an MHI dataset should be included in the MHI dataset.

Disused dumping grounds for harmful materials are considered dangerous for an indefinite period and must therefore be encoded.

The attribute *interoperabilityIdentifier* should be used to link S-131 **DumpingGround** features to the corresponding S-101 features.

The complex attribute *depthsDescription* should be populated with information about depths within the **DumpingGround**. Since such information may change frequently for dumping grounds that are in active use or have been revived for use, and cautionary language about volatility that is appropriate to the particular circumstances of the port area should be included.

6.12.2 Spoil grounds and dredging areas

The S-101 DCEG states that spoil grounds are significant in that “very large quantities of material may be dumped, decreasing the depth of water available” and that such spoil grounds should be updated in S-101 ENCs in a timely manner. Producers of S-131 data should monitor updates to relevant S-101 ENCs for such updates and update S-131 datasets accordingly. Further, port authority information should be pro-actively monitored for changes to dumping ground locations, extents, and depths which may still be in the ENC update process.

The S-101 DCEG also states that “Extraction (or dredging) areas are those areas where a concentration of dredging vessels may be encountered, taking up sand or shingle to be brought ashore (for example for construction purposes). Their significance is primarily as a collision hazard, although they also indicate the likelihood of finding a greater depth of water than charted.”

Encoders should note that channels dredged to provide an adequate depth of water for navigation are “dredged areas”, not to be confused with “dredging areas”.

6.12.2.1 Sources

S-131 data producers should note the following (from S-101 Edition 2.0.0 DCEG clause 16.7):

- The S-101 DCEG directs S-101 encoders to encode spoil grounds using a Dumping Ground feature, with (S-101) attribute category of dumping ground = 5 (spoil ground).
- The S-101 DCEG directs S-101 encoders to encode dredging areas as Restricted Area feature with attribute category of restricted area = 21 (dredging area).
  - An area in which seabed material (for example sand, shingle) is being extracted for purposes such as construction must be encoded, where required, using the (S-101) feature Offshore Production Area (see clause 14.6), with attribute category of production area = 13 (seabed material extraction area).

Since depths in dumping grounds are liable to be less than charted, S-101 may use Quality of Bathymetric Data features to degrade quality over relevant areas. S-131 data producers should include S-101 quality features in monitoring and adopt similar strategies in S-131 quality features, creating if necessary a distinct quality feature or features to cover such areas.

6.12.3 Remarks

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.
- Within a spoil ground; if the depths within the area are liable to be very much less than charted after the discharge of spoil and post-dumping surveys are not available, they may be treated as unsurveyed areas in S-101 ENCs, in which case soundings and depth contours may be omitted. Alternatively, an indication of the discrepancy between charted depth information and the actual depths within the spoil ground may be provided by downgrading the information included in the underlying S-101 Quality of Bathymetric Data feature. S-131 data producers should consider similar methods for S-131 quality over the area.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.

— If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.13 Fender Line

IHO Definition: An imaginary line parallel to a face of a berth or quay which touches the seaward face of the fenders.				
S-131 Geo Feature: FenderLine				
Super Type: Layout				
Primitives: curve				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Orientation			C	0,1
Orientation Uncertainty			(S) RE	0,1
Orientation Value			(S) RE	1,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*

Information associations				
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
componentOf	LayoutDivision	HarbourAreaSection	aggregation	1,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.13.1 General

A **FenderLine** feature is an imaginary line that touches the seaward face of the fenders. A fender line is distinct from the physical fenders. A **FenderLine** features is useful during berthing as it indicates where and when the vessel will touch the physical fenders and can also provide the orientation of the berth.

When a **Berth** is encoded as a curve spatial primitive, the **Berth** itself may coincide with the **FenderLine**. However, ENC encoding guidance may require the **Berth** feature in S-101 to be encoded offset from a Shoreline Construction or Coastline feature, S-131 data producers should take this possibility into account when drawing on ENCs for fender line information.

The attribute *interoperabilityIdentifier* should be used to link this feature to related S-101 fender features if any.

The *orientation* attribute should be used to encode the orientation of the fender line. Uncertainty in orientation should be encoded in the *orientationUncertainty* sub-attribute.

A **SpatialQuality** associated to the curve primitive for the **FenderLine** should be used to indicate the accuracy of fender line positioning (see clauses 2.4.6.1 and 14.2). Potential decay of accuracy over time may need to be taken into account when encoding accuracy information.

Accurate location and orientation information is of the utmost importance in encoding **FenderLine** features.

6.13.1.1 Notes on source materials

The fender line is distinct from the physical fenders which can be encoded in S-57 / S-101 but in most cases are not included in the ENC. The figures below depict hypothetical **FenderLine** features in relation to fenders.

Figure 6-7 — Fender line

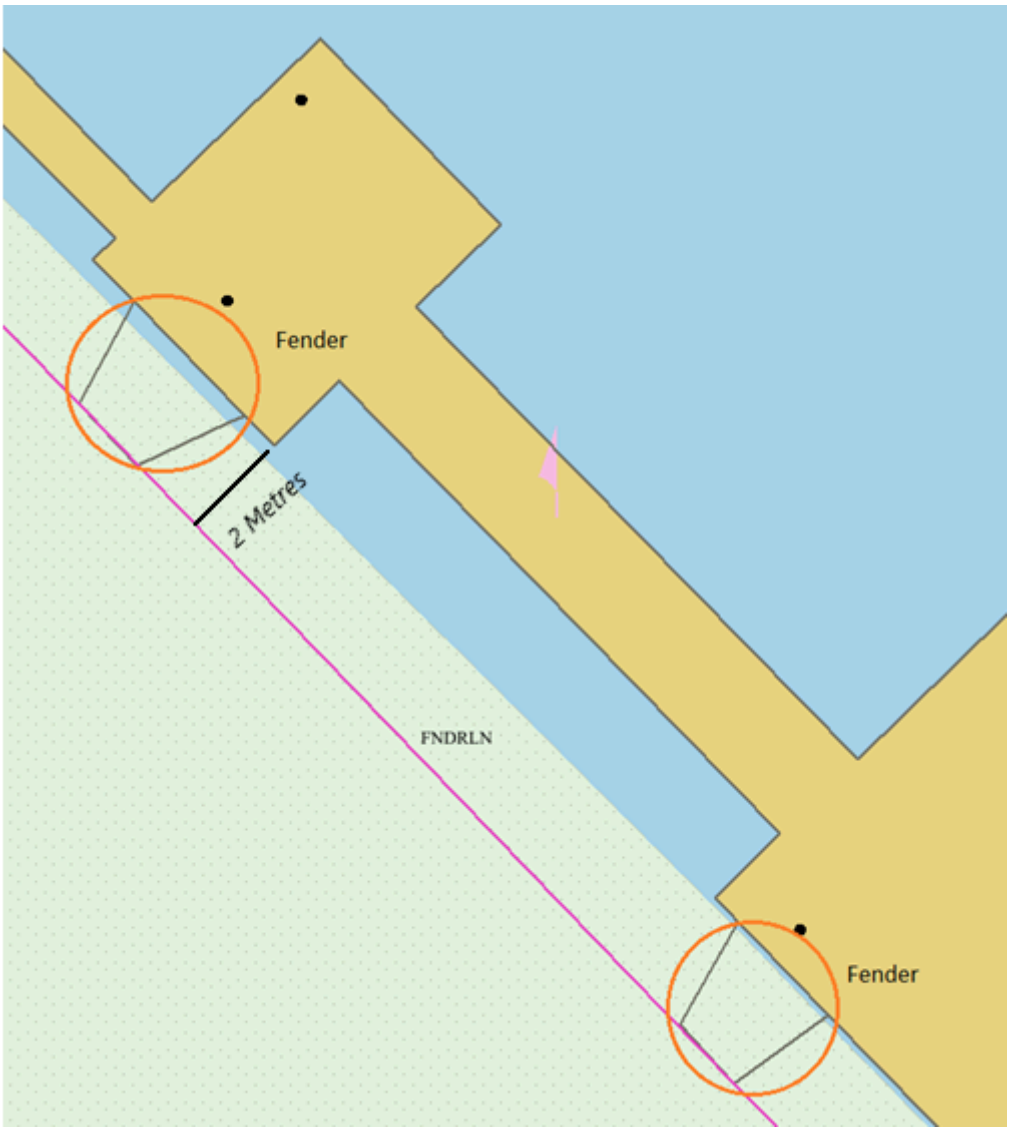

Figure 6-8 — Example of fenders which are not encoded in the ENC

Data producers should use the most accurate and up-to-date source of information for fenderline information. This will generally be the port authority.

6.13.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.14 Harbour Area (Administrative)

IHO Definition: The area over which a harbour authority has jurisdiction.

S-131 Geo Feature: HarbourAreaAdministrative				
Super Type: Layout				
Primitives: point surface				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
UN Location Code			TE	0,1
Nationality			TE	0,1
Applicable Load Line Zone			TE	0,1
ISPS Level		1: ISPS Level 1 2: ISPS Level 2 3: ISPS Level 3	EN	0,1
Category of Harbour Facility		1: RoRo Terminal 3: Ferry Terminal 4: Fishing Harbour 5: Yacht Harbour/Marina 6: Naval Base 7: Tanker Terminal 8: Passenger Terminal 9: Shipyard 10: Container Terminal 11: Bulk Terminal 12: Ship Lift 13: Straddle Carrier 14: Service Harbour 15: Pilotage Service	EN	0,*
General Harbour Information			C	0,1
General Port Description			(S) C	0,1
Facilities Layout Description			(S) C	0,1
Limits Description			(S) C	0,1
Construction Information			(S) C	0,*
Cargo Services Description			(S) C	0,1
Weather Resource			(S) C	0,*
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*

Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
serviceDescriptionReference	ServiceAvailability	AvailablePortServices	association	0,1
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
limitExtent	JurisdictionalLimit	OuterLimit	association	0,1
layoutUnit	LayoutDivision	HarbourAreaSection	association	0,*
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.14.1 General

The **HarbourAreaAdministrative** feature is used for encoding the location and extent of individual ports or harbours.

A **HarbourAreaAdministrative** feature may be subdivided into **HarbourAreaSection** features to represent subdivisions of the harbour or port area (see clause 6.15). **HarbourAreaAdministrative** features should be thus subdivided if the source material includes such subdivisions, or if it is necessary to distinguish portions of the harbour or port area (for example, if different sections have different names or designations for administrative jurisdiction purposes).

The attribute *interoperabilityIdentifier* should be used to link this feature to the corresponding S-101 features.

6.14.1.1 Notes on source materials

The ENC feature for **HarbourAreaAdministrative** covers only the navigable water areas of a harbour. Since most port installations are on land, data producers will find it necessary to create a larger spatial primitive that includes areas of shore installations. Information about port area extents may be available from port authorities, however such information may need to be reconciled with ENC data prior to use in S-131 datasets.

6.14.2 Spatial primitives

HarbourAreaAdministrative should be encoded with surface spatial primitives except in small-scale MHI datasets where internal features are omitted.

Simplified primitives approximating the actual port area may be created to encompass both shore and water areas of a port, where accurate information about port areas and extents is difficult to determine. In this case a **NauticalInformation** indicating that the boundaries are approximate should be attached to the **HarbourAreaAdministrativeArea** feature with approximate boundaries. Conversely, a **HarbourAreaAdministrativeArea** feature with boundaries conforming to only water areas should have an attached **NauticalInformation** indicating that its boundaries include only the water areas portion of the harbour.

If it is necessary to depict the water portions of the harbour area as well as the whole extent (covering shore installations as well as navigable waters) two or more **HarbourAreaAdministrativeArea** features may be used, which may overlap as necessary. A **NauticalInformation** information object should be attached to each feature as described in the previous paragraph.

6.14.3 Remarks

- Services for import and export cargoes should be described in separate instances of *cargoServicesDescription.textContent*. When this is done, the *headline* sub-attribute of *textContent* should indicate whether the *textContent* instance pertains to import or export cargoes.
- In the complex attribute *constructionInformation*, the *textContent* sub-atttribute is used for encoding a textual and/or graphical description of the development. The mandatory *development* sub-attribute is used for encoding a brief description of the type of development.
- In the complex attribute *weatherResource*, at least one of *onlineResource* or *textContent* must be populated. If *onlineResource* is populated *dynamicResource* must be populated. If the information is to be obtained from an external source, the external source must be indicated in *onlineResource*,
- Links to online resources for weather information should be provided in complex attribute *weatherResource* and not in a linked **ContactDetails** information type.
- Note also that *weatherResource* binds the generic textual attribute *textContent* and therefore information about accessing the online weather resource which cannot be encoded in other sub-attributes of *weatherResource* should be provided in that *textContent* attribute instead of creating a separate **ContactDetails** object.
- The attributes *categoryOfHarbourFacility* and *generalHarbourInformation* should be populated so that together the provide a complete overview of port/harbour type and function. For example, if a large commercial harbour area includes a marina in its jurisdiction, *categoryOfHarbourFacility* should include the listed value 5 (Yacht Harbour/Marina). However, it is not necessary to mention every single port service or facility in these attributes.
- There is no requirement for a dataset to contain only one **HarbourAreaAdministrative** feature, even if the dataset covers only one port.
- If the complex attribute *generalHarbourInformation* is present at least one of its sub-attributes must be populated.
- If the complex attribute *fixedDateRange* is present at least one of its sub-atttributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - — If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.15 Harbour Area Section

IHO Definition: A distinguishable portion of the area over which a harbour authority has jurisdiction. Remarks: Denotes a specific, distinguishable or designated portion of a harbour or port area, as distinct from the entire harbour or port area.

S-131 Geo Feature: HarbourAreaSection				
Super Type: Layout				
Primitives: point surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Port Section		1: Port Fairway 3: Berth Pocket 8: Seaplane Anchorage 9: Dredged Basin 11: Port Safety Zone 12: Lay-by Berth	EN	0,1
Category of Harbour Facility		4: Fishing Harbour 5: Yacht Harbour/ Marina 6: Naval Base 9: Shipyard 14: Service Harbour 15: Pilotage Service 16: Service and Repair 17: Quarantine Station	EN	0,*
ISPS Level		1: ISPS Level 1 2: ISPS Level 2 3: ISPS Level 3	EN	0,1
Facilities Layout Description			C	0,1
Text Content			(S) C	1,*
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
serviceDescriptionReference	ServiceAvailability	AvailablePortServices	association	0,1
facilityOperatingHours	LocationHours	ServiceHours	association	0,1

Information associations				
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
componentOf	LayoutDivision	HarbourAreaAdministrative	aggregation	0,1
constitute	Subsection	HarbourAreaSection	aggregation	0,1
subUnit	Subsection	HarbourAreaSection	association	0,*
hasInfrastructure	Infrastructure	HarbourPhysicalInfrastructure	association	0,*
layoutUnit	LayoutDivision	AnchorageArea Berth DockArea DumpingGround FenderLine HarbourBasin PilotBoardingPlace SeaplaneLandingArea Terminal TurningBasin WaterwayArea	association	0,*
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.15.1 General

HarbourAreaSection features must be used when it is necessary to represent subdivisions of a port or harbour area, or group harbour facilities under a common designation. A **HarbourAreaSection** feature may contain specialized features such as Terminals, Berths, etc., and/or smaller **HarbourAreaSection** features.

6.15.2 Remarks

- If a **HarbourAreaSection** feature contains other **HarbourAreaSection** features (i.e., is associated to other **HarbourAreaSection** features via *subUnit* roles), the *categoryOfPortSection* and *categoryOfHarbourFacility* attributes on the containing feature must be either (a) the union or superset of the values of those attributes on its subdivisions, or (b) not encoded in the containing feature.
- A **HarbourAreaSection** feature may have both *subUnit* and *layoutUnit* roles, i.e., it may contain other **HarbourAreaSection** feature as well as specialized features such as **Terminal**, **Berth**, etc. Generally, a **HarbourAreaSection** will have both types of roles only when it contains subdivision **HarbourAreaSection** features that do not cover the whole spatial extent of the container.
- If there is a subdivision hierarchy of **HarbourAreaSection** features, specialized features (**Terminal**, **Berth**, etc.) or infrastructure features should be associated to the **HarbourAreaSection** feature at the lowest level possible (i.e., the lowest level that contains the entire specialized or infrastructure feature).

- There is no requirement for **HarbourAreaSection** features to cover the entire extent of a **HarbourAreaAdministrative** feature. For example, larger ports may have areas which are spatially within the harbour area (or adjacent to its navigable waters as legally defined) but which are not controlled by the port authority, for example naval bases or civic waterfronts.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.16 Harbour Basin

IHO Definition: An enclosed area of water surrounded by quay walls constructed to provide means for the transfer of cargos from and to ships.				
S-131 Geo Feature: HarbourBasin				
Super Type: Layout				
Primitives: surface				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Depths Description			C	0,1
Category of Depths Description		1: Shoal 2: General Depth 3: Controlling Depth	(S) EN	1,1
Text Content			(S) C	1,*
Location by Text			TE	0,1
Marked By			C	0,1
Text Content			(S) C	1,*
ISPS Level		1: ISPS Level 1 2: ISPS Level 2 3: ISPS Level 3	EN	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*

Graphic	FeatureType	C	0,*
Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
componentOf	LayoutDivision	HarbourAreaSection	aggregation	1,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.16.1 General

This feature may be used in S-131 to encode basins not marked by quay walls or specifically designated for cargo transfer.

Depths in the basin should be described using the complex attribute *depthsDescription*. Significant differences in depth characteristics or values between the basin and adjacent areas or channels should be described using this complex attribute.

Remarks

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.17 Mooring/Warping Facility

IHO Definition: The equipment or structure used to secure a vessel.				
S-131 Geo Feature: MooringWarpingFacility				
Super Type: Layout				
Primitives: point				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Mooring/Warping Facility		4: Tie-Up Wall 5: Post or Pile 6: Mooring Cable	EN	0,1
ID Code			TE	1,1
Bollard Description			TE	0,1
Safe Working Load			RE	0,1
Heaving Lines From Shore			BO	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
serviceDescriptionReference	ServiceAvailability	AvailablePortServices	association	0,1
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*

Information associations				
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
primaryFacility	PrimaryAuxiliaryFacility	AnchorBerth BerthPosition	association	0,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.17.1 General

In S-131, only mooring/warping facilities that are in use are encoded as features.

The identifying number of the mooring/warping facility, if any, must be encoded in the *iDCode* attribute.

The feature should be linked to corresponding S-101 features using the *interoperabilityIdentifier* attribute if this attribute is populated in the S-101 ENC feature.

6.17.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - — If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.18 Outer Limit

IHO Definition: The extent to which a coastal State claims or may claim a specific jurisdiction in accordance with the provisions of International Law.				
S-131 Geo Feature: OuterLimit				
Super Type: Layout				
Primitives: curve surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Limits Description			C	0,1
Text Content			(S) C	1,*
Marked By			C	0,*
Text Content			(S) C	1,*
Landmark Description			C	0,*

Text Content			(S) C	1,*
Offshore Mark Description			C	0,*
Text Content			(S) C	1,*
Major Light Description			C	0,*
Text Content			(S) C	1,*
Useful Mark Description			C	0,*
Text Content			(S) C	1,*
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
entranceReference	LimitEntrance	Entrance	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
limitReference	JurisdictionalLimit	HarbourAreaAdministrative	association	1,1
theCartographicText	TextAssociation	TextPlacement	association	0,1

Feature associations				
	(inherited from FeatureType)			

6.18.1 General

This feature may be used to encode the legally or officially designated limits of the harbour area for purposes of navigation. Land-side boundaries of jurisdiction need not be encoded as **OuterLimit** features.

6.18.2 Remarks

- Aids to navigation should not be encoded in the attribute *landmarkDescription*. Instead, they should be encoded in the appropriate attribute for describing marks (*offshoreMarkDescription*, *majorLightDescription*, or *usefulMarkDescription*).
- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.19 Pilot Boarding Place

IHO Definition: A location offshore where a pilot may board a vessel in preparation to piloting it through local waters.				
S-131 Geo Feature: PilotBoardingPlace				
Super Type: Layout				
Primitives: surface point				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Depths Description			C	0,1
Category of Depths Description		1: Shoal 2: General Depth 3: Controlling Depth	(S) EN	1,1
Text Content			(S) C	1,*
Location by Text			TE	0,1
Pilot Movement		1: Embarkation 2: Disembarkation 3: Pilot Change	EN	0,3
Marked By			C	0,1
Text Content			(S) C	1,*
ISPS Level		1: ISPS Level 1 2: ISPS Level 2 3: ISPS Level 3	EN	0,1

Inherited Attributes			
S-131Attribute	**Inherited From**	**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType	URN	0,1
Global Location Number	FeatureType	TE	0,1
Interoperability Identifier	FeatureType	URN	0,*
Feature Name	FeatureType	C	0,*
Fixed Date Range	FeatureType	C	0,1
Periodic Date Range	FeatureType	C	0,*
RxN Code	FeatureType	C	0,*
Graphic	FeatureType	C	0,*
Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
componentOf	LayoutDivision	HarbourAreaSection	aggregation	1,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.19.1 General

For a pilot boarding place, the pilot vessel may either cruise in the area or come out on request. Off some large ports pilots on outgoing ships may be disembarked at a different location. Pilots may board from a helicopter; it is then less important for a ship to reach the exact position of the boarding place but an approximate position should still be encoded. Some pilot stations are used solely for long-distance (deep-sea) pilots. Pilots may be in constant attendance, in regular attendance at certain limited times, or available by previous arrangement only. The primary purpose of encoded pilotage information is to show the position of the facility. Because of the many variations in the service provided, the main source of information on pilotage must be in an associated publication or product.

If it is required to encode a pilot boarding place, it must be done using the feature **PilotBoardingPlace**.

For general information about the representation of pilot boarding places on charts, see S-4 – B-491 and S-101 DCEG.

The attribute *interoperabilityIdentifier* may be used to link this feature to the corresponding S-101 features.

6.19.2 Remarks

- If it is required to encode the ship to shore or shore to ship contact information in addition to contact information for the pilot service, it must be done using the information class **ContactDetails** (see clause 11.5). The **ContactDetails** must be associated to the **PilotBoardingPlace** feature using the association **AdditionalInformation**.
- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.20 Seaplane Landing Area

IHO Definition: A designated portion of water for the landing and take-off of seaplanes.				
S-131 Geo Feature: SeaplaneLandingArea				
Super Type: Layout				
Primitives: surface point				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Depths Description			C	0,1
Category of Depths Description		1: Shoal 2: General Depth 3: Controlling Depth	(S) EN	1,1
Text Content			(S) C	1,*
Location by Text			TE	0,1
Marked By			C	0,1
Text Content			(S) C	1,*
ISPS Level		1: ISPS Level 1 2: ISPS Level 2 3: ISPS Level 3	EN	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1

Interoperability Identifier	FeatureType	URN	0,*
Feature Name	FeatureType	C	0,*
Fixed Date Range	FeatureType	C	0,1
Periodic Date Range	FeatureType	C	0,*
RxN Code	FeatureType	C	0,*
Graphic	FeatureType	C	0,*
Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
componentOf	LayoutDivision	HarbourAreaSection	aggregation	1,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.20.1 General

If it is required to encode a seaplane landing area, it must be done using the feature **SeaplaneLandingArea**.

If it is required to encode an area where seaplanes draw water for fire fighting activities, this must be done using **SeaplaneLandingArea**.

If it is required to encode an anchorage for seaplanes, it must be done using an **AnchorageArea** feature, with attribute *categoryOfAnchorage* = 6 (seaplane anchorage).

This feature should be linked to the corresponding S-101 ENC feature if any using an *interoperabilityIdentifier* attribute.

6.20.2 Remarks

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  — If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.21 Terminal

IHO Definition: A terminal covers that area on shore which provides buildings and constructions for the transfer of cargo or passengers from and to ships.				
S-131 Geo Feature: Terminal				
Super Type: Layout				
Primitives: point surface				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Port Facility Number			TE	0,1
Category of Terminal		1: RoRo Terminal 3: Ferry Terminal 7: Tanker Terminal 8: Passenger Terminal 10: Container Terminal 11: Bulk Terminal	EN	0,1
Category of Cargo		3: General 4: Liquid 6: Livestock 7: Dangerous or Hazardous 8: Heavy Lift 10: Dry Bulk Cargo 11: Liquid Bulk Cargo 12: Reefer Container Cargo 14: Project Cargo 15: Break Bulk Cargo	EN	0,*
Product		1: Oil 2: Gas 4: Stone 5: Coal 6: Ore 7: Chemicals 9: Milk 10: Bauxite 11: Coke 12: Iron Ingots 13: Salt 14: Sand 15: Timber 16: Sawdust/Wood Chips 17: Scrap Metal 18: Liquefied Natural Gas	EN	0,*

		19: Liquefied Petroleum Gas 20: Wine 21: Cement 22: Grain		
Terminal Identifier			TE	0,1
SMDG Terminal Code			TE	0,1
UN Location Code			TE	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
serviceDescriptionReference	ServiceAvailability	AvailablePortServices	association	0,1
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
componentOf	LayoutDivision	HarbourAreaSection	aggregation	1,1

Feature associations				
layoutUnit	LayoutDivision	Berth	association	0,*
hasInfrastructure	Infrastructure	HarbourPhysicalInfrastructure	association	0,*
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.21.1 General

A terminal in S-131 may include water areas immediately adjacent to the shore installation.

Data producers should endeavour to encode **Terminal** features as areas rather than points. Point spatial primitives may be used when the boundaries cannot be determined or in small-scale datasets.

6.21.1.1 Notes on source materials

Since port authorities sometimes designate terminals by their nominal point locations instead of providing precise coordinates, point terminal features may be located in water areas.

Terminals are encoded in S-101 as S-101 **HarbourFacility** features with a *categoryOfHarbourFacility* attribute. Such **HarbourFacility** features must not be repeated in S-131 as S-131 **HarbourFacility** features, instead an S-131 **Terminal** feature should be encoded. The *interoperabilityIdentifier* attribute may be used to link an S-131 **Terminal** to a corresponding S-101 **HarbourFacility**.

6.21.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.22 Turning Basin

IHO Definition: An area of water or enlargement of a channel used for turning vessels.				
S-131 Geo Feature: TurningBasin				
Super Type: Layout				
Primitives: surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Depths Description			C	0,1
Category of Depths Description		1: Shoal 2: General Depth 3: Controlling Depth	(S) EN	1,1
Text Content			(S) C	1,*
Location by Text			TE	0,1
Marked By			C	0,1
Text Content			(S) C	1,*

ISPS Level		1: ISPS Level 1 2: ISPS Level 2 3: ISPS Level 3	EN	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
componentOf	LayoutDivision	HarbourAreaSection	aggregation	1,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.22.1 General

This feature may be used to encode water areas designated as for turning and similar manoeuvres.

Depths in the basin should be described using the complex attribute *depthsDescription*. Significant differences in depth characteristics or values between the basin and adjacent areas or channels should be described using this complex attribute.

6.22.2 Remarks

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

6.23 Waterway Area

IHO Definition: An area in which uniform general information of the waterway exists.				
S-131 Geo Feature: WaterwayArea				
Super Type: Layout				
Primitives: surface				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Port Section		1: Port Fairway 3: Berth Pocket 8: Seaplane Anchorage 9: Dredged Basin 11: Port Safety Zone 12: Lay-by Berth	EN	0,1
Depths Description			C	0,1
Category of Depths Description		1: Shoal 2: General Depth 3: Controlling Depth	(S) EN	1,1
Text Content			(S) C	1,*
Location by Text			TE	0,1
Marked By			C	0,1
Text Content			(S) C	1,*
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*

Graphic	FeatureType	C	0,*
Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
componentOf	LayoutDivision	HarbourAreaSection	aggregation	1,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

6.23.1 General

Waterways can be encoded to indicate how specific sections of water have been divided for various administrative purposes such as for organizing traffic and managing the available water column. When it is required to encode a section of water as one of the types mentioned in the *categoryOfPortSection* attribute, this must be done using the feature **WaterwayArea** with *categoryOfPortSection* set to the appropriate value.

The attribute *interoperabilityIdentifier* may be used to link this feature to related S-101 features.

6.23.2 Remarks

- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

7 Physical infrastructure

7.1 Introduction

Physical infrastructure features describe the infrastructural facilities of the harbour area. They include floating and dry docks, gridirons, ship lifts, straddle carriers, bollards, dolphins, power facilities and locks.

The features are depicted in Figure 7-1 below. In addition, they inherit the attributes and associations of higher-level supertypes **FeatureType**, **OrganizationContactArea**, and **SupervisedArea**.

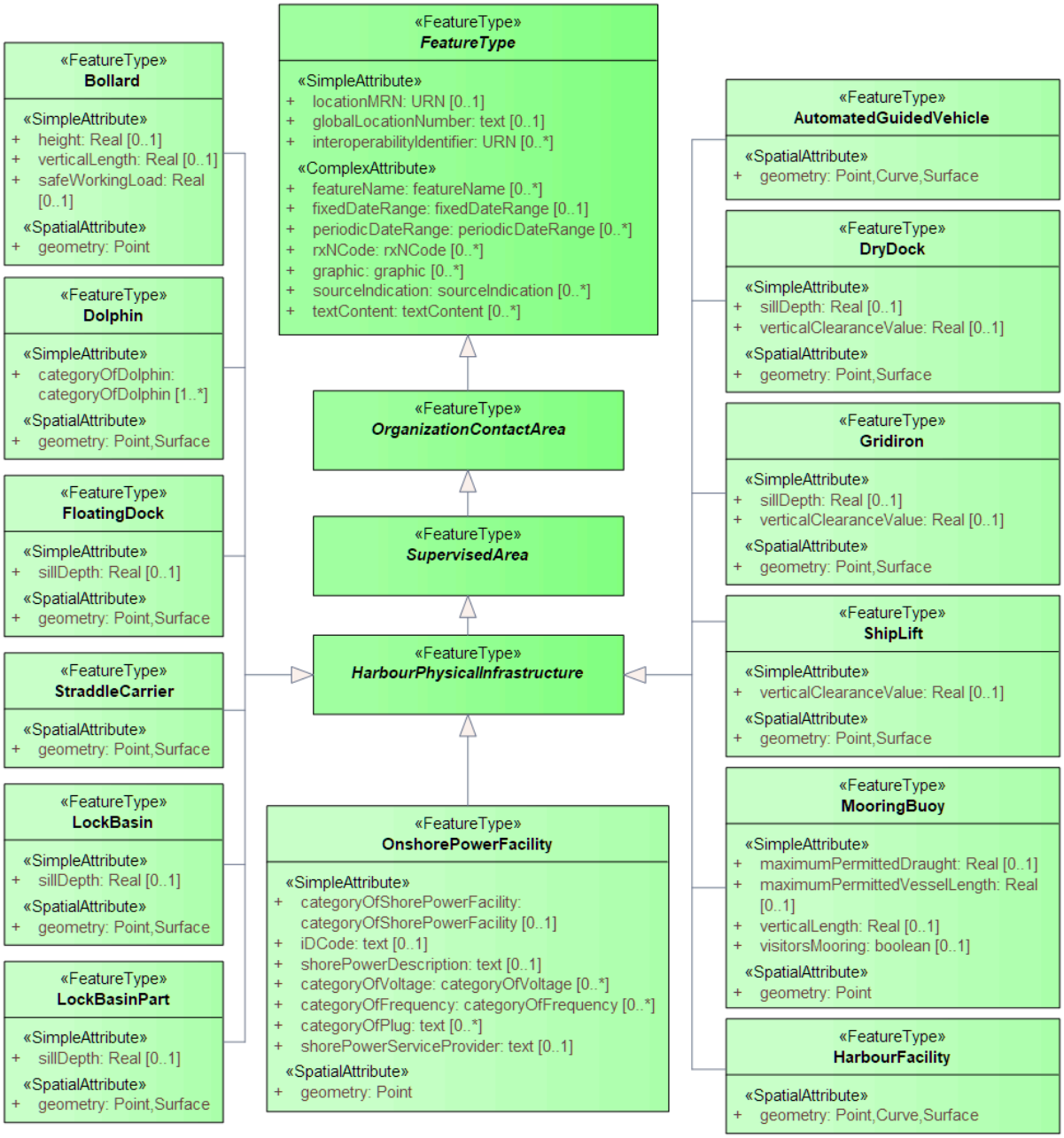

Figure 7-1 — Physical infrastructure features

7.2 Automated Guided Vehicle

IHO Definition: Equipment with material handling or operational capabilities, characterised by wheeled (including tracked) mobility, and which autonomously moves along a preset route based on environmental markers or external guidance signals.				
S-131 Geo Feature: AutomatedGuidedVehicle				
Super Type: HarbourPhysicalInfrastructure				
Primitives: point curve surface				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure (inherited from HarbourPhysicalInfrastructure)	HarbourAreaSection Terminal	association	0,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

7.2.1 General

Both Automated Guided Vehicles (AGVs) and straddle carriers are common equipment for horizontal transportation between the wharf and the yard. Compared to straddle carriers, AGVs have superior performance in terms of automation in path design, flexibility in adapting to harbour layout, and adaptability of load platforms to various types of cargo. With the advancement and application of intelligent systems, sensor positioning, and fast-charging technologies, AGVs are increasingly being used in automated terminals.

7.2.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

7.3 Bollard

IHO Definition: Small shaped post, mounted on a wharf or dolphin used to secure ship's lines.				
S-131 Geo Feature: Bollard				
Super Type: HarbourPhysicalInfrastructure				
Primitives: point				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Height			RE	0,1
Vertical Length			RE	0,1
Safe Working Load			RE	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1

Periodic Date Range	FeatureType	C	0,*
RxN Code	FeatureType	C	0,*
Graphic	FeatureType	C	0,*
Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure (inherited from HarbourPhysicalInfrastructure)	HarbourAreaSection Terminal	association	0,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

7.3.1 General

The identifier or designator (e.g., bollard number) for a bollard must be encoded using the complex attribute *featureName*.

The attribute *interoperabilityIdentifier* should be used to link this feature to the corresponding S-101 Bollard feature.

7.3.2 Safe working load

The attribute *safeWorkingLoad* must be used to encode the safe working load (SWL) of the bollard. The value must be encoded using the rated value of safe working load, which is a fraction of the rated breaking load.

7.3.3 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.

— If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

7.4 Dolphin

IHO Definition: A post or group of posts, used for mooring or warping a vessel, or as an aid to navigation. The dolphin may be in the water, on a wharf or on the beach.				
S-131 Geo Feature: Dolphin				
Super Type: HarbourPhysicalInfrastructure				
Primitives: point surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Dolphin		1: Mooring Dolphin 2: Deviation Dolphin 3: Berthing Dolphin 4: Fender or Breasting Dolphin	EN	1,*
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*

Information associations				
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure (inherited from HarbourPhysicalInfrastructure)	HarbourAreaSection Terminal	association	0,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

7.4.1 General

The attribute *interoperabilityIdentifier* should be used to link this feature to the corresponding S-101 Dolphin feature.

7.4.1.1 Notes on source materials

Dolphins that are disused and/or have fallen into disrepair may be encoded in ENCs using **Obstruction** or **Pile** features. Disused dolphins should not be encoded in S-131 datasets.

7.4.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

7.5 Dry Dock

IHO Definition: An artificial basin fitted with a gate or caisson, into which vessels can be floated and the water pumped out to expose the vessel's bottom. Also called graving dock.				
S-131 Geo Feature: DryDock				
Super Type: HarbourPhysicalInfrastructure				
Primitives: point surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Sill Depth			RE	0,1
Vertical Clearance Value			RE	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1

Global Location Number	FeatureType	TE	0,1
Interoperability Identifier	FeatureType	URN	0,*
Feature Name	FeatureType	C	0,*
Fixed Date Range	FeatureType	C	0,1
Periodic Date Range	FeatureType	C	0,*
RxN Code	FeatureType	C	0,*
Graphic	FeatureType	C	0,*
Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure (inherited from HarbourPhysicalInfrastructure)	HarbourAreaSection Terminal	association	0,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

7.5.1 General

A dry dock (or graving dock) is an artificial basin into which a ship can be floated for cleaning and repairs. The entrance can be closed by gate or caisson and the water pumped out to expose the vessel's bottom.

The attribute *interoperabilityIdentifier* may be used to link this feature to the corresponding S-101 features.

7.5.1.1 Notes on source materials

In S-101, a dry dock must also be covered by the S-101 LandArea feature. The boundary of a dry dock is not encoded as a separate Coastline or Shoreline Construction feature, except for the gate feature (Gate), which may be encoded. S-131 dry docks may therefore be superimposed on ENC LandArea features. The boundary of a **DryDock** in S-131 may be derived from the S-101 **DryDock** geometry. Data

producers should note that S-101 Gate features may be encoded as separate features in the underlying S-101 ENC.

The S-131 spatial primitive should conform to to the **DryDock** spatial coordinates in the largest-scale underlying harbour ENC. An enclosing feature such as **HarbourAreaSection** may also be encoded if there is a need for depicting adjunct features like Gates which are adjacent to the S-101 geometry for **DryDock** but not included within the S-101 spatial primitive for the main feature.

7.5.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

7.6 Floating Dock

IHO Definition: A form of dry dock consisting of a floating structure of one or more sections which can be partly submerged by controlled flooding to receive a vessel, then raised by pumping out the water so that the vessel's bottom can be exposed.				
S-131 Geo Feature: FloatingDock				
Super Type: HarbourPhysicalInfrastructure				
Primitives: point surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Sill Depth			RE	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure (inherited from HarbourPhysicalInfrastructure)	HarbourAreaSection Terminal	association	0,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

7.6.1 General

In S-101, a Floating Dock feature must also be covered by Depth Area, Dredged Area or Unsurveyed Area features. The boundary of a Floating Dock feature of type surface is not be encoded as a separate feature (Coastline or Shoreline Construction). S-131 encoders should therefore verify that an S-131 **FloatingDock** is covered by an S-101 feature of the appropriate type in an underlying S-101 ENC. If a discrepancy is detected an attempt should be made to reconcile it.

The S-131 **FloatingDock** feature allows encoding of the sill depth for the dock as a real attribute.

The attribute *interoperabilityIdentifier* may be used to link this feature to the corresponding S-101 Floating Dock feature.

7.6.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

7.7 Gridiron

IHO Definition: A structure in the intertidal zone serving as a support for vessels at low stages of the tide to permit work on the exposed portion of the vessel's hull.

S-131 Geo Feature: Gridiron				
Super Type: HarbourPhysicalInfrastructure				
Primitives: point surface				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Sill Depth			RE	0,1
Vertical Clearance Value			RE	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure	HarbourAreaSection Terminal	association	0,1

Feature associations				
	(inherited from HarbourPhysicalInfrastructure)			
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

7.7.1 General

The attribute *interoperabilityIdentifier* should be used to link this feature to the corresponding S-101 Gridiron feature.

7.7.1.1 Notes on source materials

Due to gridirons normally being located in intertidal areas, S-101 encoding instructions only require encoding Gridiron on the largest optimum display scale ENC data.

7.7.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

7.8 Harbour Facility

IHO Definition: A harbour installation with a service or commercial operation of public interest.				
S-131 Geo Feature: HarbourFacility				
Super Type: HarbourPhysicalInfrastructure				
Primitives: point curve surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*

Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure (inherited from HarbourPhysicalInfrastructure)	HarbourAreaSection Terminal	association	0,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

7.8.1 General

In S-131 the **HarbourFacility** feature is used only for encoding the locations of port facilities for which no suitable S-131 feature type is defined. The kind of facility must be described in attribute *textContent*.

The attribute *interoperabilityIdentifier* should be used to link this feature to the corresponding S-101 features if any.

7.8.2 Example of HarbourFacility use

In the absence of a more specific feature for encoding cranes, they may be encoded using a **HarbourFacility** feature with attribute *textContent.headline* value “Crane” or “Cranes” and information about lifting capacity, vertical clearance, etc., indicated using sub-attributes of *textContent* and/or its complex sub-attribute *information*. Requirements about vessel characteristics, cargo, etc., can be encoded in an associated **Applicability** information type. Photographs may optionally be added using the complex attribute *graphic*.

7.8.3 Remarks

- An S-131 **HarbourFacility** must not be encoded to coincide with a more specific S-131 harbour facility such as a **ShipLift** except when it describes a distinctly different type of facility not captured in the S-131 Application Schema.
- Since there are no category attributes attached to **HarbourFacility** in Edition 2.0.0, the attribute *textContent* is mandatory and must be used to describe the type of facility.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

7.9 Lock Basin

IHO Definition: A wet dock in a waterway, permitting a ship to pass from one level to another.				
S-131 Geo Feature: LockBasin				
Super Type: HarbourPhysicalInfrastructure				
Primitives: point surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Sill Depth			RE	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure (inherited from HarbourPhysicalInfrastructure)	HarbourAreaSection Terminal	association	0,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

7.9.1 General

A lock is an enclosure at the entrance to a canal or non-tidal basin. Its ends are closed by lock gates.

Locks in MHI harbour areas should be encoded using the features **LockBasin** and **LockBasinPart** (clause 7.10). **LockBasinPart** is used if and only if a lock is divided into more than one parts by gates, and the parts have different characteristics or associations, otherwise a single **LockBasin** feature must be encoded.

Locks in MHI data may be derived from various S-101 or S-401 features (see S-101 Edition 2.0.0 and S-401 Edition 1.2.0), from which the summary in clause Clause 7.9.1.1 below is derived.

Working schedules can be encoded using the working times model in S-131 (see clauses 2.4.10.4 and 11.2).

The attribute *interoperabilityIdentifier* should be used to link an S-131 **LockBasin** feature to the corresponding S-101 or S-401 features if any.

7.9.1.1 Notes on source materials

In S-101 Edition 2.0.0 only locks that are not navigable at the optimum display scale of the ENC data are supposed to be encoded as S-101 Lock Basin features, covered by a Land Area or Unsurveyed Area feature. The name of the lock is encoded using the complex attribute **featureName** on the S-101 Lock Basin feature

In S-101 Edition 2.0.0 a lock that is navigable at the optimum display scale of the ENC data, is encoded using the S-101 features Depth Area or Dredged Area. The geographic features making up the limits of the lock are encoded using appropriate features such as Coastline, Shoreline Construction or Gate. Such locks are not encoded as LockBasin. Additionally, the name of the lock, may be encoded using the feature Sea Area/Named Water Area.

Lock gates are encoded as an S-101 Gate feature with attribute category of gate = 4 (lock gate) or 3 (caisson). For smaller optimum display scale ENC data, a lock may be encoded using Gate only, without using Lock Basin.

S-401 adopts similar criteria to S-101.

7.9.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

7.10 Lock Basin Part

IHO Definition: A lock basin is divided into several lock basin parts, if this lock basin has one ground level but several gates.

S-131 Geo Feature: LockBasinPart				
Super Type: HarbourPhysicalInfrastructure				
Primitives: point surface				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Sill Depth			RE	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure (inherited from HarbourPhysicalInfrastructure)	HarbourAreaSection Terminal	association	0,1

Feature associations				
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

7.10.1 General

LockBasinPart is used if and only if a lock is divided into several parts, otherwise a single **LockBasin** feature must be encoded.

If a lock basin has more than two gates and the ground level is the same, different lock basin parts must be created.

If the lock basin part has a special time schedule or special operating hours apply, working times can be encoded using the working times model in S-131 (see clauses 2.4.10.4 and 11.2).

The sill depth for each **LockBasinPart** may be encoded using the optional *sillDepth* attribute.

The attribute *interoperabilityIdentifier* should be used to link an S-131 **LockBasinPart** feature to the corresponding S-101 **LockBasin** features if any as well as the corresponding S-401 **LockBasinPart** features, if any.

7.10.1.1 Aggregations of lock basin parts in a common lock system

A covering **LockBasin** feature should be encoded if it is necessary to encode information that applies uniformly to all lock basin parts or to the lock system as a whole, such aa a common operating schedule, name, single global location number, MRN, etc.

7.10.1.2 Notes on source materials

Lock Basin Part features are used in inland navigation charts (see S-401 — IEHG INLAND ELECTRONIC NAVIGATIONAL CHART PRODUCT SPECIFICATION — Edition 1.2.0).

S-401 requires that all features which belong to one lock must be associated to a Lock Aggregation. There is no equivalent aggregation feature or aggregration relationship in the S-131 Application Schema, but a covering **LockBasin** feature **must** be encoded to hold common attributes and associations (clause 7.10.1.1).

If the **LockBasinPart** features have no information in common, a covering **LockBasin** feature **may** be encoded.

7.10.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

7.11 Mooring Buoy

IHO Definition: A buoy secured to the bottom by permanent moorings with means for mooring a vessel by use of its anchor chain or mooring lines.		
S-131 Geo Feature: MooringBuoy		
Super Type: HarbourPhysicalInfrastructure		
Primitives: point		
Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-131 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Maximum Permitted Draught			RE	0,1
Maximum Permitted Vessel Length			RE	0,1
Vertical Length			RE	0,1
Visitors Mooring			BO	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure (inherited from HarbourPhysicalInfrastructure)	HarbourAreaSection Terminal	association	0,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

7.11.1 General

Mooring buoys must be shown in order to facilitate mooring operations.

If the underlying harbour ENC does not show disused mooring buoys or moored vessels, such of these as may be within the extent of the MHI dataset should be included as possible hazards to navigation.

- For disused moorings, a **Restriction** indicating that the buoy is disused and not available for mooring must be attached to the **MooringBuoy**.
- For permanently moored vessels, a **Restriction** indicating that the buoy is in permanent use and not available for mooring must be attached to the **MooringBuoy**.

Limitations on maximum vessel draft and length may be encoded using the attributes *maximumPermittedDraught* and *maximumPermittedlength*. Other restrictions on use by particular types of vessels or limitations on vessel dimensions should be encoded using an associated **Applicability**.

For disused moorings or permanent mooring buoys, attributes *maximumPermittedDraught*, *maximumPermittedlength*, *verticalLength* and *visitorsMooring* are prohibited.

The attribute *interoperabilityIdentifier* should be used to link this feature to related S-101 features if any.

7.11.2 Remarks

- If it is required to encode the total vertical length, including any equipment features (for example light), of the buoy above the water level, it must be done using the attribute *verticalLength*.
- If it is required to encode a visitors mooring, it must be done by populating the attribute *visitorsMooring* = true.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

7.12 Onshore Power Facility

IHO Definition: Facilities or infrastructure providing shore power to berthed vessels.				
S-131 Geo Feature: OnshorePowerFacility				
Super Type: HarbourPhysicalInfrastructure				
Primitives: point				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Shore Power Facility		1: High-Voltage Shore Power System 2: Low-Voltage Shore Power System 3: Hybrid Shore Power System	EN	0,1
ID Code			TE	0,1
Shore Power Description			TE	0,1
Category of Voltage		1: 230V 2: 400V 3: 120V 4: 120V or 240V	EN	0,*

		5: 208V 6: 440V 7: 440V or 690V 8: 480V 9: 690V 10: 6600V 11: 6600V or 11000V 12: 11000V 13: 22000V 14: 380V 15: 11000V or 22000V		
Category of Frequency		1: 50Hz 2: 60Hz	EN	0,*
Category of Plug			TE	0,*
Shore Power Service Provider			TE	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure (inherited from HarbourPhysicalInfrastructure)	HarbourAreaSection Terminal	association	0,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

7.12.1 General

Incorporating shore power in S-131 datasets will:

- Enable ship management systems to plan berthing arrangements in advance based on onshore power availability;
- Allow port authorities to track shore power coverage rates and assess emission reduction progress;
- Provide key decision-making data for emission reduction strategies.

The connection type and rating may be encoded using attribute *categoryOfPlug*. The value encoded in this attribute should include a specification of the standard(s) to which the connection conforms. Low-voltage shore connection (LVSC) systems generally use IEEE 80005-3 for operability and IEC 60309-5 for dimensions while high-voltage shore connection (HVSC) systems generally use IEEE 80005-1 for operability and IEC 62613-2 for dimensions, but connections conforming to other specifications are sometimes used.

7.12.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

7.13 Ship Lift

IHO Definition: A platform powered by synchronous electric motors (for example syncrolift) used to lift vessels (larger than boats) in and out of the water.				
S-131 Geo Feature: ShipLift				
Super Type: HarbourPhysicalInfrastructure				
Primitives: point surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Vertical Clearance Value			RE	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1

Interoperability Identifier	FeatureType	URN	0,*
Feature Name	FeatureType	C	0,*
Fixed Date Range	FeatureType	C	0,1
Periodic Date Range	FeatureType	C	0,*
RxN Code	FeatureType	C	0,*
Graphic	FeatureType	C	0,*
Source Indication	FeatureType	C	0,*
Text Content	FeatureType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation (inherited from FeatureType)	NauticalInformation	association	0,*

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure (inherited from HarbourPhysicalInfrastructure)	HarbourAreaSection Terminal	association	0,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

7.13.1 General

The attribute *interoperabilityIdentifier* should be used to link this feature to the corresponding S-101 features if any.

Limitations on vessels which may be permitted to use the facility can be encoded with an associated **Applicability** information type.

7.13.1.1 Notes on source materials

Ship lifts may be encoded in S-101 ENC datasets as **HarbourFacility** features with *categoryOfHarbourFacility* = 12 (ship lift).

7.13.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.

- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  — If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

7.14 Straddle Carrier

IHO Definition: A wheeled vehicle designed to lift and carry containers or vessels within its own framework. It is used for moving, and sometimes stacking, shipping containers and vessels.				
S-131 Geo Feature: StraddleCarrier				
Super Type: HarbourPhysicalInfrastructure				
Primitives: point surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
Location Maritime Resource Name	FeatureType		URN	0,1
Global Location Number	FeatureType		TE	0,1
Interoperability Identifier	FeatureType		URN	0,*
Feature Name	FeatureType		C	0,*
Fixed Date Range	FeatureType		C	0,1
Periodic Date Range	FeatureType		C	0,*
RxN Code	FeatureType		C	0,*
Graphic	FeatureType		C	0,*
Source Indication	FeatureType		C	0,*
Text Content	FeatureType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
facilityOperatingHours	LocationHours	ServiceHours	association	0,1
controlAuthority	ServiceControl (inherited from SupervisedArea)	Authority	association	0,1
theContactDetails	ServiceContact (inherited from OrganizationContactArea)	ContactDetails	association	0,*
permission	PermissionType (inherited from FeatureType)	Applicability	association	0,*
theRxN	AssociatedRxN (inherited from FeatureType)	AbstractRxN	association	0,*
theInformation	AdditionalInformation	NauticalInformation	association	0,*

Information associations				
	(inherited from FeatureType)			

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
infrastructureLocation	Infrastructure (inherited from HarbourPhysicalInfrastructure)	HarbourAreaSection Terminal	association	0,1
theCartographicText	TextAssociation (inherited from FeatureType)	TextPlacement	association	0,1

7.14.1 General

The attribute *interoperabilityIdentifier* should be used to link this feature to the corresponding S-101 features if any.

Limitations on vessels which may be permitted to use the facility can be encoded with an associated **Applicability** information type.

7.14.1.1 Notes on source materials

Ship lifts may be encoded in S-101 ENC datasets as **HarbourFacility** features with *categoryOfHarbourFacility* = 13 (straddle carrier).

7.14.2 Remarks

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

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8 Cartographic Features

8.1 Introduction

This product specification uses the **TextPlacement** cartographic features derived from S-101. The structure of the feature and its usage are the same as in S-101 but the feature specification in S-131 omits elements which are not relevant to marine protected areas, for example, 'light characteristic' is omitted as a listed value for the attribute *textType*.

8.2 Text Placement

IHO Definition: The Text Placement feature is used in association with the Feature Name attribute or a light description to optimize text positioning in ECDIS.				
S-131 Geo Feature: TextPlacement				
Super Type:				
Primitives: point				
Real World	*Paper Chart Symbol*		*ECDIS Symbol*	
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Text Offset Bearing			IN	1,1
Text Offset Distance			IN	1,1
Text Rotation			BO	0,1
Text Type		1: Name	EN	1,2
Scale Minimum			IN	0,1
Inherited Attributes				
S-131Attribute	**Inherited From**		**Type**	**Multiplicity**
No inherited attributes				

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

Feature associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
thePositionProvider	TextAssociation	FeatureType	composition	1,1

8.2.1 General

If it is required to place text to improve clarity and readability of display, it must be done using the cartographic feature Text Placement. In navigationally relevant areas such as shipping channels and dredged areas, where default ECDIS text positioning may cover other features, Data Producers should consider using Text Placement. The Text Placement feature must be associated with the relevant geo feature using the composition Text Association (see clause 15.1).

While the feature associations table above indicates the abstract type FeatureType as the target of feature associations from TextPlacement, the actual association in any TextPlacement instance should be a reverse link to the non-abstract feature type (sub-type of FeatureType at any level) which links to the particular TextPlacement instance.

NOTE: Where an associated instance of Text Placement has not been related to a feature having the attribute name and/or the attributes associated with the characteristics of a feature populated, the text will be positioned in the ECDIS display in accordance with the default position for text strings defined in the Portrayal Catalogue.

8.2.2 Remarks

- The Text Placement cartographic feature is used by the ECDIS to optionally position text in ECDIS, which has been populated using an attribute(s) for the associated feature. The attribute(s) is identified by populating the mandatory attribute text type.
- Where two instances of text type are populated for a Text Placement instance, the feature name and characteristics as derived from the target feature attribution will be vertically aligned in the ECDIS display in accordance with the defined text offset bearing and distance. If it is required to position the feature name and the feature characteristics independently, this must be done by associating two instances of Text Placement, one having text type = 1 (name) and the other having text type = 2 (feature characteristic), to the target feature. Note, however, that independent vertical or horizontal alignment of both the name and the characteristic of a feature is not recommended, as the text will overlap as the Mariner zooms to smaller scales than the optimum display scale for the data.
- The attributes text offset bearing and text offset distance define the bearing (related to true north) and distance of the anchor point of the text, in millimetres in the ECDIS display, to be displayed from the associated feature. The values populated for these attributes must be determined based on the desired position of the text at the optimum display scale of the ENC data. Note that the attribute text offset bearing does not rotate the text itself, but determines the alignment of the anchor point (or justification) for the text location (horizontal (left, centred or right) and vertical (bottom, centre or top)) based on the encoded bearing. Displayed text will always appear horizontal regardless of the display mode set by the mariner (north-up or course-up), unless the Boolean attribute text rotation is set to True.
- The Boolean attribute text rotation, when populated as True, will rotate the text on the ECDIS display to align along the bearing populated for the attribute text offset bearing.
- Data Producers are advised to determine the best positioning for text at the optimum display scale for the data; and based on “north-up” ECDIS display. While text offset bearing, text offset distance and text rotation will position the text at the same location relative to the associated feature at all Mariner’s Selected Viewing Scales, Data Producers are advised that, as the Mariner zooms out to smaller viewing scales, text may unintentionally cover other charted detail. Therefore, as an alternative, Data Producers may experiment with positioning the text so that it clears the majority of other charted features at the smallest scale at which the text is intended to be displayed, and populating the attribute scale minimum accordingly (see bullet below). Data Producers are also advised that optimum results may not be achieved when the Mariner has set the display setting for the ECDIS to screen rotations other than “north-up”. Encoders should also consider the positioning of the name of a feature where the name is encoded in multiple languages, as the name displayed may be of varying character length based on the Mariner’s language settings (see clause 2.7.1).
- The attribute scale minimum (if permitted by the data format) may be used to determine a scale at which the text string is no longer visible in the ECDIS when scale minimum functionality is enabled. Where populated, the value for scale minimum on Text Placement must not be set to a smaller scale value than the value populated for the associated feature.
- Text Placement should normally be associated with features of type point, but may be used for features of type curve and surface.

9 Abstract Information Types

The abstract information types are depicted in Figure 9-1. At the root is the type named **InformationType**, from which all information types except **SpatialQuality** inherit several attributes. This means that any information type in S-131 except **SpatialQuality** can have any of the several attributes in the **InformationType** box. The information types **AbstractRxN** adds attributes and associations inherited by the four types **Regulations**, **Restrictions**, **Recommendations**, and **NauticalInformation**.

The abstract information type hierarchy in S-131 is intentionally harmonised with the abstract hierarchy in other nautical publications Product Specifications.

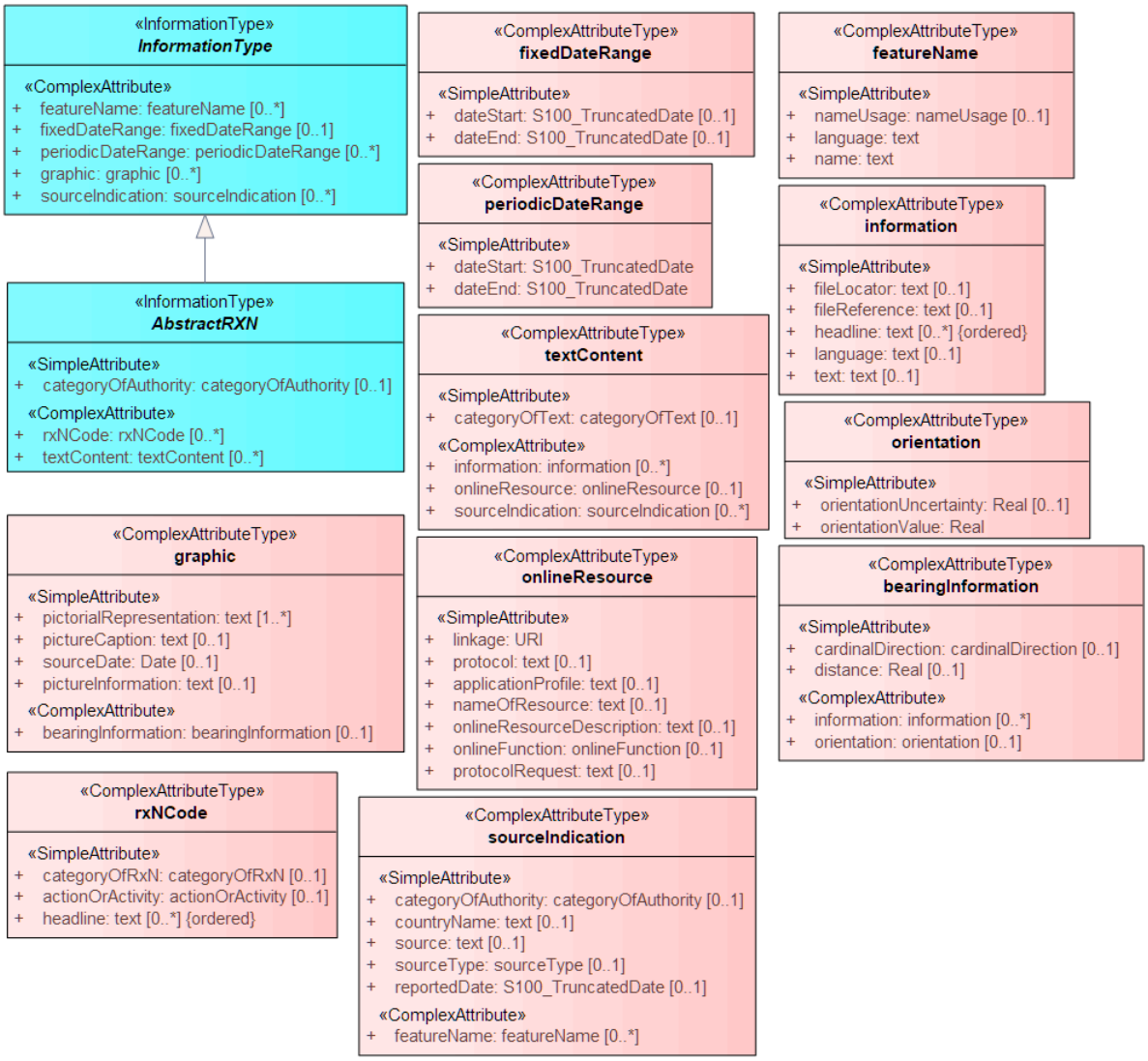

Figure 9-1 — Abstract information types

9.1 Information Type

IHO Definition: Generalized information type which carries all the common attributes.

S-131 Information Type: InformationType (Abstract type)				
Super Type:				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Feature Name			C	0,*
Language			(S) TE	1,1
Name			(S) TE	1,1
Name Usage		1: Default Name Display 2: Alternate Name Display 3: No Chart Display	(S) EN	0,1
Fixed Date Range			C	0,1
Date Start			(S) TD	0,1
Date End			(S) TD	0,1
Periodic Date Range			C	0,*
Date Start			(S) TD	1,1
Date End			(S) TD	1,1
Graphic			C	0,*
Pictorial Representation			(S) TE	1,*
Picture Caption			(S) TE	0,1
Source Date			(S) DA	0,1
Picture Information			(S) TE	0,1
Bearing Information			(S) C	0,1
Source Indication			C	0,*
Category of Authority		2: Border Control 3: Police 4: Port 5: Immigration 6: Health 7: Coast Guard 8: Agricultural 9: Military 10: Private Company 11: Maritime Police 12: Environmental 13: Fishery 14: Finance 15: Maritime 16: Customs	(S) EN	0,1
Country Name			(S) TE	0,1
Source			(S) TE	0,1
Source Type		1: Law or Regulation 2: Official Publication 7: Mariner Report, Confirmed 8: Mariner Report, Not Confirmed 9: Industry Publications and Reports	(S) EN	0,1

		10: Remotely Sensed Images 11: Photographs 12: Products Issued by HO Services 13: News Media 14: Traffic Data		
Reported Date			(S) TD	0,1
Feature Name			(S) C	0,*
Inherited Attributes				
S-131 Attribute	**Inherited From**		**Type**	**Multiplicity**
No inherited attributes				

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

9.1.1 General

Where a complex attribute has all its sub-attributes optional (e.g., multiplicity 0..1 or 0..*), at least one of the sub-attributes must be populated.

The *featureName* attribute of an instance of an information type can be used for a short title that is either a proper name (if such is relevant) or which describes the instance. For example, the *featureName* attribute of an **Authority** information type can be the name of a government agency.

The *featureName* attributes of information types should not duplicate the geographic feature name of an associated feature, but should pertain to the information instance itself.

The *featureName* attribute should be populated only if the value conveys useful information to the end user. Some examples of such situations are:

- providing the name of an organisation, such as the name of an **Authority**.
- distinguishing between instances – if multiple instances of the same information type are associated to the same feature type (or another information type), the different instances may be given descriptive names to make it easier for the mariner to distinguish their content.

Some information instances are associated to multiple features, in which case its name should be general enough to be relevant to all the features.

For example, if naming Regulations instances describing regulations, consider whether (for example) there is a general regulation applicable to all areas in a jurisdiction and an exceptional regulations object associated to a single area or a subset of areas in the jurisdiction. In this situation, the general regulations may be encoded with the name “General regulations for (feature type) Areas” and associated to several features, while a specific feature can also have a specific regulation whose name is “Special regulations for (named area)”.

9.1.2 Remarks

- If the complex attribute *bearingInformation* is present, at least one of its sub-attributes must be populated.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

9.2 AbstractRxN

IHO Definition: An abstract superclass for information types that encode rules, recommendations, and general information in text or graphic form.				
S-131 Information Type: AbstractRxN (Abstract type)				
Super Type: InformationType				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Authority		2: Border Control 3: Police 4: Port 5: Immigration 6: Health 7: Coast Guard 8: Agricultural 9: Military 10: Private Company 11: Maritime Police 12: Environmental 13: Fishery 14: Finance 15: Maritime 16: Customs	EN	0,1
RxN Code			C	0,*
Category of RxN		1: Navigation 2: Communication 3: Environmental Protection 4: Wildlife Protection 5: Security 6: Customs 7: Cargo Operation 8: Refuge 9: Health 10: Natural Resources or Exploitation 11: Port 12: Finance 13: Agriculture	(S) CL	0,1
Action or Activity		1: Navigating With a Pilot 2: Entering Port 3: Leaving Port 4: Berthing 5: Slipping 6: Anchoring 7: Weighing Anchor 8: Transiting 9: Overtaking 10: Reporting 11: Working Cargo 12: Landing 13: Diving 14: Fishing 15: Discharging Overboard 16: Passing 17: Ballast Water Exchange 18: Hull Cleaning 19: Scientific Research 20: Tourism	(S) CL	0,1

		21: Education 22: Infrastructure Maintenance		
Headline			(S) TE	0,* (ordered)
Text Content			C	0,*
Category of Text		1: Abstract or Summary 2: Extract 3: Full Text	(S) EN	0,1
Information			(S) C	0,*
Online Resource			(S) C	0,1
Source Indication			(S) C	0,*
Inherited Attributes				
S-131 Attribute	**Inherited From**		**Type**	**Multiplicity**
Feature Name	InformationType		C	0,*
Fixed Date Range	InformationType		C	0,1
Periodic Date Range	InformationType		C	0,*
Graphic	InformationType		C	0,*
Source Indication	InformationType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
isApplicableTo	InclusionType	Applicability	association	0,*
theOrganisation	RelatedOrganisation	Authority	association	0,*

9.2.1 General

AbstractRxN is the supertype of the four types intended primarily for encoding information from regulatory or other text sources. The attributes *categoryOfRxN* and *actionOrActivity* should be encoded wherever possible in order to allow software to classify the content according to the type of regulation (*categoryOfRxN*) and its effects on common maritime activities by both commercial and recreational vessels.

The complex attribute *rxNCode* can be used to classify regulations (or recommendations, etc.) according to their principal subject (sub-attribute categoryOfRxN) and the type of vessel activity affected (sub-attribute actionOrActivity), as well as provide a sequence of brief topic headings (sub-attribute headline). The *rxNCode* attribute is intended to be used to allow mariners to obtain information relevant to particular subjects or to particular kinds of vessel operations.

- As an abstract type, instances of **AbstractRxN** cannot be directly encoded in datasets. However, the encoding instructions for this type apply to all its sub-types unless explicitly overriden in the encoding instructions for any particular sub-type.

9.2.2 Remarks

- At least one of the attributes *textContent* and *graphic* must be populated. Populating both is permitted.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.

  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.

- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

10 Textual Regulations

10.1 Introduction

The information types **Regulations**, **Restrictions**, **Recommendations**, and **NauticalInformation** all inherit the attributes of their immediate abstract superclass **AbstractRxN**, which provides attributes *textContent* and *graphic* for textual and pictorial material respectively. The sub-attributes of its complex attribute *rxnCode* allow optional classification of the material encoded in *textContent* or *graphic* according to the type of material and the kind of nautical activity affected by it. The classifications in *rxNCode* sub-attributes *categoryOfRxN* and *actionOrActivity* are intended to facilitate software queries for information, while the sub-attribute *headline* provides additional topic headings for subject matter.

These four information types also inherit the attributes of abstract superclass InformationType, which allows encoding of the effective and expiry dates, if any, and the source of information , if it is necessary to encode that data.

The content of the regulation (recommendation, etc.) should be encoded in the *textContent* attribute, which is also inherited from the abstract superclass **InformationType**. It may be encoded inline (*textContent.information.text*) or in an external file (*textContent.information.fileReference*) depending on its length, on whether it is unique to the feature instance, and on whether the producer decides to include a support file containing multiple sections referenced from different places in the dataset. (See also clauses 2.4.8 and 2.4.9 for general guidance on encoding textual information.)

These four information types are intended primarily for encoding textual information, such as that which derives from textual source material such as port handbooks, national or local laws or official publications.

The four types for textual information are depicted in Figure 10-1

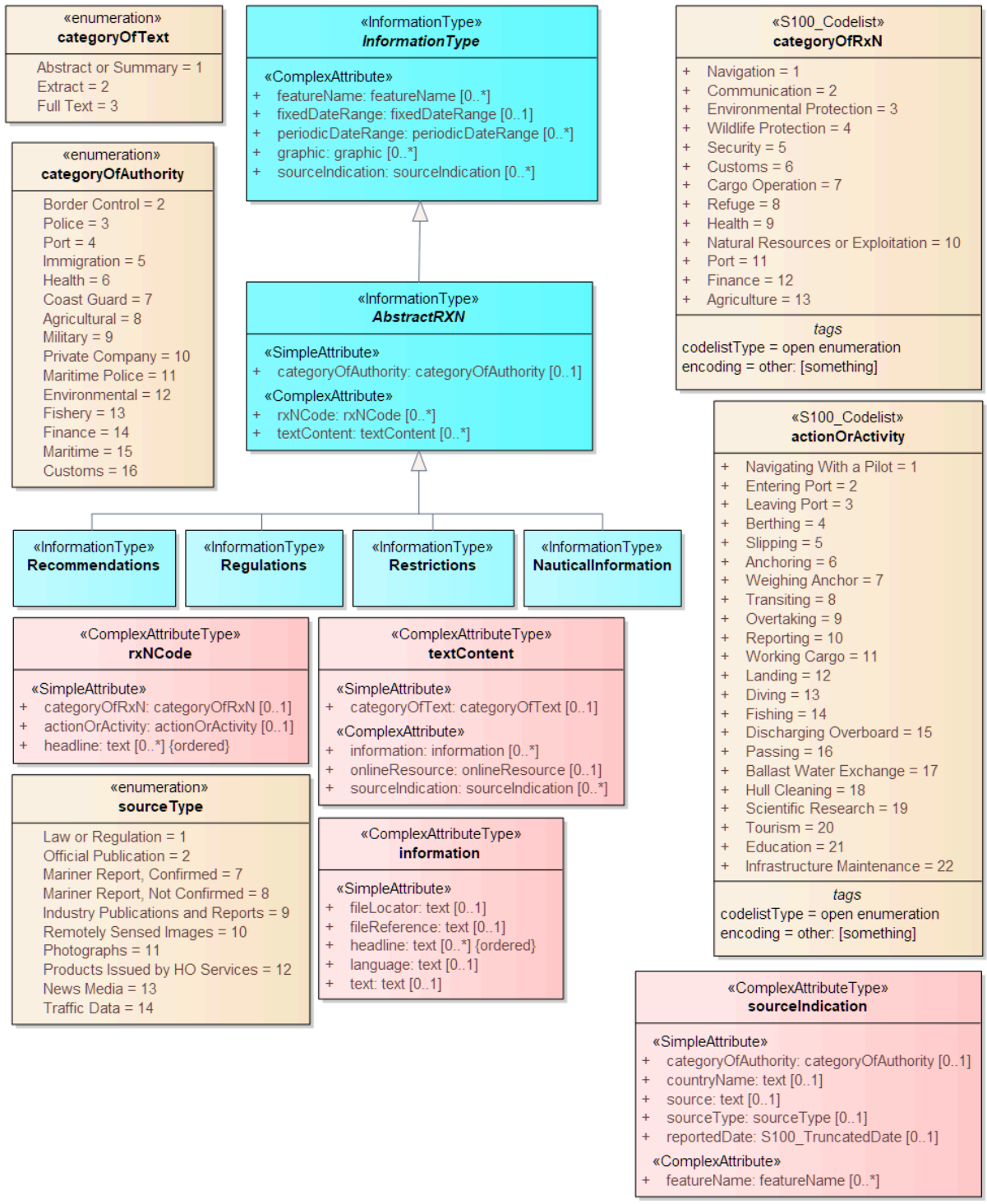

Figure 10-1 — Types for textual information concerning regulations, etc.

Where possible, these types should be classified using the *categoryOfRxN* and *actionOrActivity* codelists in the rxnCode complex attribute. Being open enumeration codelists, they allow for additional categories not listed among their standard values. For example, an “under repair” activity might be encoded in the

actionOrActivity attribute (as “other: underRepair”, following the syntax rule for encoding “extra” values in open enumerations[2]).

Producers should note that such extra values will merely be displayed and not processed (for example, the user interface will not use extra values to choose symbols or filter instances of Regulations[3], whereas it may apply filters to the standard values and/or them in portrayal).

10.2 Regulations, etc., for specific locations

All geo features may have an association to any of **Regulations** or its sibling information types. This association is **AssociatedRxN** and it is inherited from the root feature type **FeatureType**.

If it is necessary to identify an authority or organization related to a particular regulation (restriction, etc.) object, this may be done using the **RelatedOrganisation** association between **Regulations**, etc., and an **Authority** object.

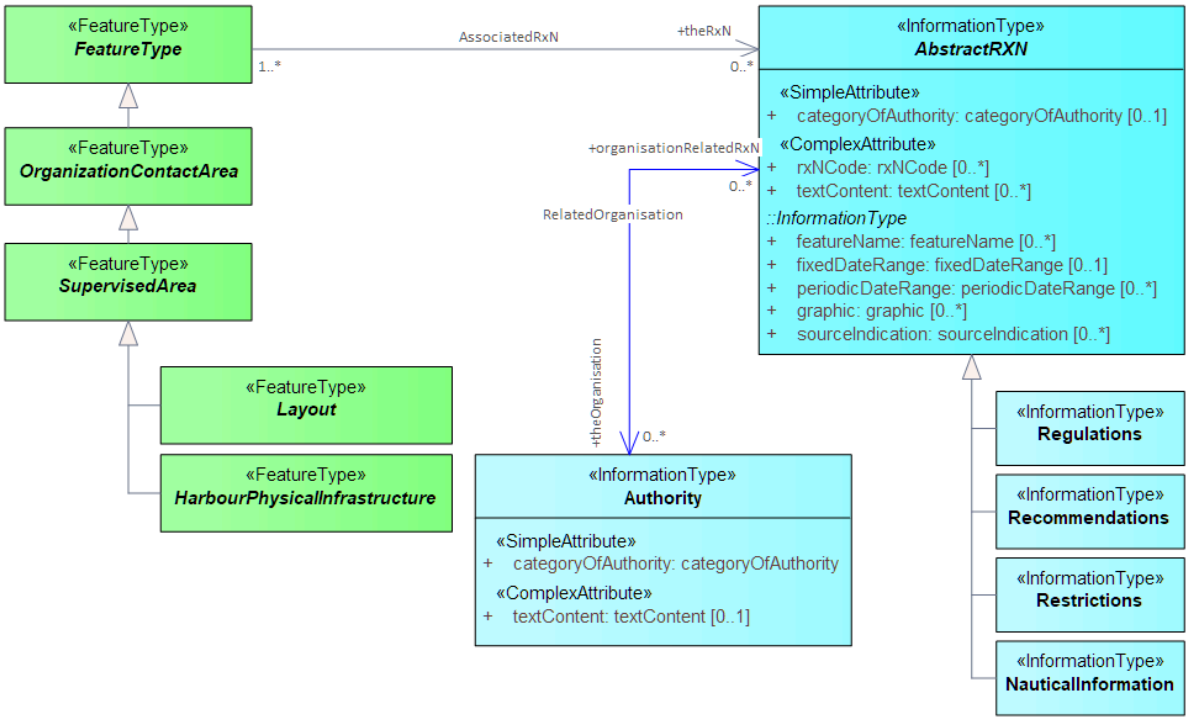

Figure 10-2 — Regulations, etc., for geo features

10.3 Regulations applying only to vessels with specific characteristics or cargoes

Regulations applying only to vessels of specified types, exceeding specified dimensions, or carrying specified cargoes (or other limitations which apply only to subsets of vessels) are encoded by defining the subset of vessels using an **Applicability** instance and associating the **Regulations** object to that **Applicability**.

For information on the use of **Applicability** to define subsets of vessels, see clause 12 in this DCEG and clause 4 in the main PS.

[2] S-100 3-6.7 specifies the format as “The word ‘other’ followed by a colon and a single space character (that is ‘other: ’ without quotes), followed by one or more alphanumeric strings separated by single spaces.”

[3] In the interest of brevity, “Regulations” in this sub-clause stands for any one of the four types described by this section.

10.4 Regulations

IHO Definition: Regulations for a related area or facility.				
S-131 Information Type: Regulations (Abstract type)				
Super Type: AbstractRxN				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Inherited Attributes				
S-131 Attribute	**Inherited From**		**Type**	**Multiplicity**
Category of Authority	AbstractRxN		EN	0,1
RxN Code	AbstractRxN		C	0,*
Text Content	AbstractRxN		C	0,*
Feature Name	InformationType		C	0,*
Fixed Date Range	InformationType		C	0,1
Periodic Date Range	InformationType		C	0,*
Graphic	InformationType		C	0,*
Source Indication	InformationType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
isApplicableTo	InclusionType (inherited from AbstractRxN)	Applicability	association	0,*
theOrganisation	RelatedOrganisation (inherited from AbstractRxN)	Authority	association	0,*

10.4.1 General

Regulations is intended to be used for official rules, laws, and similar source material, i.e., sources that have the force of law or are mandated by a controlling authority. They will generally originate from some kind of administration or authority, including port authorities.

A single instance of **Regulations** can be referenced by multiple feature instances.

10.4.2 Remarks

- Instances of **Regulations** do not encode a reverse link to the geographic features which reference them. While an association from geographic feature to information type can be encoded in the geographic feature instance, the reverse association from the information type to the geographic feature is omitted from the information type instance.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - — If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

10.5 Restrictions

IHO Definition: Restrictions for a related area or facility.				
S-131 Information Type: Restrictions (Abstract type)				
Super Type: AbstractRxN				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Inherited Attributes				
S-131 Attribute	**Inherited From**		**Type**	**Multiplicity**
Category of Authority	AbstractRxN		EN	0,1
RxN Code	AbstractRxN		C	0,*
Text Content	AbstractRxN		C	0,*
Feature Name	InformationType		C	0,*
Fixed Date Range	InformationType		C	0,1
Periodic Date Range	InformationType		C	0,*
Graphic	InformationType		C	0,*
Source Indication	InformationType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
isApplicableTo	InclusionType (inherited from AbstractRxN)	Applicability	association	0,*
theOrganisation	RelatedOrganisation (inherited from AbstractRxN)	Authority	association	0,*

10.5.1 General

Restrictions is intended for restrictions that constrain the activities of vessels temporarily with or without the legal force, or for longer terms without the force of law; they may be issued by a local authority such as a port captain or US Coast Guard district.

A single instance of **Restrictions** can be referenced by multiple feature instances.

Modelling of restrictions where the default is all activities are prohibited and only exceptions are listed should be done as follows:

- Create **Restrictions**.*textContent.information.text* = “All activities except those specifically permitted” (**Regulations** instead of **Restrictions** also works)
- Assign **Restrictions**.*textContent.information.headline* = “Prohibited Activities”
- Associate it to the feature via an **AssociatedRxN**
- If it applies only to some kinds of vessels, also create an **Applicability** and associate it to the **Restrictions**.
- Create a **Regulations** object with *rxnCode.actionOrActivity* listing the permitted activities and *rxnCode.headline* = “Permitted Activities” and link it to the feature with an **AssociatedRxN** (and link it to the same **Applicability** if defined)

10.5.2 Remarks

- Instances of Restrictions do not encode a reverse link to the geographic features which reference them. While an association from geographic feature to information type can be encoded in the

geographic feature instance, the reverse association from the information type to the geographic feature is omitted from the information type instance.

- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

10.6 Recommendations

IHO Definition: Recommendations for a related area or facility.				
S-131 Information Type: Recommendations (Abstract type)				
Super Type: AbstractRxN				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Inherited Attributes				
S-131 Attribute	**Inherited From**		**Type**	**Multiplicity**
Category of Authority	AbstractRxN		EN	0,1
RxN Code	AbstractRxN		C	0,*
Text Content	AbstractRxN		C	0,*
Feature Name	InformationType		C	0,*
Fixed Date Range	InformationType		C	0,1
Periodic Date Range	InformationType		C	0,*
Graphic	InformationType		C	0,*
Source Indication	InformationType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
isApplicableTo	InclusionType (inherited from AbstractRxN)	Applicability	association	0,*
theOrganisation	RelatedOrganisation (inherited from AbstractRxN)	Authority	association	0,*

10.6.1 General

Recommendations is intended for encoding suggestions, limitations, or preferred procedures that are not mandatory.

For example, a recommendation for approaching a particular berth at a given orientation may be encoded in a Recommendations object associated to the Berth feature with an **AssociatedRxN** association from the Berth to the **Recommendations** object. If it is a port rule rather than a recommendation, it should be encoded as a **Restrictions** or **Regulations** object instead, with the same association from the Berth feature.

A single instance of **Recommendations** can be referenced by multiple feature instances.

10.6.2 Remarks

- Instances of **Recommendations** do not encode a reverse link to the geographic features which reference them. While an association from geographic feature to information type can be encoded in the geographic feature instance, the reverse association from the information type to the geographic feature is omitted from the information type instance.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

10.7 Nautical Information

IHO Definition: Nautical information about a related area or facility.				
S-131 Information Type: NauticalInformation (Abstract type)				
Super Type: AbstractRxN				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Inherited Attributes				
S-131 Attribute	**Inherited From**		**Type**	**Multiplicity**
Category of Authority	AbstractRxN		EN	0,1
RxN Code	AbstractRxN		C	0,*
Text Content	AbstractRxN		C	0,*
Feature Name	InformationType		C	0,*
Fixed Date Range	InformationType		C	0,1
Periodic Date Range	InformationType		C	0,*
Graphic	InformationType		C	0,*
Source Indication	InformationType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
isApplicableTo	InclusionType (inherited from AbstractRxN)	Applicability	association	0,*
theOrganisation	RelatedOrganisation (inherited from AbstractRxN)	Authority	association	0,*

10.7.1 General

NauticalInformation is intended for material that is largely informative in nature, of which does not fit into the category of regulation, recommendation, or restriction.

A single instance of **NauticalInformation** can be referenced by multiple feature instances.

10.7.2 Remarks

- Instances of **NauticalInformation** do not encode a reverse link to the geographic features which reference them. While an association from geographic feature to information type can be encoded in the geographic feature instance, the reverse association from the information type to the geographic feature is omitted from the information type instance.
- In theory, **NauticalInformation** can be associated with any geographic feature through either an **AdditionalInformation** or **AssociatedRxN** association. **AdditionalInformation** should be used only when the information encoded in **NauticalInformation** is general in nature and does not supplement information encoded in a **Regulations**, Restrictions*, or **Recommendations** object associated to the same feature.
- If the complex attribute *rxNCode* is present at least one of its sub-attributes must be populated.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

11 Services, Organisations and Schedules

11.1 Introduction

Information about the services available in specific areas is modelled by means of an information association from the feature to the **AvailablePortServices** information type. This relationship is depicted in Figure 11-1. This type contains attributes for encoding various types of services, in the form of enumeration attributes, details of which are provided in clause Clause 11.8.

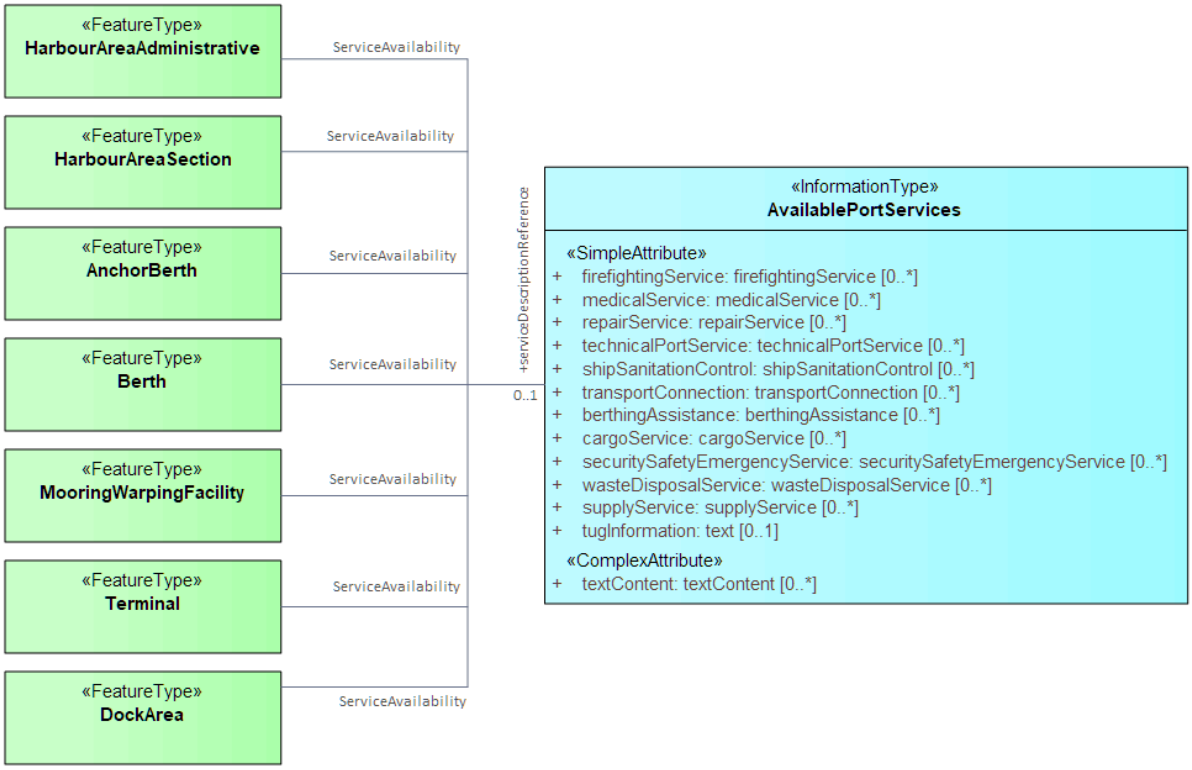

Figure 11-1 — Port Services

11.2 Work schedules and holidays

Operating schedules and business hours of organizations are encoded by associating a **ServiceHours** instance to an **Authority**. Partial work schedules on holidays or other special days are encoded by associating a **NonstandardWorkingDay** instance to the **ServiceHours** instance.

Similarly, operating schedules for a facility are encoded by associating a **ServiceHours** to the geo feature representing the facility, and associating a **NonstandardWorkingDay** to the **ServiceHours** to encode partial working days. The types and associations are depicted in Figure 11-2 (note that this figure does not show inherited attributes, which are also available to the encoder).

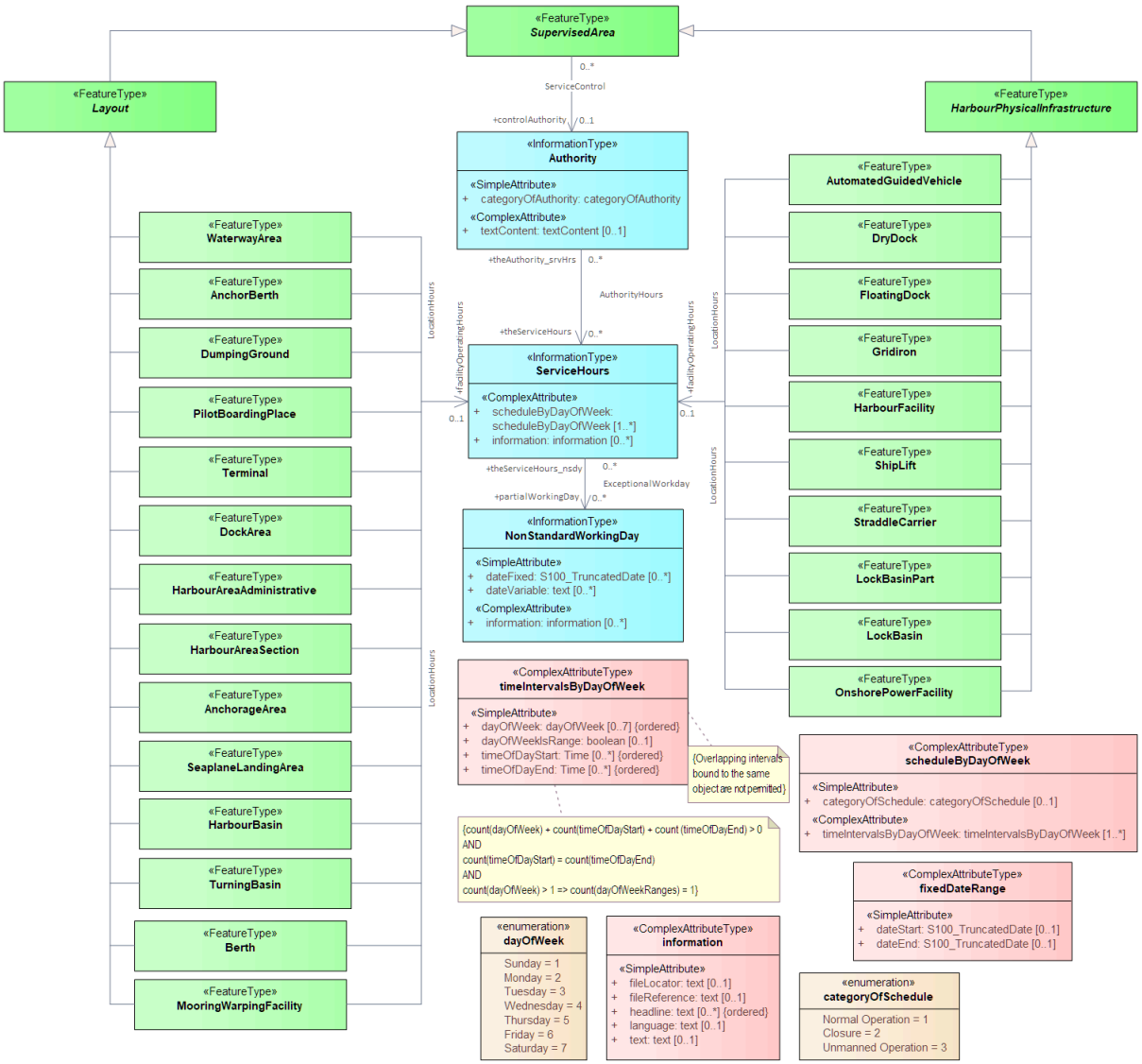

Figure 11-2 — Operating schedules

For further guidance and examples, see clause 2.4.10.4.

11.3 Contact information

Contact information for service operators, controllers or facilities should be encoded in instances of the **ContactDetails** information type, which may be linked from multiple instances of geographic features or information types. Any S-131 geographic feature except meta and cartographic features can be associated to an instance of ContactDetails. S-131 geographic features inherit the association to **ContactDetails** from the abstract feature type **OrganizationContactArea**, as shown in Figure 11-3 (note that this figure does not show inherited attributes, which are also available to the encoder).

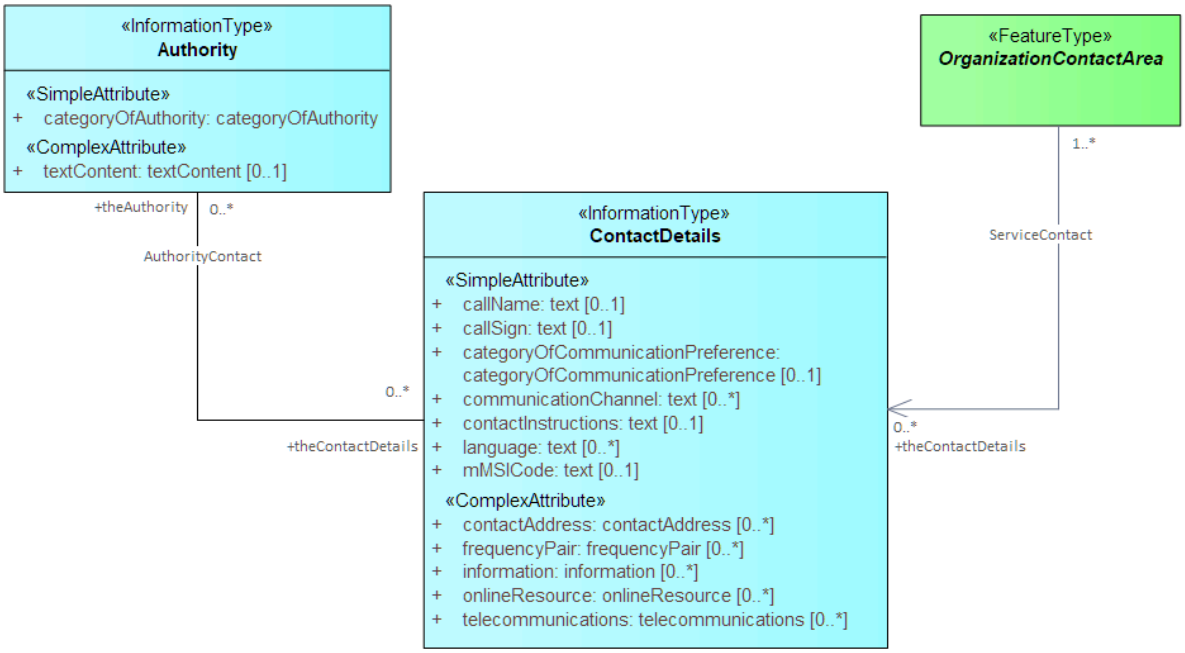

Figure 11-3 — Associations to contact information

Contact information must not be encoded directly in the feature or information type instance using a *textContent* or *information* complex attribute bound directly to the feature or information type. An instance of **ContactDetails** must be created instead. The exception to this rule is when contact-related attributes such as *communicationChannel* are bound to the feature or information type, in which case a **ContactDetails** instance should be created only if it is necessary to provide contact information which cannot be coded in the contact-specific attributes bound to the feature.

11.4 Authority

IHO Definition: A person or organisation having political or administrative power and control.				
S-131 Information Type: Authority (Abstract type)				
Super Type: InformationType				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of Authority		2: Border Control 3: Police 4: Port 5: Immigration 6: Health 7: Coast Guard 8: Agricultural 9: Military 10: Private Company 11: Maritime Police 12: Environmental 13: Fishery 14: Finance 15: Maritime 16: Customs	EN	1,1
Text Content			C	0,1
Category of Text		1: Abstract or Summary 2: Extract 3: Full Text	(S) EN	0,1

Information			(S) C	0,*
Online Resource			(S) C	0,1
Source Indication			(S) C	0,*
Inherited Attributes				
S-131 Attribute	**Inherited From**		**Type**	**Multiplicity**
Feature Name	InformationType		C	0,*
Fixed Date Range	InformationType		C	0,1
Periodic Date Range	InformationType		C	0,*
Graphic	InformationType		C	0,*
Source Indication	InformationType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
theContactDetails	AuthorityContact	ContactDetails	association	0,*
organisationRelatedRxN	RelatedOrganisation	AbstractRxN	association	0,*
theServiceHours	AuthorityHours	ServiceHours	association	0,*

11.4.1 General

The **Authority** information type is used for encoding information about organizations, including official authorities (port and other) as well as private organizations which control or operate port facilities.

For encoding the contact details for an organization, use an associated **ContactDetails** information type (see the information associations table below).

For encoding the general operating hours of an organization, use an associated **ServiceHours** information type (see clause 4 in the main Product Specification).

For encoding the supervisory or operating organization for a facility or area, use an information association from the geo feature to **Authority** (see clause Clause 5.4 (Supervised Area) and clause 4 in the main Product Specification).

11.4.2 Remarks

- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - — If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

11.5 Contact Details

IHO Definition: Information on how to reach a person or organisation by postal, internet, telephone, telex and radio systems.

S-131 Information Type: ContactDetails (Abstract type)				
Super Type: InformationType				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Call Name			TE	0,1
Call Sign			TE	0,1
Category of Communication Preference		1: Preferred Calling 2: Alternate Calling 3: Preferred Working 4: Alternate Working	EN	0,1
Communication Channel			TE	0,*
Contact Instructions			TE	0,1
Language			TE	0,*
MMSI Code			TE	0,1
Contact Address			C	0,*
Delivery Point			(S) TE	0,* (ordered)
City Name			(S) TE	0,1
Administrative Division			(S) TE	0,1
Country Name			(S) TE	0,1
Postal Code			(S) TE	0,1
Frequency Pair			C	0,*
Frequency Shore Station Receives			(S) IN	0,1
Frequency Shore Station Transmits			(S) IN	1,1
Information			C	0,*
File Locator			(S) TE	0,1
File Reference			(S) TE	0,1
Headline			(S) TE	0,* (ordered)
Language			(S) TE	0,1
Text			(S) TE	0,1
Online Resource			C	0,*
Linkage			(S) URI	1,1
Protocol			(S) TE	0,1
Application Profile			(S) TE	0,1
Name of Resource			(S) TE	0,1
Online Resource Description			(S) TE	0,1
Online Function		1: Download	(S) EN	0,1

		3: Offline Access 4: Order 5: Search 6: Complete Metadata 7: Browse Graphic 8: Upload 9: Email Service 10: Browsing 11: File Access		
Protocol Request			(S) TE	0,1
Telecommunications			C	0,*
Category of Communication Preference		1: Preferred Calling 2: Alternate Calling 3: Preferred Working 4: Alternate Working	(S) EN	0,1
Telecommunication Identifier			(S) TE	1,1
Telecommunication Carrier			(S) TE	0,1
Contact Instructions			(S) TE	0,1
Telecommunication Service		1: Voice 2: Facsimile 3: SMS 4: Data 5: Streamed Data 6: Telex 7: Telegraph 8: Email	(S) EN	0,*
Inherited Attributes				
S-131 Attribute	**Inherited From**		**Type**	**Multiplicity**
Feature Name	InformationType		C	0,*
Fixed Date Range	InformationType		C	0,1
Periodic Date Range	InformationType		C	0,*
Graphic	InformationType		C	0,*
Source Indication	InformationType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
theAuthority	AuthorityContact	Authority	association	0,*

11.5.1 General

The **ContactDetails** information type provides several attributes for encoding different types of contact details.

ContactDetails may be associated to:

- An **Authority** information type via an information association (**AuthorityContact**), in which case it encodes the contact information for the organization in general.
- A geo feature via a feature association **ServiceContact**, inherited by geo features from **OrganizationContactArea** (5.3), in which case it encodes contact information particular to the

specific feature, either because further information about the controlling authority is not available or because the contact is specific to the feature.

A single instance of **ContactDetails** may be referenced from multiple feature or information type instances.

11.5.2 Remarks

- If it is required to encode different call name, call sign, communication preference or contact instructions in different languages, this must be done by creating and associating a different instance of ContactDetails per language. The *language* attribute must be used to designate the language(s) of each instance. If there is no difference in these attributes for different languages, a singe instance of **ContactDetails** should be created and all the languages indicated using *language* attributes.
- For attributes which allow multiplicity > 1 (*contactAddress*, *frequencyPair*, *information*, *onlineResource*, and *telecommunications*), information that is different for different languages may be encoded using different attribute instances taking care to indicate the language in each attribute instance. Where there is no language sub-attribute, use another appropriate sub-attribute (for example, *contactInstructions* or *onlineResourceDescription*) to indicate the language.
- The name of the contact (for example, the name of the agency, pilot service, office, etc.) should be encoded in the *featureName* attribute, which is inherited from **InformationType**.
- Reverse links from **ContactDetails** to a geo feature referencing it are not encoded, since S-100 feature catalogues does not provide information-to-feature bindings.
- If the complex attribute *contactAddress* is present at least one of its sub-attributes must be populated.
- If the complex attribute *information* is present at least one of its sub-attributes must be populated.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

11.6 Service Hours

IHO Definition: The time when a service is available and known exceptions.				
S-131 Information Type: ServiceHours (Abstract type)				
Super Type: InformationType				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Schedule by Day of Week			C	1,*
Category of Schedule		1: Normal Operation 2: Closure 3: Unmanned Operation	(S) EN	0,1
Text			(S) TE	0,1
Time Intervals by Day of Week			(S) C	1,*
Information			C	0,*
File Locator			(S) TE	0,1
File Reference			(S) TE	0,1
Headline			(S) TE	0,* (ordered)
Language			(S) TE	0,1
Text			(S) TE	0,1

Inherited Attributes			
S-131 Attribute	**Inherited From**	**Type**	**Multiplicity**
Feature Name	InformationType	C	0,*
Fixed Date Range	InformationType	C	0,1
Periodic Date Range	InformationType	C	0,*
Graphic	InformationType	C	0,*
Source Indication	InformationType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
partialWorkingDay	ExceptionalWorkday	NonStandardWorkingDay	association	0,*
theAuthority_srvHrs	AuthorityHours	Authority	association	0,*

11.6.1 General

See clause 2.4.10.4 for more information on how to use **ServiceHours** to encode schedules.

Seasonal variations in service hours can be encoded using multiple **ServiceHours** instances with appropriate *periodicDateRange* values.

11.6.2 Remarks

- If none of the listed values of *categoryOfSchedule* applies, *categoryOfSchedule* must be omitted and its co-sub-attribute *text* used to describe the nature of the schedule.
- If the complex attribute *information* is present at least one of its sub-attributes must be populated.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

11.7 Non-Standard Working Day

IHO Definition: Days when many services are not available. Often days of festivity or recreation or public holidays when normal working hours are limited, especially a national or religious festival, etc.				
S-131 Information Type: NonStandardWorkingDay (Abstract type)				
Super Type: InformationType				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Date Fixed			TD	0,*
Date Variable			TE	0,*
Information			C	0,*
File Locator			(S) TE	0,1
File Reference			(S) TE	0,1
Headline			(S) TE	0,* (ordered)

Language			(S) TE	0,1
Text			(S) TE	0,1
Inherited Attributes				
S-131 Attribute	**Inherited From**		**Type**	**Multiplicity**
Feature Name	InformationType		C	0,*
Fixed Date Range	InformationType		C	0,1
Periodic Date Range	InformationType		C	0,*
Graphic	InformationType		C	0,*
Source Indication	InformationType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

11.7.1 General

An instance of **NonStandardWorkingDay** is used in conjunction with **ServiceHours** to indicate exceptions to normal work or operating schedules.

11.7.2 Remarks

- Non-standard workdays which cannot be represented using fixed or variable dates should be encoded using the information complex attribute, preferably as a short description in the text sub-attribute of information. The information attribute can also be used for encoding any additional explanatory information if the explanation is essential knowledge for specifying the day.
- The two date range attributes (fixed and periodic date range) should be used if the non-standard day applies only in specific years or periods (e.g., seasonally).
- If the complex attribute *information* is present at least one of its sub-attributes must be populated.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

11.8 Available Port Services

IHO Definition: Services that are available for a given port.				
S-131 Information Type: AvailablePortServices (Abstract type)				
Super Type: InformationType				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Firefighting Service		1: Shore-Based Firefighting 2: Onboard Firefighting 3: Firefighting Boat	EN	0,*
Medical Service		1: Ambulance 2: Fumigation 3: Doctor 4: Quarantine 5: Vaccination Centre	EN	0,*
Repair Service		1: Compensation of Magnetic Compass	EN	0,*

		2: Diver Service 3: Bridge Equipment Repair 4: Engine Repair 5: Electronic Equipment Repair 6: Hull Repair 7: Navigational Equipment Repair 8: Propeller Repair 9: Salvage Gear Repair 10: Shaft Repair		
Technical Port Service		1: Compensation of Magnetic Compass 2: Degaussing 3: Cargo Surveying 4: Vetting	EN	0,*
Ship Sanitation Control		1: Sanitation Measures Only 2: Issue SSCC 3: Issue SSCEC	EN	0,*
Transport Connection		2: Heliport 3: Helipad 4: Hired Boat 5: Bus Station 6: Ferry 8: Motorway 9: Launch 11: Inland Waterway Transport 12: Short Sea Transportation 13: Marine Highway	CL	0,*
Berthing Assistance		1: Berthing Information 2: Line Personnel 3: Mooring Boat 4: Mule 5: Tugboat 6: Icebreaking Ship	EN	0,*
Cargo Service		1: Stevedoring 2: Cargo Surveying 3: Cargo Lashing 4: Draught Survey	EN	0,*
Security-Safety-Emergency Service		1: Coast Guard 2: Customs 3: Environmental Emergency Information Centre 4: Emergency Coordination Centre 5: Guard and/or Security Service 6: Immigration 7: Police 8: Sea Rescue Control	CL	0,*
Waste Disposal Service		1: MARPOL Annex I Oily Bilge Water 2: MARPOL Annex I Oily Residues 3: MARPOL Annex I Oily Tank Washings 4: MARPOL Annex I Dirty Ballast Water 5: MARPOL Annex I Scale and Sludge from Tank Cleaning 6: MARPOL Annex I Other Oily Waste 7: MARPOL Annex II Category X 8: MARPOL Annex II Category Y 9: MARPOL Annex II Category Z 10: MARPOL Annex II Category OS 11: MARPOL Annex IV Sewage 12: MARPOL Annex V Plastics 13: MARPOL Annex V Food Wastes 14: MARPOL Annex V Domestic Wastes 15: MARPOL Annex V Cooking Oil	EN	0,*

		16: MARPOL Annex V Incinerator Ashes 17: MARPOL Annex V Operational Wastes 18: MARPOL Annex V Animal Carcasses 19: MARPOL Annex V Fishing Gear 20: MARPOL Annex V E-Waste 21: MARPOL Annex V Cargo Residues — non-HME 22: MARPOL Annex V Cargo Residues — HME 23: MARPOL Annex VI Ozone-Depleting Substances 24: MARPOL Annex VI Exhaust Gas-Cleaning Residues		
Supply Service		1: Shore Power 2: Fuel Oil Bunkering 3: LNG Bunkering 4: Lubricants 5: Steam 6: Potable Water 7: International Shore Connection 8: Provisions 9: Chandler 10: Mechanics Workshop	EN	0,*
Tug Information			TE	0,1
Text Content			C	0,*
Category of Text		1: Abstract or Summary 2: Extract 3: Full Text	(S) EN	0,1
Information			(S) C	0,*
Online Resource			(S) C	0,1
Source Indication			(S) C	0,*

Inherited Attributes			
S-131 Attribute	**Inherited From**	**Type**	**Multiplicity**
Feature Name	InformationType	C	0,*
Fixed Date Range	InformationType	C	0,1
Periodic Date Range	InformationType	C	0,*
Graphic	InformationType	C	0,*
Source Indication	InformationType	C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

11.8.1 General

AvailablePortServices may be used to either describe port services at specific kinds of locations in harbours (see Figure 11-1).

11.8.2 Remarks

- At least one of the attributes of **AvailablePortServices** must be populated.

- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

12 Limitations

12.1 Introduction

Certain regulations, recommendations, etc., apply only to vessels of specified dimensions, types, or carrying specified cargo, etc. Similarly, certain features have specific significance for vessels of specified dimensions (e.g., different speed limits for vessels carrying specified cargoes or exceeding specified dimensions, or entry prohibitions for certain vessel types).

12.2 Defining subsets of vessels by dimensions, cargo, and other characteristics

This is modelled by first defining the relevant subset of vessels according to the dimension, type, cargo, etc., and then associating that subset to the appropriate feature or information type. The subset of vessels is modelled using the **Applicability** class, which contains attributes for the most common vessel characteristics used in nautical publications. These include measurements (length, beam, draught), type of cargo, displacement, etc. Constraints which cannot be modelled using the attributes of **Applicability** can be described in plain text in its information attribute.

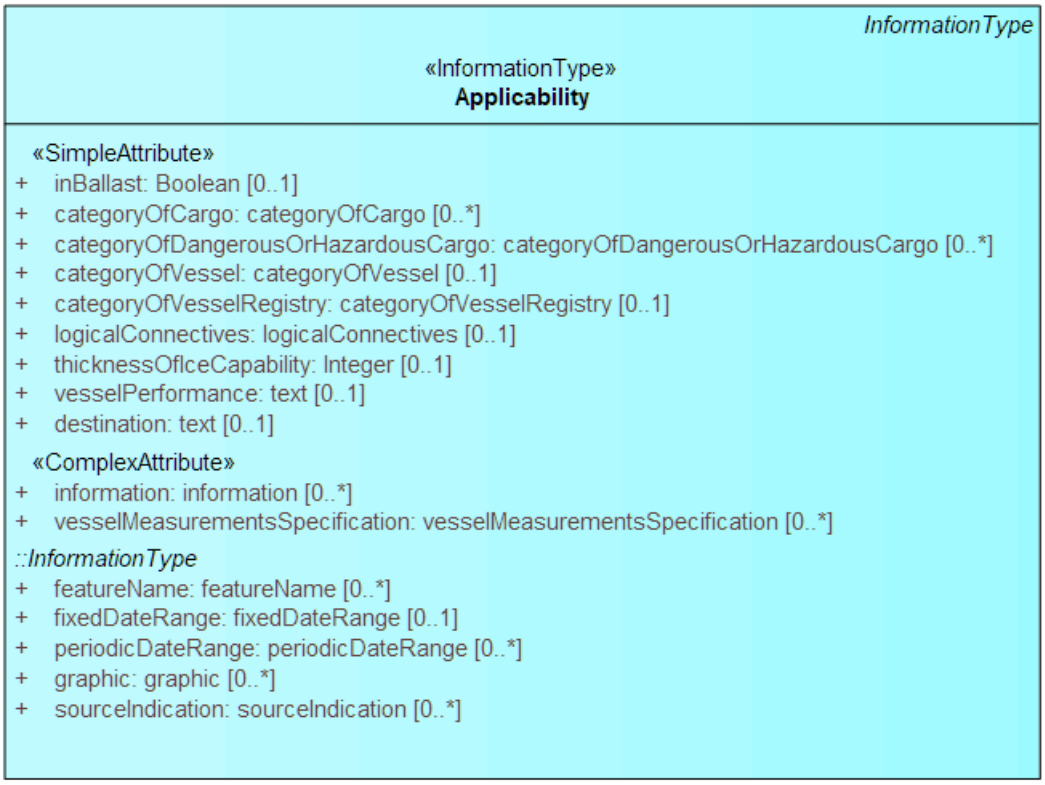

Figure 12-1 — Characteristics and dimensions defining sets of vessels

Conditions relating to vessel dimensions are modelled by the complex attribute *vesselMeasurementsSpecification*, which has sub-attributes for naming the dimension and indicating the limit (whether the condition applies to a vessel which exceeds or falls below the limit).

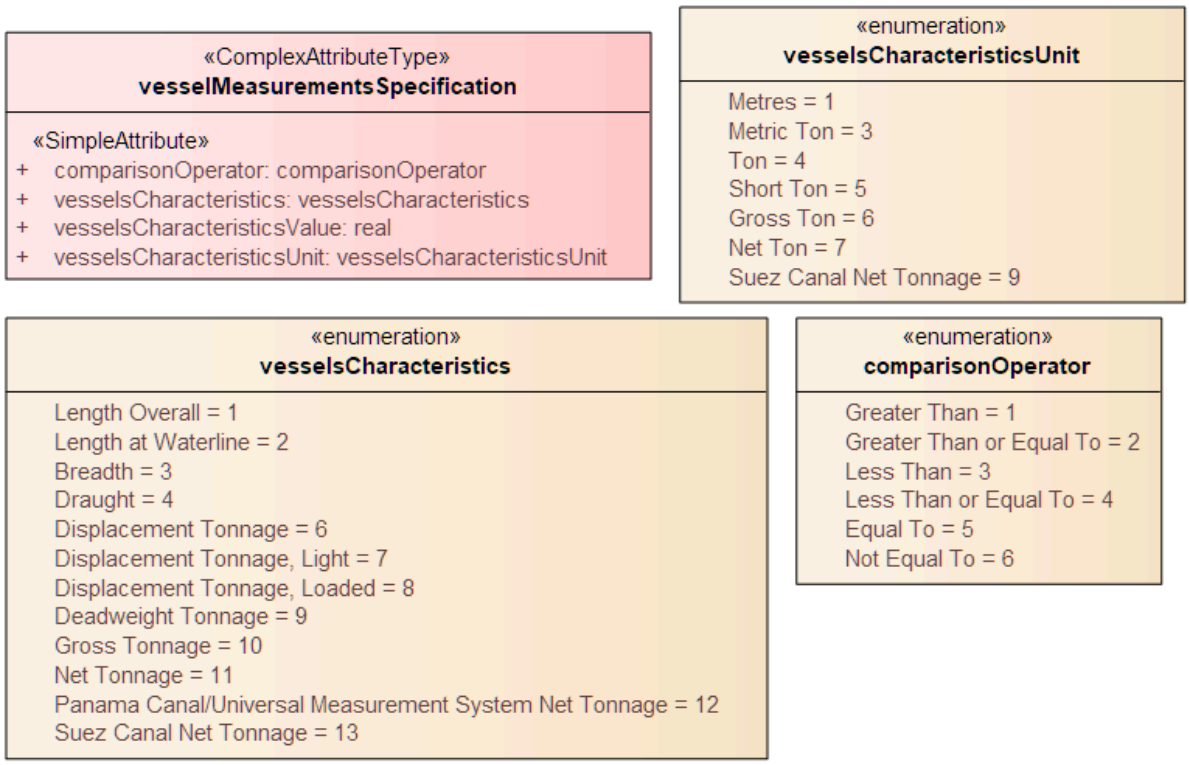

Figure 12-2 — Attributes for specifying vessel dimensions

For example, the combinations in Table 12-1 below describe the conditions “length overall > 50 m” (Condition 1); “length overall < 90 m” (Condition 2); and “breadth > 20 m” (Condition 3).

Table 12-1 — Examples of conditions based on vessel dimensions

Attribute	Condition 1	Condition 2	Condition 3
vesselsCharacteristics	length overall	length overall	breadth
comparisonOperator	greater than	less than	greater than
vesselsCharacteristicsValue	50	90	20
vesselsCharacteristicsUnit	metre	metre	metre

The *logicalConnectives* attribute of **Applicability** is used to indicate how multiple conditions are combined. Combinations may be cumulative (conjunctive, AND) or alternatives (disjunctive, OR).

EXAMPLE 1: Encoding *logicalConnectives=AND* combined with Conditions 1 and 2 above describes a vessel of length between 50 and 90 metres.

EXAMPLE 2: Encoding *logicalConnectives=OR* combined with Conditions 1 and 3 describes a vessel of length greater than 50 metres or beam greater than 20 metres.

This modelling cannot represent subsets defined by both AND and OR combinations, but it is always possible to convert such complex conditions into multiple combinations each using only AND (‘conjunctive normal form’) or OR (‘disjunctive normal form’), and model the subset using more than one **Applicability** object.

12.3 Characterizing the relationship between the vessel set and the feature or regulation

The relationship between a set of vessels and a geographic feature may be one of several different mandate levels ranging from prohibition on use of entry into a geographic location to mandatory use of a feature (such as vessels exceeding certain dimensions being required to board pilots at an outer boarding place).

The relationship between a set of vessels and a regulation information type (or recommendation, restriction, or special note) may be one of inclusion or specific exclusion — either the regulation (recommendation, etc.) specifically applies to the specified set of vessels, or the specified set of vessels is explicitly excluded from the regulation. (If a regulation does not apply to a set of vessels but there is no explicit exemption stated in the source material, there is no relationship that needs to be encoded.)

The association classes **PermissionType** and **InclusionType** (Figures 12-3 and 12-4) characterize these relationships using values of their attributes *categoryOfRelationship* and *membership* respectively.

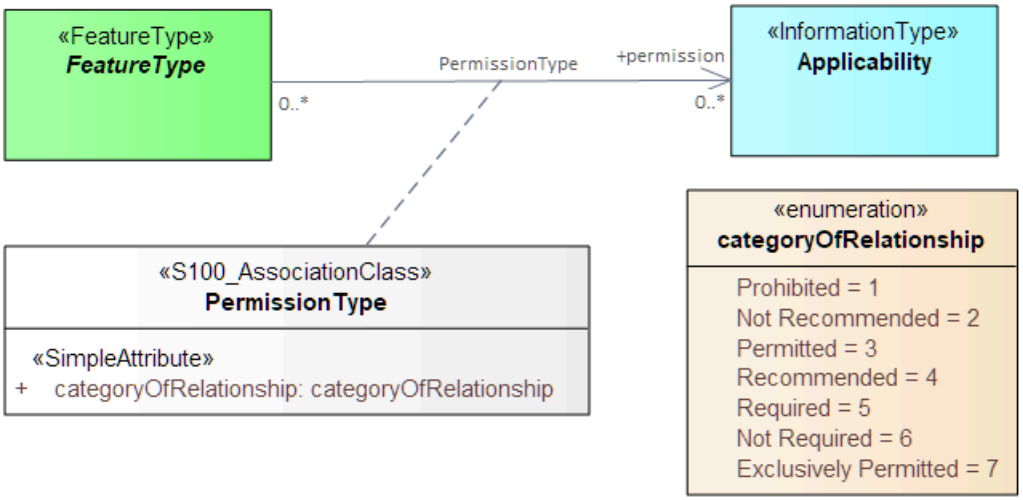

Figure 12-3 — Permission relationship

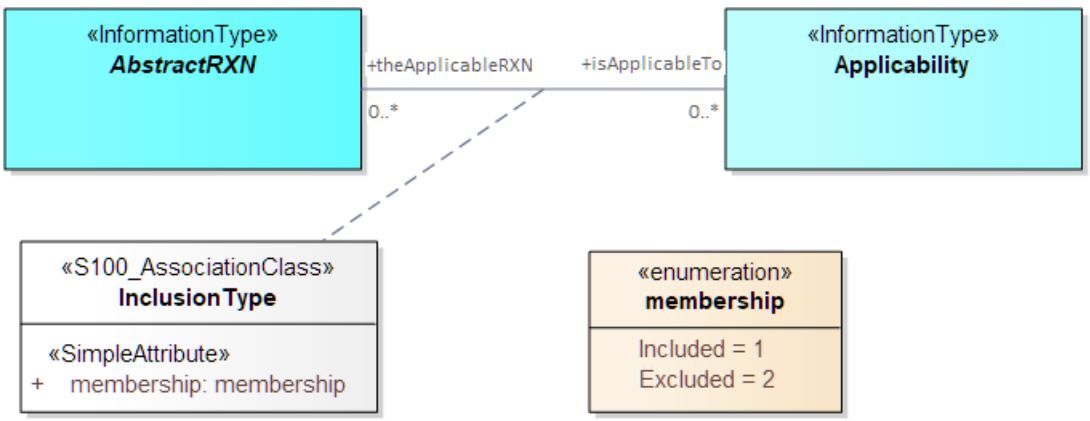

Figure 12-4 — Inclusion/exclusion relationship

EXAMPLE 1: A specified set of vessels is COVERED by a regulation and another set of vessels is EXEMPT from the regulation — described by the membership attribute values “included” and “excluded” respectively.

EXAMPLE 2: Vessels with specified cargo and dimensions MUST use a specified berth, vessels of smaller dimensions are RECOMMENDED to use the berth, and naval transports are EXEMPT from using the berth — described by the categoryOfRelationship attribute values “required”, “recommended” and “recommended” respectively.

12.4 Production hints and recommended practices (informative)

12.4.1 Capturing the application of a regulation, recommendation, etc. to specified kinds of vessels

Encoders may find it easiest to capture the application of a regulation (recommendation , etc.) to a class or set of vessels in three phases:

1) Encode the operative part of the regulation (the part that describes what the vessels subject to the regulation must or must not do), creating an instance of **Regulations** (or **Recommendations**, etc., as appropriate). Descriptions of what kinds of vessels are subject to the regulation must be excluded from the content of the **Regulations** instance.
2) Create an **Applicability** information type and encode the description of what kinds of vessels are subject to (or exempted from) the regulation.
3) Link the two using an **InclusionType** with *membership=included* if the vessels described by **Applicability** are subject to the regulation, or *membership=excluded* if they are explicitly exempted from the regulation.

It is not necessary to create separate instances of the regulation for inclusion and exclusion.

12.4.2 Capturing the permissibility or otherwise of a geographic feature for specified kinds of vessels

Encoders may find it easiest to capture the permissibility of a feature to specified kinds of vessels in three phases.

1) Create the geographic feature if it does not already exist.
2) Create an **Applicability** information type and encode the description of what kinds of vessels are required to use the geographic feature.
3) Link the two using a **PemissionType** with *categoryOfRelationship = required*.

For the other relationships (prohibited, not recommended, etc.) steps 2 and 3 should be modified accordingly (i.e., if use by certain kinds of vessels is “not recommended” encode the description of that kind of vessels in an **Applicability** and create a linking **PermissionType** with *categoryOfRelationship = not recommended*).

It is not necessary to create a separate instance of the geographic feature for each type of relationship.

12.4.3 Constructing the Applicability information type

Where the source material describes complex conditions, encoders may find it useful to write out the conditions in structured language with grouping parentheses, for example, as “(condition A) AND (condition B) AND (condition C)”, or draw diagrams, before encoding **Applicability** and its associations.

Note that the model limitation on mixing logical connectives means some forms of conditions which use “nesting” cannot be encoded in a single **Applicability** instance and multiple instances must be created.

EXAMPLE: The complex condition “(condition A) AND condition B) OR (condition C” must be encoded as two **Applicability** instances, one with “(condition A) AND (condition B)” and the other with “(condition A) AND (condition C)”.

Table 12-2 — Example of conversion of complex condition to multiple simple conditions

Complex condition	Encode as
(condition A) AND condition B) OR (condition C	Applicability 1: (condition A) AND (condition B) Applicability 2: (condition A) AND (condition C)

Data producers may contact NIPWG with questions about encoding complex conditions.

As a last resort, conditions may be written as phrases in natural language and encoded in the information attribute. It is acceptable for an **Applicability** to have only the *information* attribute populated.

12.5 Applicability

IHO Definition: Describes the relationship between vessel characteristics and: (i) the applicability of an associated information object or feature to the vessel; or, (ii) the use of a facility, place, or service by the vessel; or, (iii) passage of the vessel through an area.				
S-131 Information Type: Applicability (Abstract type)				
Super Type: InformationType				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
In Ballast			BO	0,1
Category of Cargo		2: Container 5: Passenger 6: Livestock 7: Dangerous or Hazardous 8: Heavy Lift 10: Dry Bulk Cargo 11: Liquid Bulk Cargo 12: Reefer Container Cargo 13: Ro-Ro Cargo 14: Project Cargo 15: Break Bulk Cargo	EN	0,*
Category Of Dangerous Or Hazardous Cargo		1: IMDG Code Class 1 Div. 1.1 2: IMDG Code Class 1 Div. 1.2 3: IMDG Code Class 1 Div. 1.3 4: IMDG Code Class 1 Div. 1.4 5: IMDG Code Class 1 Div. 1.5 6: IMDG Code Class 1 Div. 1.6 7: IMDG Code Class 2 Div. 2.1 8: IMDG Code Class 2 Div. 2.2 9: IMDG Code Class 2 Div. 2.3 10: IMDG Code Class 3 11: IMDG Code Class 4 Div. 4.1 12: IMDG Code Class 4 Div. 4.2 13: IMDG Code Class 4 Div. 4.3 14: IMDG Code Class 5 Div. 5.1 15: IMDG Code Class 5 Div. 5.2 16: IMDG Code Class 6 Div. 6.1 17: IMDG Code Class 6 Div. 6.2 18: IMDG Code Class 7 19: IMDG Code Class 8 20: IMDG Code Class 9	EN	0,*

		21: Harmful Substances in Packaged Form		
Category of Vessel		1: General Cargo Vessel 2: Container Carrier 3: Tanker 4: Bulk Carrier 5: Passenger Vessel 6: Roll-On Roll-Off 7: Refrigerated Cargo Vessel 8: Fishing Vessel 9: Service 10: Warship 11: Towed or Pushed Composite Unit 12: Tug and Tow 13: Light Recreational 14: Semi-Submersible Offshore Installation 15: Jack-Up Exploration or Project Installation 16: Livestock Carrier 17: Sport Fishing	CL	0,1
Category of Vessel Registry		1: Domestic 2: Foreign	EN	0,1
Logical Connectives		1: Logical Conjunction 2: Logical Disjunction	EN	0,1
Thickness of Ice Capability			IN	0,1
Vessel Performance			TE	0,1
Destination			TE	0,1
Information			C	0,*
File Locator			(S) TE	0,1
File Reference			(S) TE	0,1
Headline			(S) TE	0,* (ordered)
Language			(S) TE	0,1
Text			(S) TE	0,1
Vessel Measurements Specification			C	0,*
Comparison Operator		1: Greater Than 2: Greater Than or Equal To 3: Less Than 4: Less Than or Equal To 5: Equal To 6: Not Equal To	(S) EN	1,1
Vessels Characteristics		1: Length Overall 2: Length at Waterline 3: Breadth 4: Draught 6: Displacement Tonnage	(S) EN	1,1

		7: Displacement Tonnage, Light 8: Displacement Tonnage, Loaded 9: Deadweight Tonnage 10: Gross Tonnage 11: Net Tonnage 12: Panama Canal/ Universal Measurement System Net Tonnage 13: Suez Canal Net Tonnage		
Vessels Characteristics Value			(S) RE	1,1
Vessels Characteristics Unit		1: Metres 3: Metric Ton 4: Ton 5: Short Ton 6: Gross Ton 7: Net Ton 9: Suez Canal Net Tonnage	(S) EN	1,1
Inherited Attributes				
S-131 Attribute	**Inherited From**		**Type**	**Multiplicity**
Feature Name	InformationType		C	0,*
Fixed Date Range	InformationType		C	0,1
Periodic Date Range	InformationType		C	0,*
Graphic	InformationType		C	0,*
Source Indication	InformationType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**
theApplicableRxN	InclusionType	AbstractRxN	association	0,*

12.5.1 General

The **Applicability** information type is intended for defining sets of vessels according to their dimensions, capabilities, and cargo. Its attributes are intended for defining different limitation conditions, as described by their definitions in clauses 18 and 19.

Multiple instances of **Applicability** associated to the same feature or regulation are treated as “inclusive OR”, that is, each **Applicability** defines an independent set of vessels to which the regulation, permission or requirement applies (or which is specifically exempted, depending on the attribute encoded in the association class).

Clauses 12.1 to 12.3 contain a comprehensive discussion of the use of **Applicability** to describe subsets of vessels according to dimensions, types, cargo, and other characteristics. The remarks below provide additional guidance.

12.5.2 Remarks

- Multiple values of *categoryOfCargo* and of *categoryOfDangerousOrHazardousCargo* should be treated as “inclusive OR” (i.e., if *categoryOfCargo* = *1* and *2*, then it means vessels with either bulk or container cargo or both).

- Limitations which cannot be expressed using more specific attributes should be encoded in text form in the *information* attribute.
- It is acceptable for an **Applicability** to have only the *information* attribute populated.
- Vessel types which do not conform to any of the listed categoryOfVessel values should be encoded as “other: <text>” where <text> is a producer-supplied type name.
- The attribute *logicalConnectives* has multiplicity lower bound 0 for the case where there is only a single limiting condition (for example, if the only condition is “length overall > 100m”) and must be omitted in such a situation. If there is more than one condition, *logicalConnectives* must be encoded. If *logicalConnectives* is omitted and there is more than one condition, the default value assumed is logical conjunction.
- Mutually inconsistent measurements (e.g., draught > 10m and draught < 5m) are an error.
- The inherited attributes *featureName* and *graphic* may be used to provide supplementary information in the form of a title for the defined set of vessels and sketch or other graphic pertaining to the set, but there being no widely acknowledged use cases for them, their use in **Applicability** is discouraged.
- Encoding the inherited *fixedDateRange* and *periodicDateRange* attributes for **Applicability** is discouraged. The *fixedDateRange* and *periodicDateRange* attributes may theoretically be used to qualify the set defined by the **Applicability** instance, but must not be used to define the commencement, termination, season, etc., of the regulation or feature to which **Applicability** is associated (fixed and periodic date ranges should be encoded in the regulation or feature instance instead).
- If the complex attribute *information* is present at least one of its sub-attributes must be populated.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

13 Harbour Entrance

13.1 Entrance

IHO Definition: The seaward end of a channel, harbour, dock, etc.				
S-131 Information Type: Entrance (Abstract type)				
Super Type: InformationType				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Entrance Description			TE	0,1
Associated Feature Name			TE	0,*
Local Knowledge Description			TE	0,1
Approach Description			TE	0,1
Marked By			C	0,*
Text Content			(S) C	1,*
Landmark Description			C	0,*
Text Content			(S) C	1,*
Offshore Mark Description			C	0,*
Text Content			(S) C	1,*
Major Light Description			C	0,*
Text Content			(S) C	1,*
Useful Mark Description			C	0,*
Text Content			(S) C	1,*
Text Content			C	0,*
Category of Text		1: Abstract or Summary 2: Extract 3: Full Text	(S) EN	0,1
Information			(S) C	0,*
Online Resource			(S) C	0,1
Source Indication			(S) C	0,*
Inherited Attributes				
S-131 Attribute	**Inherited From**		**Type**	**Multiplicity**
Feature Name	InformationType		C	0,*
Fixed Date Range	InformationType		C	0,1
Periodic Date Range	InformationType		C	0,*
Graphic	InformationType		C	0,*
Source Indication	InformationType		C	0,*

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

13.1.1 General

The **Entrance** information type should be used to encode descriptive information about harbour entrances.

13.1.2 Remarks

- Aids to navigation should not be encoded in the attribute *landmarkDescription*. Instead, they should be encoded in the appropriate attribute for describing marks (*offshoreMarkDescription*, *majorLightsDescription*, or *usefulMarksDescription*).
- The attribute *markedBy* should be used to describe aids to navigation used to demarcate the location, for example, by marking a limit line, or one of the boundaries of an area.
- If the complex attribute *textContent* is present at least one of its sub-attributes must be populated.
  - If the *textContent* sub-attribute *information* is present at least one of its sub-attributes must be populated.
- If the complex attribute *fixedDateRange* is present at least one of its sub-attributes must be populated.
- If the complex attribute *sourceIndication* is present at least one of its sub-attributes must be populated.

14 Spatial Quality

14.1 Introduction

The spatial quality for individual spatial primitives may be reported using the SpatialQuality information type. The conceptual model is depicted in Figure 2-1.

14.2 Spatial Quality

IHO Definition: The indication of the quality of the locational information for features in a dataset.				
S-131 Information Type: SpatialQuality (Abstract type)				
Super Type:				
S-131 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Quality of Horizontal Measurement		1: Surveyed 2: Unsurveyed 3: Inadequately Surveyed 4: Approximate 5: Position Doubtful 6: Unreliable 7: Reported (Not Surveyed) 8: Reported (Not Confirmed) 9: Estimated 10: Precisely Known 11: Calculated	EN	0,1
Spatial Accuracy			C	0,*
Fixed Date Range			(S) C	0,1
Horizontal Position Uncertainty			(S) C	0,1
Vertical Uncertainty			(S) C	0,1
Inherited Attributes				
S-131 Attribute	**Inherited From**		**Type**	**Multiplicity**
No inherited attributes				

Information associations				
S-131 Role	**S-131 Association Name**	**Associated to**	**Type**	**Mult.**

14.2.1 General

The **SpatialQuality** information type allows indication of the spatial quality for individual spatial primitives. Quality information in **SpatialQuality** overrides quality information in covering quality meta-feature(s).

The association to **SpatialQuality** is from the spatial primitive. It is not encoded directly as an information association in the feature instance, but in the spatial primitive .

Information associations to *SpatialQuality from spatial primitives*					
Source	**Role**	**Association Name**	**Associated to**	**Type**	**Mult.**
(point or curve spatial primitive)	theQualityInformation	SpatialAssociation	SpatialQuality	association	0,1

The GML structures for point and curve primiitives are depicted in Figure 14-1 and Figure 14-2.

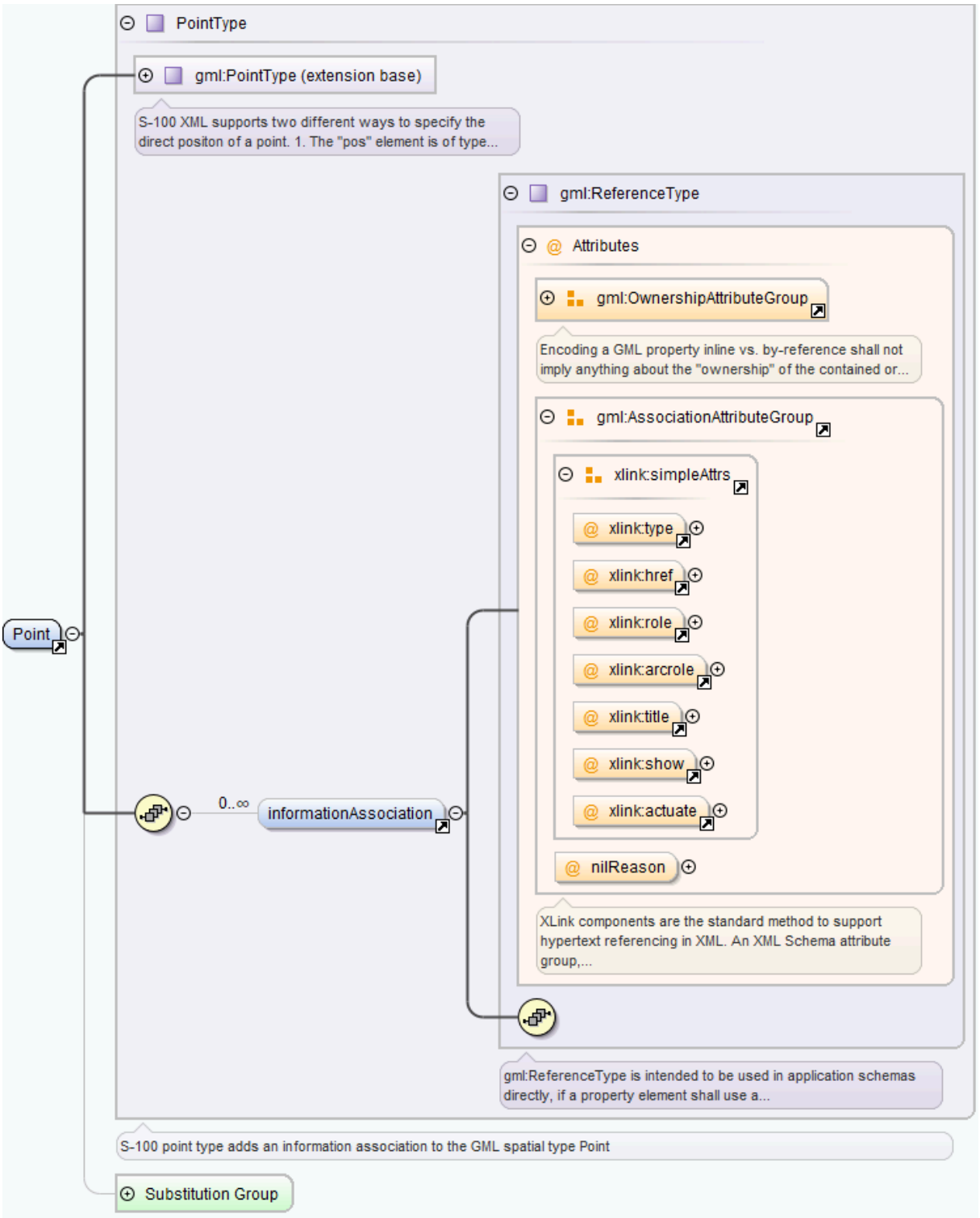

Figure 14-1 — Spatial quality for point spatial primitives

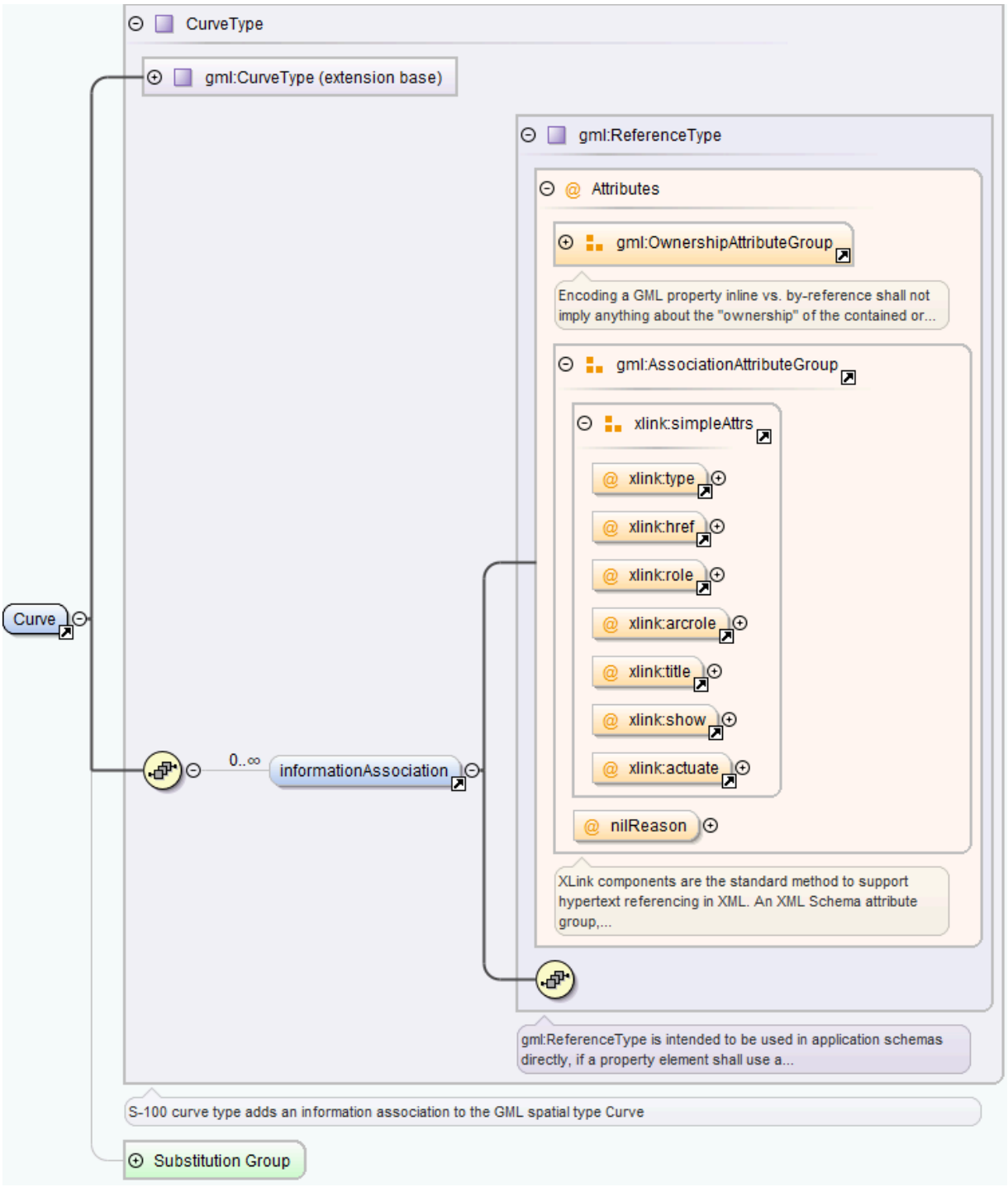

Figure 14-2 — Spatial quality for curve spatial primitives

The association must be encoded using the *informationAssociation* tag with:

- xlink:title = SpatialAssociation
- xlink:href = gml:id of the SpatialQuality instance (using the same prefix convention as for other information associations, for example #SQ00001)
- xlink:arcrole = data:theQualityInformation

The *xlink:show*, *xlink:type* and *xlink:actuate* attributes are not populated. S-100 permits the *xlink:role* attribute to be populated with the “[o]ptional description of the nature of the target resource, given as a URI”. However, since the rules for URIs describing target resources are still to be formulated at the time of writing, population of this optional attribute is not recommended.

14.2.2 Remarks

- **SpatialQuality** can only be associated to point and curve types. To indicate the quality of an area boundary, associate **SpatialQuality** to the curve feature for the area boundary.
- **SpatialQuality** associated to Curve or Composite Curve spatial objects cannot have vertical uncertainty attributes.
- If the complex attribute *spatialAccuracy* is present at least one of its sub-attributes must be populated.

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15 Feature Associations

15.1 Text association

Definition : A feature association for the binding between a geo feature and the cartographically positioned location for text.

CamelCase : TextAssociation

Remarks :

Roles : thePositionProvider theCartographicText

15.2 Subsection

Definition : A division of a feature into parts of the same type as the whole.

CamelCase : Subsection

Remarks :

Roles : subUnit constitute

15.3 Infrastructure

Definition : The infrastructure facilities in an area.

CamelCase : Infrastructure

Remarks :

Roles : infrastructureLocation hasInfrastructure

15.4 Primary/Auxiliary Facility

Definition : Describes the relationship between a primary feature and a feature that plays a supporting role in the use of the primary facility by a vessel.

CamelCase : PrimaryAuxiliaryFacility

Remarks :

Roles : primaryFacility auxiliaryFacility

15.5 Demarcation

Definition : Demarcation of location(s) within a feature by relation to another feature or features

CamelCase : Demarcation

Remarks :

Roles : demarcationIndicator demarcatedFeature

15.6 Jurisdictional Limit

Definition : The limit(s) of a jurisdiction claimed by a coastal State.

CamelCase : JurisdictionalLimit

Remarks :

Roles : limitReference limitExtent

15.7 Layout Division

Definition : A division of a feature into parts of type(s) different from the type of the whole.

CamelCase : LayoutDivision

Remarks :

Roles : layoutUnit componentOf

16 Information Associations

16.1 Additional information

Definition : A feature association for the binding between at least one instance of a geo feature and an instance of an information type.

CamelCase : AdditionalInformation

Remarks :

Roles : theInformation

16.2 Authority contact

Definition : Contact information for an authority

CamelCase : AuthorityContact

Remarks :

Roles : theAuthority theContactDetails

16.3 Authority hours

Definition : Service hours for an authority

CamelCase : AuthorityHours

Remarks :

Roles : theAuthority_srvHrs theServiceHours

16.4 Associated RxN

Definition : Association between a geographic location and a regulation, restriction, recommendation, or nautical information

CamelCase : AssociatedRxN

Remarks :

Roles : theRxN

16.5 Exceptional workday

Definition : Exception to the usual working day

CamelCase : ExceptionalWorkday

Remarks :

Roles : theServiceHours_nsdy partialWorkingDay

16.6 Service control

Definition : The controlling authority for a service area

CamelCase : ServiceControl

Remarks : This is an information association linking a location where a service is provided with an information type describing the provider. Contrast to serviceProvisionArea, which is a feature association linking the area served with another feature describing the provider. Role controlledService encodable only as a generic inverse association in 3.0.0 datasets as it is an information→feature link

Roles : controlAuthority

16.7 Service contact

Definition : Contact details for a service or facility

CamelCase : ServiceContact

Remarks :

Roles : theContactDetails

16.8 Location hours

Definition : Working hours for a service or facility described by a geographic location

CamelCase : LocationHours

Remarks : This association links a geo feature to a Service Hours object. Distinction: authyHours, which links an information type (Authority) to a Service Hours object.

Roles : facilityOperatingHours

16.9 Related organisation

Definition : Related organisation

CamelCase : RelatedOrganisation

Remarks :

Roles : organisationRelatedRxN theOrganisation

16.10 InclusionType

Definition : Association class specifying the relationship between the subset of vessels described by an APPLIC data object and a regulation (restriction, recommendation, or nautical information).

CamelCase : InclusionType

Remarks :

Roles : theApplicableRxN isApplicableTo

16.11 Permission Type

Definition : Association class for associations describing whether the subsets of vessels determined by the ship characteristics specified in APPLIC may (or must, etc.) transit, enter, or use a feature.

CamelCase : PermissionType

Remarks :

Roles : permission

16.12 Spatial Association

Definition : An association for the binding between a spatial type and its spatial quality information.

CamelCase : SpatialAssociation

Remarks :

Roles : theQualityInformation

16.13 Limit Entrance

Definition : Association between a limit feature and the entrance for the limit.

CamelCase : LimitEntrance

Remarks :

Roles : entranceReference

16.14 Service Availability

Definition : The services available within a location.

CamelCase : ServiceAvailability

Remarks :

Roles : serviceDescriptionReference

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17 Association Roles

17.1 The Authority

Definition : A pointer to an Authority object

CamelCase : theAuthority

Remarks :

17.2 Authority service hours

Definition : The authority for which service hours are given

CamelCase : theAuthority_srvHrs

Remarks :

17.3 Auxiliary Facility

Definition : A reference to a feature that supplements or supports the use of the primary feature in an AuxiliaryFacility relationship.

CamelCase : auxiliaryFacility

Remarks :

17.4 Component of

Definition : A pointer to the aggregate in a whole-part relationship.

CamelCase : componentOf

Remarks :

17.5 Constitute

Definition : Reference to a whole of the same type as the part feature in the relationship.

CamelCase : constitute

Remarks :

17.6 Contact details

Definition : A pointer to an Contact Details object

CamelCase : theContactDetails

Remarks :

17.7 Control authority

Definition : The controlling organization or authority for a geographically located service

CamelCase : controlAuthority

Remarks :

17.8 Demarcated Feature

Definition : Reference to the feature within which locations are demarcated.

CamelCase : demarcatedFeature

Remarks :

17.9 Demarcation Indicator

Definition : Reference to a feature demarcating a location within another feature.

CamelCase : demarcationIndicator

Remarks :

17.10 Entrance Reference

Definition : Reference to an information type describing the entrance to a limit area.

CamelCase : entranceReference

Remarks :

17.11 Facility Operating Hours

Definition : Reference to information about the days and times during which a facility operates or may be used.

CamelCase : facilityOperatingHours

Remarks :

17.12 Has Infrastructure

Definition : Reference to the feature describing a particular instance of physical infrastructure.

CamelCase : hasInfrastructure

Remarks :

17.13 Infrastructure Location

Definition : Reference to the feature within which the infrastructure is located.

CamelCase : infrastructureLocation

Remarks :

17.14 Is Applicable To

Definition : The object or class of objects to which the regulation, restriction, recommendation, or nautical information applies

CamelCase : isApplicableTo

Remarks :

17.15 Layout Unit

Definition : A reference to the diverse units comprising a feature of a different type.

CamelCase : layoutUnit

Remarks :

17.16 Limit Extent

Definition : Reference to a feature demarcating the extent to which a coastal State claims or may claim a specific jurisdiction.

CamelCase : limitExtent

Remarks :

17.17 Limit Reference

Definition : Reference to the feature for which a coastal State claims a specific jurisdiction different from the feature's geographic boundary.

CamelCase : limitReference

Remarks :

17.18 Organisation-Related RxN

Definition : Reference to regulation, recommendation, restriction or general information related to an organisation

CamelCase : organisationRelatedRxN

Remarks :

17.19 Permission

Definition : Association class for associations describing whether the subsets of vessels determined by the ship characteristics specified in APPLIC may (or must, etc.) transit, enter, or use a feature.

CamelCase : permission

Remarks :

17.20 Primary Facility

Definition : A reference to the primary feature in an Auxiliaryfacility relationship.

CamelCase : primaryFacility

Remarks :

17.21 Partial Working Day

Definition : The work hours for a non-standard workday

CamelCase : partialWorkingDay

Remarks :

17.22 Service Description Reference

Definition : Reference to an information object describing services.

CamelCase : serviceDescriptionReference

Remarks :

17.23 Service Hours (reference)

Definition : Service hours for an authority or service provider

CamelCase : theServiceHours

Remarks :

17.24 Sub-Unit

Definition : Reference to a part of the same type as the whole feature in the relationship.

CamelCase : subUnit

Remarks :

17.25 The information

Definition : A pointer to an object that provides more information about the referencing feature or information type.

CamelCase : theInformation

Remarks : Registry definition “The information” merely repeats the name.

17.26 The organisation

Definition : The organisation to which information relates

CamelCase : theOrganisation

Remarks :

17.27 The Quality Information

Definition : A pointer to an information type providing spatial quality information.

CamelCase : theQualityInformation

Remarks :

17.28 The RxN

Definition : The regulation, restriction, recommendation, or nautical information

CamelCase : theRxN

Remarks :

17.29 The Applicable RxN

Definition : The applicable regulation, restriction, recommendation or nautical information

CamelCase : theApplicableRxN

Remarks :

17.30 The Cartographic Text

Definition : A pointer to a specific cartographically positioned location for text.

CamelCase : theCartographicText

Remarks :

17.31 The Position Provider

Definition : A pointer to a specific feature(s).

CamelCase : thePositionProvider

Remarks :

17.32 The service hours for a non-standard workday

Definition : The usual service hours to which an exception applies

CamelCase : theServiceHours_nsdy

Remarks :

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18 Simple Attributes

18.1 Administrative Division

Definition : A generic term for an administrative region within a country at a level below that of the sovereign state.

Type : text

CamelCase : administrativeDivision

Alias :

Remarks :

18.2 Applicable Load Line Zone

Definition : The load line zone in which the port is located. Defined by the International Convention on Load Lines.

Type : text

CamelCase : applicableLoadLineZone

Alias :

Remarks :

18.3 Application Profile

Definition : Name of an application profile that can be used with the online resource.

Type : text

CamelCase : applicationProfile

Alias : APPPRF

Remarks :

18.4 Approach Description

Definition : Description of the approach to a location.

Type : text

CamelCase : approachDescription

Alias :

Remarks :

18.5 Associated Feature Name

Definition : The name of an associated feature.

Type : text

CamelCase : associatedFeatureName

Alias :

Remarks : Intended for designating related features in other datasets or products, since such feature instances cannot be linked by feature associations.

18.6 Available Berthing Length

Definition : The length of a berth or dock which is available for use.

Type : real

CamelCase : availableBerthingLength

Alias :

Remarks :

Units: Metre **Definition**: The basic unit of length in the International System of Units (SI) system. **Symbol**: m

Range: Lower Bound (Inclusive): 0.0 Upper Bound (Inclusive): 10000.0

18.7 Berthing Assistance

Definition : Classification of assistance for mooring or anchoring operations.

Type : enumeration

CamelCase : berthingAssistance

Alias :

Remarks :

Code	Label	Definition
1	Berthing Information	Information about assistance or arrangements for a service related to berthing operations.
2	Line Personnel	Personnel specializing in the mooring and unmooring of vessels.
3	Mooring Boat	A boat which assists the securement of a vessel to a berth or mooring with ropes or anchor.
4	Mule	A locomotive for moving vessels.
5	Tugboat	A powerful small boat designed to pull or push larger ships or powerless barges.
6	Icebreaking Ship	A ship equipped to make and maintain a channel through ice.

18.8 Bollard Description

Definition : A textual description of the type of bollard at a berth or mooring facility.

Type : text

CamelCase : bollardDescription

Alias :

Remarks :

18.9 Bollard Number

Definition : An identifier used to locate a specific bollard.

Type : text

CamelCase : bollardNumber

Alias :

Remarks : A bollard is a small shaped post, mounted on a wharf or dolphin used to secure ship's lines.

18.10 Call Name

Definition : The designated call name of a station; for example, radio station, radar station, pilot.

Type : text

CamelCase : callName

Alias :

Remarks : This is the name used when calling a radio station by radio; for example, "Singapore Pilots".

18.11 Call Sign

Definition : The designated call-sign of a station (radio station, radar station, pilot, …).

Type : text

CamelCase : callSign

Alias : CALSGN

Remarks :

18.12 Cardinal Direction

Definition : Principal and intermediate compass points.

Type : enumeration

CamelCase : cardinalDirection

Alias : CARDIR

Remarks :

Code	Label	Definition
1	North	348.75-011.25 degrees (true north).
2	North Northeast	011.25 — 033.75 degrees.
3	Northeast	033.75 — 056.25 degrees.
4	East Northeast	056.25-078.75 degrees.
5	East	078.75-101.25 degrees.
6	East Southeast	101.25-123.75 degrees.
7	Southeast	123.75-146.25 degrees.
8	South Southeast	146.25-168.75 degrees.
9	South	168.75-191.25 degrees.
10	South Southwest	191.25-213.75 degrees.
11	Southwest	213.75-236.25 degrees.
12	West Southwest	236.25-258.75 degrees.

Code	Label	Definition
13	West	258.75-281.25 degrees.
14	West Northwest	281.25-303.75 degrees.
15	Northwest	303.75 — 326.25 degrees.
16	North Northwest	326.25 — 348.75 degrees.

18.13 Cargo Service

Definition : Classification of services related to the goods or items carried by vessels.

Type : enumeration

CamelCase : cargoService

Alias :

Remarks : Defines an enumeration or codelist listing specific services.

Code	Label	Definition
1	Stevedoring	The loading, unloading, moving or handling of cargo, ship's stores, gear, or other materials, into, in, on, or out of any vessel.
2	Cargo Surveying	Inspection, evaluation or monitoring of the quantity, stowage, loading and unloading, and condition of cargo, and the effects of cargoes on vessel stability and safety.
3	Cargo Lashing	The securement of cargo to the ship's structure and/or other cargo.
4	Draught Survey	Determination of the quantity of certain types of bulk cargo by assessment of its effect on displacement when loaded in a vessel.

18.14 Category of Anchorage

Definition : Classification of an area where different use types of vessel can remain static.

Type : enumeration

CamelCase : categoryOfAnchorage

Alias : CATACH

Remarks :

Code	Label	Definition
1	Unrestricted Anchorage	An area in which vessels anchor or may anchor.
2	Deep Water Anchorage	An area in which vessels of deep draught anchor or may anchor.
3	Tanker Anchorage	An area in which tankers anchor or may anchor.
5	Quarantine Anchorage	An area where a vessel anchors when satisfying quarantine regulations.
6	Seaplane Anchorage	An area in which seaplanes anchor or may anchor.
7	Small Craft Anchorage	An area in which yachts and small boats anchor or may anchor.
9	Anchorage for Periods Up To 24 Hours	An area in which vessels anchor or may anchor for periods of up to 24 hours.

Code	Label	Definition
10	Anchorage for a Limited Period of Time	An area in which vessels may anchor for a period of time not to exceed a specific limit.
14	Waiting Anchorage	An area in which vessels anchor or may anchor while waiting, for example, for access to a port or berth.
15	Reported Anchorage	A location not defined by a regulatory authority that has been reported to be suitable and safe for anchoring.

18.15 Category of Authority

Definition : The type of person, government agency or organisation granted powers of managing or controlling access to and/or activity in an area.

Type : enumeration

CamelCase : categoryOfAuthority

Alias : CATAUT

Remarks :

Code	Label	Definition
2	Border Control	The administration to prevent or detect and prosecute violations of rules and regulations at international boundaries.
3	Police	The department of government, or civil force, charged with maintaining public order.
4	Port	Person or corporation, owners of, or entrusted with or invested with the power of managing a port. May be called a Harbour Board, Port Trust, Port Commission, Harbour Commission, Marine Department.
5	Immigration	The authority controlling people entering a country.
6	Health	The authority with responsibility for checking the validity of the health declaration of a vessel and for declaring free pratique.
7	Coast Guard	Organization keeping watch on shipping and coastal waters according to governmental law; normally the authority with responsibility for search and rescue.
8	Agricultural	The authority with responsibility for preventing infection of the agriculture of a country and for the protection of the agricultural interests of a country.
9	Military	A military authority which provides control of access to or approval for transit through designated areas or airspace.
10	Private Company	A private or publicly owned company or commercial enterprise which exercises control of facilities, for example a calibration area.
11	Maritime Police	A governmental or military force with jurisdiction in territorial waters. Examples could include Gendarmerie Maritime, Carabinierie, and Guardia Civil.
12	Environmental	An authority with responsibility for the protection of the environment.
13	Fishery	An authority with responsibility for the control of fisheries.
14	Finance	An authority with responsibility for the control and movement of money.
15	Maritime	A national or regional authority charged with administration of maritime affairs.
16	Customs	The agency or establishment for collecting duties, tolls.

18.16 Category of Berth Location

Definition : Classification of a berth according to the method of describing its location or extent.

Type : enumeration

CamelCase : categoryOfBerthLocation

Alias :

Remarks :

Code	Label	Definition
1	Wharf Reference Metre Mark	A wharf or quay with reference position(s) given by one or more metre marks.
2	Wharf Reference Position	A wharf or quay with reference position(s) given by one or more point or points in geographic coordinates.
3	Pier (Jetty)	A long, narrow structure extending into the water to afford a berthing place for vessels, to serve as a promenade, etc.
4	Multi-Buoy Mooring Berth	A designated facility where a vessel may moor, usually by a combination of the mooring buoys and the ship’s anchors.

18.17 Category of Cargo

Definition : Classification of the different types of cargo that a ship may be carrying.

Type : enumeration

CamelCase : categoryOfCargo

Alias : CATCGO

Remarks : If item 7 is used, the nature of dangerous or hazardous cargoes can be amplified with category of dangerous or hazardous cargo.

Code	Label	Definition
1	Bulk	Unpacked homogenous cargo poured loose in a certain space of a vessel, for example oil or grain.
2	Container	One of a number of standard sized cargo carrying units, secured using standard corner attachments and bar.
3	General	Break bulk cargo normally loaded by crane.
4	Liquid	Any cargo loaded by pipeline.
5	Passenger	A fee paying traveller.
6	Livestock	Live animals carried in bulk.
7	Dangerous or Hazardous	Dangerous or hazardous cargo as described by the IMO International Maritime Dangerous Goods code.
8	Heavy Lift	Indivisible heavy items of weight generally over 100 tons, and width or height greater than 100 metres.
9	Ballast	Material carried by a ship to ensure its stability.
10	Dry Bulk Cargo	Commodity cargo that is transported unpackaged in large quantities. These types of goods usually need to be kept dry during the whole transportation period.
11	Liquid Bulk Cargo	Liquids or gases that are transported in bulk and carried unpackaged.

Code	Label	Definition
12	Reefer Container Cargo	Cargo transported in refrigerated containers, generally perishable commodities which require temperature-controlled transportation, such as fruit, meat, fish, vegetables, dairy products and other foods.
13	Ro-Ro Cargo	Wheeled cargo, such as cars, busses, trucks, agricultural vehicles and cranes, that are driven on and off the ship on their own wheels or using a platform vehicle, such as a self-propelled modular transporter.
14	Project Cargo	Project cargo is a term used to broadly describe the national or international transportation of large, heavy, high value, or critical (to the project they are intended for) pieces of equipment. Also commonly referred to as heavy lift, this includes shipments made of various components which need disassembly for shipment and reassembly after delivery.
15	Break Bulk Cargo	Goods that are stowed on board ship in individually counted units, and not in intermodal containers nor in bulk as with oil or grain.

18.18 Category of Communication Preference

Definition : Classification of frequencies, VHF channels, telephone numbers, or other means of communication based on preference.

Type : enumeration

CamelCase : categoryOfCommunicationPreference

Alias :

Remarks :

Code	Label	Definition
1	Preferred Calling	The first choice channel or frequency to be used when calling a radio station.
2	Alternate Calling	A channel or frequency to be used for calling a radio station when the preferred channel or frequency is busy or is suffering from interference.
3	Preferred Working	The first choice channel or frequency to be used when working with a radio station.
4	Alternate Working	A channel or frequency to be used for working with a radio station when the preferred working channel or frequency is busy or is suffering from interference.

18.19 Category Of Dangerous Or Hazardous Cargo

Definition : Classification of dangerous goods or hazardous materials based on the International Maritime Dangerous Goods Code (IMDG Code).

Type : enumeration

CamelCase : categoryOfDangerousOrHazardousCargo

Alias : CATDHC

Remarks :

Code	Label	Definition
1	IMDG Code Class 1 Div. 1.1	Explosives, Division 1: Substances and articles which have a mass explosion hazard.

Code	Label	Definition
2	IMDG Code Class 1 Div. 1.2	Explosives, Division 2: Substances and articles which have a projection hazard but not a mass explosion hazard.
3	IMDG Code Class 1 Div. 1.3	Explosives, Division 3: Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.
4	IMDG Code Class 1 Div. 1.4	Explosives, Division 4: Substances and articles which present no significant hazard.
5	IMDG Code Class 1 Div. 1.5	Explosives, Division 5: Very insensitive substances which have a mass explosion hazard.
6	IMDG Code Class 1 Div. 1.6	Explosives, Division 6: Extremely insensitive articles which do not have a mass explosion hazard.
7	IMDG Code Class 2 Div. 2.1	Gases, flammable gases.
8	IMDG Code Class 2 Div. 2.2	Gases, non-flammable, non-toxic gases.
9	IMDG Code Class 2 Div. 2.3	Gases, toxic gases.
10	IMDG Code Class 3	Flammable liquids.
11	IMDG Code Class 4 Div. 4.1	Flammable solids, self-reactive substances and desensitized explosives.
12	IMDG Code Class 4 Div. 4.2	Substances liable to spontaneous combustion.
13	IMDG Code Class 4 Div. 4.3	Substances which, in contact with water, emit flammable gases.
14	IMDG Code Class 5 Div. 5.1	Oxidizing substances.
15	IMDG Code Class 5 Div. 5.2	Organic peroxides.
16	IMDG Code Class 6 Div. 6.1	Toxic substances.
17	IMDG Code Class 6 Div. 6.2	Infectious substances.
18	IMDG Code Class 7	Radioactive material.
19	IMDG Code Class 8	Corrosive substances.
20	IMDG Code Class 9	Miscellaneous dangerous substances and articles.
21	Harmful Substances in Packaged Form	Harmful substances are those substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code). Packaged form is defined as the forms of containment specified for harmful substances in the IMDG Code.

18.20 Category of Depths Description

Definition : Classification of significant aspects of depths about which information is provided.

Type : enumeration

CamelCase : categoryOfDepthsDescription

Alias :

Remarks :

Code	Label	Definition
1	Shoal	A shallow elevation composed of unconsolidated material that may constitute a hazard to surface navigation.
2	General Depth	General information about the vertical distance from the water surface to the bottom.
3	Controlling Depth	The least depth in the approach or channel to an area, such as a port or anchorage, governing the maximum draft of vessels that can enter.

18.21 Category of Dolphin

Definition : Classification of a post or group of posts, used for mooring or warping a vessel.

Type : enumeration

CamelCase : categoryOfDolphin

Alias :

Remarks :

Code	Label	Definition
1	Mooring Dolphin	A post or group of posts driven into the seabed or riverbed, used as a mooring point for vessels.
2	Deviation Dolphin	A post or group of posts, which a vessel may swing around for compass adjustment.
3	Berthing Dolphin	A post or group of posts driven into the seabed or riverbed, used to extend the berth of a vessel by providing extra mooring points.
4	Fender or Breasting Dolphin	A post or group of posts driven into the seabed or riverbed, used to assist in berthing of vessels by taking up some berthing loads; keep vessels from pressing against the pier structure; or to protect structures from possible impact by ships.

18.22 Category of Frequency

Definition : The electrical frequency provided by the power supply station.

Type : enumeration

CamelCase : categoryOfFrequency

Alias :

Remarks :

Code	Label	Definition
1	50Hz	50 Hertz
2	60Hz	60 Hertz

18.23 Category of Harbour Facility

Definition : Classification of harbour use.

Type : enumeration

CamelCase : categoryOfHarbourFacility

Alias : CATHAF

Remarks :

Code	Label	Definition
1	RoRo Terminal	A terminal for roll-on roll-off ferries.
3	Ferry Terminal	A terminal for passenger and vehicle ferries.
4	Fishing Harbour	A harbour with facilities for fishing boats.
5	Yacht Harbour/ Marina	A harbour facility for small boats, yachts, etc., where supplies, repairs, and various services are available.
6	Naval Base	A centre of operations for naval vessels.
7	Tanker Terminal	A terminal for the bulk handling of liquid cargoes.
8	Passenger Terminal	A terminal for the loading and unloading of passengers.
9	Shipyard	A place where ships are built or repaired.
10	Container Terminal	A terminal with facilities to load/unload or store shipping containers.
11	Bulk Terminal	A terminal for the handling of bulk materials such as iron ore, coal, etc.
12	Ship Lift	A platform powered by synchronous electric motors (for example syncrolift) used to lift vessels (larger than boats) in and out of the water.
13	Straddle Carrier	A wheeled vehicle designed to lift and carry containers or vessels within its own framework. It is used for moving, and sometimes stacking, shipping containers and vessels.
14	Service Harbour	A harbour within which the floating equipment (dredges, tugs …) of harbour services are stationed.
15	Pilotage Service	The services of a person who directs the movements of a vessel through pilot waters, usually a person who has demonstrated extensive knowledge of channels, aids to navigation, dangers to navigation, etc., in a particular area and is licensed for that area, are available.
16	Service and Repair	A place where mechanical services or repairs can be undertaken to engines or other vessel equipment.
17	Quarantine Station	A medical control center located in an isolated spot ashore where patients with contagious diseases from vessel in quarantine are taken.

18.24 Category of Mooring/Warping Facility

Definition : A place or structure to which a vessel can be secured.

Type : enumeration

CamelCase : categoryOfMooringWarpingFacility

Alias : CATMOR

Remarks :

Code	Label	Definition
4	Tie-Up Wall	A section of wall designated for tying-up vessels awaiting transit. Bollards and mooring devices are available for both large and small ships.
5	Post or Pile	A long heavy timber or section of steel, wood, concrete, etc., forced into the seabed to serve as a mooring facility.
6	Mooring Cable	A chain or very strong fibre or wire rope used to anchor or moor vessels or buoys.

18.25 Category of Plug

Definition : The type of plug(s) available at the power supply station.

Type : text

CamelCase : categoryOfPlug

Alias :

Remarks :

18.26 Category of Port Section

Definition : Classification of subdivisions of a port or harbour area by usage.

Type : enumeration

CamelCase : categoryOfPortSection

Alias :

Remarks :

Code	Label	Definition
1	Port Fairway	The main navigable channel in a harbour or its approaches, for vessels of larger size.
3	Berth Pocket	A body of water at a berth or anchor berth, of adequate dimensions to allow a vessel to make fast to the shore, mooring buoys, berthing dolphins or to anchor.
8	Seaplane Anchorage	An area in which sea-planes anchor or may anchor.
9	Dredged Basin	An area of water or channel enlargement of increased depth compared to adjacent areas, where the depth is maintained by dredging operations.
11	Port Safety Zone	The area around a port facility or harbour installation within which vessels are prohibited from entering without permission.
12	Lay-by Berth	A general berth for use by vessels for short term waiting until a loading or discharging berth is available.

18.27 Category of Relationship

Definition : Expresses constraints or requirements on vessel actions or activities in relation to a geographic feature, facility, or service.

Type : enumeration

CamelCase : categoryOfRelationship

Alias :

Remarks :

Code	Label	Definition
1	Prohibited	Use of facility, waterway or service is forbidden.
2	Not Recommended	Use of facility, waterway or service is not recommended.
3	Permitted	Use of facility, waterway, or service is permitted but not required.
4	Recommended	Use of facility, waterway, or service is recommended.
5	Required	Use of facility, waterway, or service is required.
6	Not Required	Use of facility, waterway, or service is not required.
7	Exclusively Permitted	Only vessels of the specified characteristics may use the facility, waterway, or service.

18.28 Category of Schedule

Definition : The type of schedule, for instance opening, closure, etc.

Type : enumeration

CamelCase : categoryOfSchedule

Alias :

Remarks :

Code	Label	Definition
1	Normal Operation	The service, office, is open, fully manned, and operating normally, or the area is accessible as usual.
2	Closure	The service, office, or area is closed.
3	Unmanned Operation	The service is available but not manned.

18.29 Category of Shore Power Facility

Definition : Classification of equipment or installations that are used for providing shoreside electrical power to a vessel at berth.

Type : enumeration

CamelCase : categoryOfShorePowerFacility

Alias :

Remarks :

Code	Label	Definition
1	High-Voltage Shore Power System	Delivers power to vessels using higher voltage (for example, 10 kV or above), suitable for large ports and large vessels. such as tankers, cargo ships, etc.
2	Low-Voltage Shore Power System	Delivers power to vessels using lower voltage, designed for small to medium-sized coastal or riverine terminals and smaller vessels.

Code	Label	Definition
3	Hybrid Shore Power System	Delivers power to vessels using high-voltage (for example, 10kV and above) and low-voltage outputs or simultaneous provision of dual-voltage power.

18.30 Category of Temporal Variation

Definition : An assessment of the likelihood of change over time.

Type : enumeration

CamelCase : categoryOfTemporalVariation

Alias :

Remarks :

Code	Label	Definition
1	Extreme Event	Indication of the possible impact of a significant event (for example hurricane, earthquake, volcanic eruption, landslide, etc), which is considered likely to have changed the seafloor or landscape significantly.
2	Likely to Change and Significant Shoaling Expected	Continuous or frequent change (for example river siltation, sand waves, seasonal storms, ice bergs, etc) that is likely to result in new significant shoaling.
3	Likely to Change But Significant Shoaling Not Expected	Continuous or frequent change (for example sand wave shift, seasonal storms, ice bergs, etc) that is not likely to result in new significant shoaling.
4	Likely to Change	Continuous or frequent change to non-bathymetric features (for example river siltation, glacier creep/recession, sand dunes, buoys, marine farms, etc).
5	Unlikely to Change	Significant change to the seafloor is not expected.
6	Unassessed	Not having been assessed.

18.31 Category of Terminal

Definition : Classification of terminals according to type of use, purpose, or type of cargo loaded or unloaded.

Type : enumeration

CamelCase : categoryOfTerminal

Alias :

Remarks :

Code	Label	Definition
1	RoRo Terminal	A terminal for roll-on roll-off ferries.
3	Ferry Terminal	A terminal for passenger and vehicle ferries.
7	Tanker Terminal	A terminal for the bulk handling of liquid cargoes.
8	Passenger Terminal	A terminal for the loading and unloading of passengers.
10	Container Terminal	A terminal with facilities to load/unload or store shipping containers.
11	Bulk Terminal	A terminal for the handling of bulk materials such as iron ore, coal, etc.

18.32 Category of Text

Definition : Classification of completeness of textual information in relation to the source material from which it is derived.

Type : enumeration

CamelCase : categoryOfText

Alias : CATTXT

Remarks :

Code	Label	Definition
1	Abstract or Summary	A statement summarizing the important points of a text.
2	Extract	An excerpt or excerpts from a text.
3	Full Text	The whole text.

18.33 Category of Vessel Registry

Definition : The locality of vessel registration or enrolment relative to the nationality of a port, territorial sea, administrative area, exclusive zone or other location.

Type : enumeration

CamelCase : categoryOfVesselRegistry

Alias :

Remarks :

Code	Label	Definition
1	Domestic	The vessel is registered or enrolled under the same national flag as the port, harbour, territorial sea, exclusive economic zone, or administrative area in which the object that possesses this attribute applies or is located.
2	Foreign	The vessel is registered or enrolled under a national flag different from the port, harbour, territorial sea, exclusive economic zone, or other administrative area in which the object that possesses this attribute applies or is located.

18.34 Category of Voltage

Definition : The electrical voltage provided by the power supply station.

Type : enumeration

CamelCase : categoryOfVoltage

Alias :

Remarks :

Code	Label	Definition
1	230V	230 Volts
2	400V	400 Volts.
3	120V	120 Volts
4	120V or 240V	120/240 Volts
5	208V	208 Volts

Code	Label	Definition
6	440V	440 Volts
7	440V or 690V	440/690 Volts
8	480V	480 Volts
9	690V	690 Volts
10	6600V	6.6 kiloVolts
11	6600V or 11000V	6.6/11 kiloVolts
12	11000V	11 kiloVolts
13	22000V	22 kiloVolts
14	380V	380 Volts
15	11000V or 22000V	11/22 kiloVolts

18.35 Cathodic Protection System

Definition : A system used to protect metal structures against corrosion by supplying direct current to the immersed external surface of the structure.

Type : boolean

CamelCase : cathodicProtectionSystem

Alias :

Remarks : Cathodic protection is applied to protect harbour installations from corrosion due to seawater, brackish water, saline mud or soil fill.

18.36 City Name

Definition : The name of a town or city.

Type : text

CamelCase : cityName

Alias : CITYNM

Remarks :

18.37 Communication Channel

Definition : A channel number assigned to a specific radio frequency, frequencies or frequency band.

Type : text

CamelCase : communicationChannel

Alias : COMCHA

Remarks : The expected input is the specific VHF-Channel. The attribute ‘communication channel’ encodes the various VHF-channels used for communication.

18.38 Comparison Operator

Definition : Numerical comparison.

Type : enumeration

CamelCase : comparisonOperator

Alias : COMPOP

Remarks : Provides the relation between the value given in the model and the real ship's value.

Code	Label	Definition
1	Greater Than	The value of the left value is greater than that of the right.
2	Greater Than or Equal To	The value of the left expression is greater than or equal to that of the right.
3	Less Than	The value of the left expression is less than that of the right.
4	Less Than or Equal To	The value of the left expression is less than or equal to that of the right.
5	Equal To	The two values are equivalent.
6	Not Equal To	The two values are not equivalent.

18.39 Condition

Definition : The various conditions of buildings and other constructions.

Type : enumeration

CamelCase : condition

Alias : CONDTN

Remarks : The default 'condition' should be considered to be completed, undamaged and working normally.

Code	Label	Definition
1	Under Construction	Being built but not yet capable of function.
2	Ruined	A structure in a decayed or deteriorated condition resulting from neglect or disuse, or a damaged structure in need of repair.
3	Under Reclamation	An area of the sea, a lake or the navigable part of a river that is being reclaimed as land, usually by the dumping of earth and other material.
5	Planned Construction	Detailed planning has been completed but construction has not been initiated.

18.40 Contact Instructions

Definition : Instructions provided on how to contact a particular person, organisation or service.

Type : text

CamelCase : contactInstructions

Alias :

Remarks :

18.41 Country Name

Definition : The name of a nation.

Type : text

CamelCase : countryName

Alias :

Remarks :

18.42 Date End

Definition : The latest date on which an object (for example a buoy) will be present.

Type : S100_TruncatedDate

CamelCase : dateEnd

Alias : DATEND

Remarks : The Date End should be encoded using 4 digits for the calendar year (YYYY), 2 digits for the month (MM) (for example April = 04) and 2 digits for the day (DD). When no specific month and/or day is required/known, indication of the month and/or day is omitted, and replaced with dashes (-). When no specific year is required (that is, the event or date range ends at the same time each year) the following two cases may be considered:- same day each year: ——MMDD- same month each year: ——MM— This conforms to ISO 8601: 2004. Date End indicates the latest date of an event or the end of a date range. It is used to indicate the end of a fixed date range, the end of a periodic date range, or the removal or cancellation of a feature at a specific date in the future.

18.43 Date Fixed

Definition : The date of an event.

Type : S100_TruncatedDate

CamelCase : dateFixed

Alias :

Remarks :

18.44 Date Start

Definition : The earliest date on which an object (for example a buoy) will be present.

Type : S100_TruncatedDate

CamelCase : dateStart

Alias : DATSTA

Remarks : The Date Start should be encoded using 4 digits for the calendar year (YYYY), 2 digits for the month (MM) (for example April = 04) and 2 digits for the day (DD). When no specific month and/or day is required/known, indication of the month and/or day is omitted, and replaced with dashes (-). When no specific year is required (that is, the event or date range ends at the same time each year) the following two cases may be considered:- same day each year: ——MMDD- same month each year: ——MM— This conforms to ISO 8601: 2004. Date Start indicates the earliest date of an event or the start of a date range. It is used to indicate the start of a fixed date range, the start of a periodic date range, or the deployment or implementation of a feature at a specific date in the future.

18.45 Date Variable

Definition : A day which is not fixed in the Gregorian calendar.

Type : text

CamelCase : dateVariable

Alias :

Remarks : Examples: The fourth Thursday in November; new moon day of Kartika (Diwali); Easter Sunday.

18.46 Day of Week

Definition : Any one of seven days in a week.

Type : enumeration

CamelCase : dayOfWeek

Alias :

Remarks :

Code	Label	Definition
1	Sunday	The day of the week following Saturday and preceding Monday.
2	Monday	The day of the week following Sunday and preceding Tuesday.
3	Tuesday	The day of the week following Monday and preceding Wednesday.
4	Wednesday	The day of the week following Tuesday and preceding Thursday.
5	Thursday	The day of the week following Wednesday and preceding Friday.
6	Friday	The day of the week following Thursday and preceding Saturday.
7	Saturday	The day of the week following Friday and preceding Sunday.

18.47 Day of Week is Range

Definition : A statement expressing if the days of the week identified define a range or not.

Type : boolean

CamelCase : dayOfWeekIsRange

Alias :

Remarks : A True value is an indication that the identified days of the week define a range between and inclusive of those days.

18.48 Delivery Point

Definition : Details of where post can be delivered such as the apartment, name and/or number of a street, building or PO Box.

Type : text

CamelCase : deliveryPoint

Alias : DELPNT

Remarks :

18.49 Destination

Definition : The place or general direction to which a vessel is going or directed.

Type : text

CamelCase : destination

Alias :

Remarks :

Max. length: 100

18.50 Development

Definition : Describes a feature that is in development.

Type : text

CamelCase : development

Alias :

Remarks :

18.51 Distance

Definition : A numeric measure of the spatial separation between two locations.

Type : real

CamelCase : distance

Alias :

Remarks :

Units: Nautical Mile **Definition**: Nautical mile **Symbol**: NM

18.52 Dynamic Resource

Definition : Whether a vessel must use a shore-based or other resource to obtain up-to-date information.

Type : enumeration

CamelCase : dynamicResource

Alias :

Remarks :

Code	Label	Definition
1	Static	The information is static, or a source of up-to-date information is unavailable or unknown.
2	Mandatory External Dynamic	An external source of up-to-date information is available and interaction with it to obtain up-to-date information is required.
3	Optional External Dynamic	An external source of up-to-date information is available but interaction with it to obtain up-to-date information is not required.
4	Onboard Dynamic	Up-to-date information may be computed using only onboard resources.

18.53 Elevation

Definition : The altitude of the ground level of an object, measured from a specified vertical datum.

Type : real

CamelCase : elevation

Alias : ELEVAT

Remarks :

Units: Metre **Definition**: The basic unit of length in the International System of Units (SI) system. **Symbol**: m

Range: Lower Bound (Inclusive): 0.0 Upper Bound (Inclusive): 8850.0

18.54 Entrance Description

Definition : Description of the seaward end of a channel, harbour, dock, etc.

Type : text

CamelCase : entranceDescription

Alias :

Remarks :

18.55 File Locator

Definition : The location of a fragment of text or other information in a support file.

Type : text

CamelCase : fileLocator

Alias :

Remarks : Application schemas must describe how the associated file is identified. The associated file will commonly be named in a file reference co-attribute of the same complex attribute. Each DCEG must specify requirements for the format of the associated file and the semantics of file locator. For example, the value of file locator may be an HTML ID in an HTML file, line number in a text file) or a bookmark in a PDF file.

18.56 File Reference

Definition : The file name of an externally referenced text file.

Type : text

CamelCase : fileReference

Alias : TXTDSC

Remarks :

18.57 Firefighting Service

Definition : Services for combating fires, provided by different methods.

Type : enumeration

CamelCase : firefightingService

Alias :

Remarks :

Code	Label	Definition
1	Shore-Based Firefighting	Personnel and equipment that are capable of combating a fire from ashore.

Code	Label	Definition
2	Onboard Firefighting	Trained firefighting personnel with the capability of boarding and combating a fire on a vessel.
3	Firefighting Boat	Specialised watercraft with firefighting apparatus designed for fighting shoreline and shipboard fires

18.58 Frequency Shore Station Receives

Definition : The shore station receiver frequency.

Type : integer

CamelCase : frequencyShoreStationReceives

Alias : FRQRXV

Remarks :

Units: Hz **Definition**: Cycles per second **Symbol**: Hz

Range: Lower Bound (Exclusive): 0 Upper Bound: (not specified)

18.59 Frequency Shore Station Transmits

Definition : The shore station transmitter frequency.

Type : integer

CamelCase : frequencyShoreStationTransmits

Alias : FRQTXM

Remarks :

Units: Hz **Definition**: Cycles per second **Symbol**: Hz

Range: Lower Bound (Exclusive): 0 Upper Bound: (not specified)

18.60 GLN Extension

Definition : The GLN extension component is used to identify internal physical locations within a location which is identified with a GLN. Must conform to the rules for GLN extension. (GS1 specification).

Type : text

CamelCase : gLNExtension

Alias :

Remarks :

18.61 Global Location Number

Definition : A globally unique, standardised identifier for parties and locations in business processes or supply chains.

Type : text

CamelCase : globalLocationNumber

Alias : GLN

Remarks : Global Location Numbers may be used to identify physical or digital locations, legal entities, organisational subdivisions or departments. A Global Location Number must conform to the GLN format specified in GS1 General Specifications.

Max. length: 13

Text pattern: \d{13}

18.62 Headline

Definition : Words set at the head of a passage or page to introduce or categorize.

Type : text

CamelCase : headline

Alias :

Remarks :

18.63 Heaving Lines From Shore

Definition : Ships must take heaving lines thrown from the shore.

Type : boolean

CamelCase : heavingLinesFromShore

Alias :

Remarks : Some ports make a ship take their heaving line.

18.64 Height

Definition : The value of the vertical distance to the highest point of the feature, measured from a specified vertical datum.

Type : real

CamelCase : height

Alias : HEIGHT

Remarks :

Units: Metre **Definition**: The basic unit of length in the International System of Units (SI) system. **Symbol**: m

Range: Lower Bound (Exclusive): 0.0 Upper Bound: (not specified)

18.65 Horizontal Distance Uncertainty

Definition : The best estimate of the horizontal accuracy of horizontal clearances and distances.

Type : real

CamelCase : horizontalDistanceUncertainty

Alias : HORACC

Remarks : The error is assumed to be positive and negative. The plus/minus character must not be encoded.

Units: metres **Definition**: SI Metres **Symbol**: m

Range: Lower Bound (Inclusive): 0 Upper Bound: (not specified)

18.66 ID Code

Definition : Identification code as specified in predefined system. Also called identification number.

Type : text

CamelCase : iDCode

Alias : Identification Number Identification Code

Remarks :

18.67 In Ballast

Definition : Whether the vessel is in ballast.

Type : boolean

CamelCase : inBallast

Alias :

Remarks :

18.68 Interoperability Identifier

Definition : A common unique identifier for entities which describe a single real-world feature, and which is used to identify instances of the feature in end-user systems where the feature may be included in multiple data product types.

Type : URN

CamelCase : interoperabilityIdentifier

Alias :

Remarks :

Text pattern: urn:mrn:.+

18.69 ISPS Level

Definition : Classification of ISPS security levels according to the ISPS Code.

Type : enumeration

CamelCase : iSPSLevel

Alias :

Remarks :

Code	Label	Definition
1	ISPS Level 1	The level for which minimum appropriate protective security measures shall be maintained at all times.
2	ISPS Level 2	The level for which appropriate additional protective security measures shall be maintained for a period of time as a result of heightened risk of a security incident.
3	ISPS Level 3	The level for which further specific protective security measures shall be maintained for a limited period of time when a security incident is probable or imminent, although it may not be possible to identify the specific target.

18.70 Language

Definition : The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way.

Type : text

CamelCase : language

Alias :

Remarks : The language is encoded by a 3 character code following ISO 639-2/T.

18.71 Linkage

Definition : Location (address) for online access using a URL/URI address or similar addressing scheme.

Type : URI

CamelCase : linkage

Alias :

Remarks :

18.72 Local Knowledge Description

Definition : Description of local knowledge that may be needed, for example to traverse a location.

Type : text

CamelCase : localKnowledgeDescription

Alias :

Remarks :

18.73 Location by Text

Definition : A textual rendering of a geographic location.

Type : text

CamelCase : locationByText

Alias :

Remarks :

18.74 Location Maritime Resource Name

Definition : Location identifier, based on MRN. This can be either a specific identifier for an identified physical location or a type-only identifier for a logical location, such as BERTH.

Type : URN

CamelCase : locationMRN

Alias :

Remarks :

18.75 Logical Connectives

Definition : Expresses whether all the constraints described by its co-attributes must be satisfied, or only one such constraint need be satisfied.

Type : enumeration

CamelCase : logicalConnectives

Alias : LOGCON

Remarks : Is intended to be used with co-attributes that encode limits on vessel dimensions, type of cargo, and other characteristics. The combination of constraints described by logicalConnectives and its co-attributes defines a subset of vessels to which information described by a feature or information type instance applies (or does not apply, is required, recommended, etc.). The relationship between the vessel subset and the information is indicated by an association — see PermissionType and InclusionType). The two listed values of logicalConnective are two of the basic operations of Boolean logic. The third basic operation (not) is not used.

Code	Label	Definition
1	Logical Conjunction	All the conditions described by the other attributes of the object, or sub-attributes of the same complex attribute, are true.
2	Logical Disjunction	At least one of the conditions described by the other attributes of the object, or sub-attributes of the same complex attributes, is true.

18.76 Manifold Number

Definition : An identifier for a specific location on a manifold (a pipe or chamber with several openings).

Type : text

CamelCase : manifoldNumber

Alias :

Remarks :

18.77 Maximum Display Scale

Definition : The largest intended viewing scale for the data.

Type : integer

CamelCase : maximumDisplayScale

Alias :

Remarks :

Range: Lower Bound (Inclusive): 1 Upper Bound: (not specified)

18.78 Maximum Permitted Draught

Definition : The maximum draught of a vessel permitted along a route, in a channel or dock, at a berth, or over a submerged feature.

Type : real

CamelCase : maximumPermittedDraught

Alias :

Remarks :

Units: Metre **Definition**: The basic unit of length in the International System of Units (SI) system. **Symbol**: m

Range: Lower Bound (Exclusive): 0.0 Upper Bound (Inclusive): 30.0

18.79 Maximum Permitted Vessel Length

Definition : The maximum length of a vessel permitted in a channel or dock, at a berth, or at an anchorage or mooring.

Type : real

CamelCase : maximumPermittedVesselLength

Alias :

Remarks :

Units: Metre **Definition**: The basic unit of length in the International System of Units (SI) system. **Symbol**: m

Range: Lower Bound (Exclusive): 0.0 Upper Bound: (not specified)

18.80 Medical Service

Definition : Services for the prevention or treatment of, or response to injury or illness.

Type : enumeration

CamelCase : medicalService

Alias :

Remarks :

Code	Label	Definition
1	Ambulance	A vehicle for conveying the sick or injured to or from a hospital.
2	Fumigation	Disinfection or purification with fumes.
3	Doctor	A place where a doctor is available to provide medical attention.
4	Quarantine	The isolation of patients with contagious diseases.
5	Vaccination Centre	A place where substances intended to procure immunity against one or several diseases are administered.

18.81 Membership

Definition : Indicates whether a vessel is included or excluded from the regulation/restriction/recommendation/nautical information.

Type : enumeration

CamelCase : membership

Alias :

Remarks :

Code	Label	Definition
1	Included	Vessels with these characteristics are included in the regulation/restriction/recommendation/nautical information.

Code	Label	Definition
2	Excluded	Vessels with these characteristics are excluded from the regulation/restriction/ recommendation/nautical information.

18.82 Method of Securing

Definition : The process, arrangement or scheme of attachment used to secure a vessel to a berth.

Type : enumeration

CamelCase : methodOfSecuring

Alias :

Remarks :

Code	Label	Definition
1	Bow to Seaward	Vessel is secured perpendicular to the wharf with bow to seaward.
2	Stern to Seaward	Vessel is secured perpendicular to the wharf with stern to the seaward.
3	Mediterranean Mooring	The vessel is secured perpendicular to the wharf.
4	Baltic Mooring	Mooring method/procedure used during onshore wind conditions without a tug.
5	Running Mooring	Mooring by maneuvering ahead and astern while dropping anchors to secure the vessel with reduced swinging room.
6	Standing Mooring	Mooring by using mainly wind and tide to position the vessel while dropping anchors to secure the vessel with reduced swinging room. Makes limited use of the engine to position the vessel.
7	Single Point Mooring	A mooring structure used by tankers to load and unload in port approaches or in offshore oil and gas fields. The size of the structure can vary between a large mooring buoy and a manned floating structure.
8	Multi-Buoy Mooring	A facility where a vessel is usually moored by a combination of the ship's anchors forward and mooring buoys aft and held on a fixed heading. Also called Conventional Buoy Mooring (CBM).
9	Ship-to-Ship Mooring	Mooring alongside another vessel.
10	Spider Buoy Mooring	Mooring system supported by a spider buoy.

18.83 Metre Mark Number

Definition : An identifier for a specific position along a linear or curvilinear extent of a wharf, quay, or jetty. Numbering may be continued over multiple segments.

Type : text

CamelCase : metreMarkNumber

Alias :

Remarks : Metre marks may be painted so as to be visible to ships approaching alongside. Metre mark numbering typically starts with zero at one end and increases with distance alongside from the commencement point.

18.84 Minimum Berth Depth

Definition : The least depth of the body of water at the berth or in a berth pocket adjacent to the berth.

Type : real

CamelCase : minimumBerthDepth

Alias :

Remarks : The minimum depth is measured from a specified sounding datum. A berth pocket is the body of water at a berth or anchor berth, of adequate dimensions to allow a vessel to make fast to the shore, mooring buoys, berthing dolphins or to anchor.

Units: Metre **Definition**: The basic unit of length in the International System of Units (SI) system. **Symbol**: m

Range: Lower Bound (Exclusive): 0.00 Upper Bound: (not specified)

18.85 Minimum Display Scale

Definition : The smallest intended viewing scale for the data.

Type : integer

CamelCase : minimumDisplayScale

Alias :

Remarks :

Range: Lower Bound (Inclusive): 1 Upper Bound: (not specified)

18.86 MMSI Code

Definition : The Maritime Mobile Service Identity (MMSI) Code is formed of a series of nine digits which are transmitted over the radio path in order to uniquely identify ship stations, ship earth stations,coast stations, coast earth stations, and group calls. These identities are formed in such a way that the identity or part thereof can be used by telephone and telex subscribers connected to the general telecommunications network principally to call ships automatically.

Type : text

CamelCase : mMSICode

Alias :

Remarks :

18.87 Name

Definition : The individual name of a feature.

Type : text

CamelCase : name

Alias : OBJNAM

Remarks :

18.88 Name of Resource

Definition : Name of the online resource.

Type : text

CamelCase : nameOfResource

Alias :

Remarks :

18.89 Name Usage

Definition : Classification of the type and display level of the name of a feature in an end-user system.

Type : enumeration

CamelCase : nameUsage

Alias :

Remarks :

Code	Label	Definition
1	Default Name Display	The name is intended to be displayed when the end-user system is set to the default name/text display setting.
2	Alternate Name Display	The name is intended to be displayed when the end-user system is set to an alternate name/text display setting, for example an alternate language.
3	No Chart Display	The name or text is not intended to be displayed.

18.90 Nationality

Definition : Identifier of membership of a particular nation.

Type : text

CamelCase : nationality

Alias : NATION

Remarks :

18.91 Online Function

Definition : Code for function performed by the online resource.

Type : enumeration

CamelCase : onlineFunction

Alias : ONLFUN

Remarks :

Code	Label	Definition
1	Download	Online instructions for transferring data from one storage device or system to another.
3	Offline Access	Online instructions for requesting the resource from the provider.
4	Order	Online order process for obtaining the resource.
5	Search	To make painstaking investigation or examination.

Code	Label	Definition
6	Complete Metadata	Complete metadata provided.
7	Browse Graphic	Browse graphic provided.
8	Upload	Online resource upload capability provided.
9	Email Service	Online email service provided.
10	Browsing	Online browsing provided.
11	File Access	Online file access provided.

18.92 Online Resource Description

Definition : Detailed text description of what the online resource is/does.

Type : text

CamelCase : onlineResourceDescription

Alias :

Remarks :

18.93 Optimum Display Scale

Definition : The largest intended viewing scale for the data.

Type : integer

CamelCase : optimumDisplayScale

Alias : CSCALE

Remarks :

Range: Lower Bound (Inclusive): 1 Upper Bound: (not specified)

18.94 Orientation Uncertainty

Definition : The best estimate of the accuracy of a bearing.

Type : real

CamelCase : orientationUncertainty

Alias :

Remarks :

Range: Lower Bound (Exclusive): 0.000 Upper Bound (Exclusive): 360.000

18.95 Orientation Value

Definition : The angular distance measured from true north to the major axis of the feature.

Type : real

CamelCase : orientationValue

Alias : ORIENT

Remarks :

Units: degrees **Definition**: degrees of arc **Symbol**: °

Range: Lower Bound (Inclusive): 0.0 Upper Bound (Inclusive): 360.0

18.96 Pictorial Representation

Definition : Indicates whether a pictorial representation of the feature is available.

Type : text

CamelCase : pictorialRepresentation

Alias : PICREP

Remarks : The ‘pictorial representation’ could be a drawing or a photo. The string encodes the file name of an external graphic file (pixel/vector).

18.97 Picture Caption

Definition : Short description of the purpose of the image.

Type : text

CamelCase : pictureCaption

Alias :

Remarks :

18.98 Picture Information

Definition : A set of information to provide credits to picture creator, copyright owner etc.

Type : text

CamelCase : pictureInformation

Alias :

Remarks :

18.99 Pilot Movement

Definition : Classification of pilot activity by arrival, departure, or change of pilot. It may also describe the place where the pilot’s advice begins, ends, or is transferred to a different pilot.

Type : enumeration

CamelCase : pilotMovement

Alias :

Remarks :

Code	Label	Definition
1	Embarkation	The place where vessels not being navigated according to a pilot’s instructions pick up a pilot while in transit from sea to a port or constricted waters for future navigation under pilot instructions.
2	Disembarkation	The place where vessels being navigated under a pilot’s instructions in transit from sea to a port or constricted waters drop the pilot and proceed without being subject to pilot instructions.

Code	Label	Definition
3	Pilot Change	The place where vessels being navigated under a pilot's instructions drop off the pilot and pick up a different pilot for future navigation under pilot's instructions.

18.100 Port Facility Number

Definition : Number assigned to the port facility in the IMO port facility database.

Type : text

CamelCase : portFacilityNumber

Alias : IMO Port Facility Number

Remarks : The IMO port facility number consists of a UN LOCODE with a 4-digit sufffix, seperated by a hyphen, for example USLAX-0001.

18.101 Postal Code

Definition : Known in various countries as a postcode, or ZIP code, the postal code is a series of letters and/or digits that identifies each postal delivery area.

Type : text

CamelCase : postalCode

Alias : POSCOD Postcode ZIP Code

Remarks :

18.102 Product

Definition : The various substances which are transported, stored or exploited.

Type : enumeration

CamelCase : product

Alias : PRODCT

Remarks :

Code	Label	Definition
1	Oil	A thick, slippery liquid that will not dissolve in water, usually petroleum based in the context of storage tanks.
2	Gas	A substance with particles that can move freely, usually a fuel substance in the context of storage tanks.
4	Stone	A general term for rock and rock fragments ranging in size from pebbles and gravel to boulders or large rock masses.
5	Coal	A hard black mineral that is burned as fuel.
6	Ore	A solid rock or mineral from which metal is obtained.
7	Chemicals	Any substance obtained by or used in a chemical process.
9	Milk	A white fluid secreted by female mammals as food for their young.
10	Bauxite	A mineral from which aluminum is obtained.

Code	Label	Definition
11	Coke	A solid substance obtained after gas and tar have been extracted from coal, used as a fuel.
12	Iron Ingots	An oblong lump of cast iron metal.
13	Salt	Sodium chloride obtained from mines or by the evaporation of sea water.
14	Sand	Loose material consisting of small but easily distinguishable, separate grains, between 0.0625 and 2.000 millimetres in diameter.
15	Timber	Wood prepared for use in building or carpentry.
16	Sawdust/Wood Chips	Powdery fragments of wood made in sawing timber or coarse chips produced for use in manufacturing pressed board.
17	Scrap Metal	Discarded metal suitable for being reprocessed.
18	Liquefied Natural Gas	Natural gas that has been liquefied for ease of transport by cooling the gas to -162 Celsius.
19	Liquefied Petroleum Gas	A compressed gas consisting of flammable light hydrocarbons and derived from petroleum.
20	Wine	The fermented juice of grapes.
21	Cement	A substance made of powdered lime and clay, mixed with water.
22	Grain	A small hard seed, especially that of any cereal plant such as wheat, rice, corn, rye etc.

18.103 Protocol

Definition : Connection protocol to be used. Example: ftp, http get KVP, http POST, etc.

Type : text

CamelCase : protocol

Alias : PROTCL

Remarks :

18.104 Protocol Request

Definition : Request used to access the resource. Structure and content depend on the protocol and standard used by the online resource, such as Web Feature Service standard.

Type : text

CamelCase : protocolRequest

Alias : PROTRQ

Remarks :

18.105 Quality of Horizontal Measurement

Definition : The degree of reliability attributed to a position.

Type : enumeration

CamelCase : qualityOfHorizontalMeasurement

Alias : QUAPOS

Remarks :

Code	Label	Definition
1	Surveyed	The position(s) was(were) determined by the operation of making measurements for determining the relative position of points on, above or beneath the earth's surface. Survey implies a regular, controlled survey of any date.
2	Unsurveyed	Survey data is does not exist or is very poor.
3	Inadequately Surveyed	Not surveyed to modern standards; or due to its age, scale, or positional or vertical uncertainties is not suitable to the type of navigation expected in the area.
4	Approximate	A position that is considered to be less than third-order accuracy, but is generally considered to be within 30.5 metres of its correct geographic location. Also may apply to an object whose position does not remain fixed.
5	Position Doubtful	Of uncertain position. The expression is used principally on charts to indicate that a wreck, shoal, etc., has been reported in various positions and not definitely determined in any.
6	Unreliable	A feature's position has been obtained from questionable or unreliable data.
7	Reported (Not Surveyed)	An object whose position has been reported and its position confirmed by some means other than a formal survey such as an independent report of the same object.
8	Reported (Not Confirmed)	An object whose position has been reported and its position has not been confirmed.
9	Estimated	The most probable position of an object determined from incomplete data or data of questionable accuracy.
10	Precisely Known	A position that is of a known value, such as the position of an anchor berth or other defined object.
11	Calculated	A position that is computed from data.

18.106 Radius

Definition : The vector extending from the centre to the periphery of a circular or spherical feature.

Type : real

CamelCase : radius

Alias : RADIUS

Remarks :

Units: Metre **Definition**: The basic unit of length in the International System of Units (SI) system. **Symbol**: m

Range: Lower Bound (Exclusive): 0.0 Upper Bound: (not specified)

18.107 Ramp Number

Definition : An identifier for a specific ramp (a sloping structure that can be used as a landing place for small vessels, landing ships, or a ferry boat, or for hauling a cradle carrying a vessel, or for the transfer of rolling cargo).

Type : text

CamelCase : rampNumber

Alias :

Remarks :

18.108 Repair Service

Definition : Work or maintenance activities whereby vessels or equipment are restored to working order, renovated, or improved in condition.

Type : enumeration

CamelCase : repairService

Alias :

Remarks :

Code	Label	Definition
1	Compensation of Magnetic Compass	The process of neutralizing or reducing to a minimum the magnetic effects the vessel itself exerts on a magnetic compass. It is based on the principle that the magnetic effect of the iron and steel of the vessel can be counterbalanced by means of magnets and soft iron placed near the compass. Also called compass adjustment, compass compensation, or magnetic compensation.
2	Diver Service	Underwater inspection and repair performed by divers.
3	Bridge Equipment Repair	Repairs to eqipment installed on the ship’s bridge.
4	Engine Repair	Repair of an engine or machine parts.
5	Electronic Equipment Repair	Repair of marine electronic instruments.
6	Hull Repair	Repairs to the ship’s body, frame, or superstructure.
7	Navigational Equipment Repair	Repairs to equipment used in the act of navigating a ship.
8	Propeller Repair	Repairs to propeller hub and blades.
9	Salvage Gear Repair	Repairs to equipment used in salvage operations.
10	Shaft Repair	Repairs to drive shafts used for transmitting mechanical power and torque to a propeller.

18.109 Reported Date

Definition : The date that the item was observed, done, or investigated.

Type : S100_TruncatedDate

CamelCase : reportedDate

Alias : SORDAT

Remarks :

18.110 Safe Working Load

Definition : The maximum safe force or load that a piece of equipment, device, or accessory can handle without breaking or failing under normal conditions.

Type : real

CamelCase : safeWorkingLoad

Alias :

Remarks :

Units: KiloNewton **Definition**: Unit of force. One Newton is defined as 1 kg-m/s^2. 1kN = 1000N. **Symbol**: kN

Range: Lower Bound (Exclusive): 0.0 Upper Bound: (not specified)

18.111 Scale Minimum

Definition : The minimum scale at which the feature may be used for example for ECDIS presentation.

Type : integer

CamelCase : scaleMinimum

Alias : SCAMIN

Remarks : The modulus of the scale is indicated, that is 1:1 250 000 is encoded as 1250000.

18.112 Ship Sanitation Control

Definition : Application of measures to ensure that a vessel is free of disease and disease risks, or issue of completion or exemption certificates for such measures.

Type : enumeration

CamelCase : shipSanitationControl

Alias :

Remarks :

Code	Label	Definition
1	Sanitation Measures Only	Capable of applying measures to ensure that a vessel is free of disease and disease risks, but cannot issue a certificate.
2	Issue SSCC	The competent authority can issue a Ship Sanitation Control Certificate after satisfactorily completing or supervising the completion of ship sanitation control measures.
3	Issue SSCEC	The competent authority may issue a Ship Sanitation Control Exemption Certificate if it is satisfied that the ship is free of infection and contamination, including vectors and reservoirs.

18.113 Shore Power Description

Definition : A textual description of precautions for shore power usage.

Type : text

CamelCase : shorePowerDescription

Alias :

Remarks :

18.114 Shore Power Service Provider

Definition : An entity that generates, sells, or is responsible for supplying shore power to vessels.

Type : text

CamelCase : shorePowerServiceProvider

Alias :

Remarks :

18.115 Sill Depth

Definition : The greatest depth over a sill.

Type : real

CamelCase : sillDepth

Alias :

Remarks :

Units: Metre **Definition**: The basic unit of length in the International System of Units (SI) system. **Symbol**: m

Range: Lower Bound (Inclusive): 0.0 Upper Bound (Inclusive): 100.0

18.116 SMDG Terminal Code

Definition : A code from the SMDG (Ship Message Design Group) Terminal Code List.

Type : text

CamelCase : sMDGTerminalCode

Alias :

Remarks : The SMDG Terminal Code List (TCL) contains codes for container handling terminal facilities that are called by seagoing cargo vessels in maritime transport. The SMDG terminal code is used when necessary to define a geographic subset of a location identified by a UN/LOCODE.

18.117 Source

Definition : The publication, document, or reference work from which information comes or is acquired.

Type : text

CamelCase : source

Alias :

Remarks : May be populated with the corresponding paper chart Notice to Mariners numbers, although other references are permitted.

Max. length: 150

18.118 Source Date

Definition : The production date of the source; for example the date of measurement.

Type : date

CamelCase : sourceDate

Alias : SORDAT

Remarks :

18.119 Source Type

Definition : Type of the source.

Type : enumeration

CamelCase : sourceType

Alias :

Remarks :

Code	Label	Definition
1	Law or Regulation	Treaty, convention, or international agreement; law or regulation issued by a national or other authority.
2	Official Publication	Publication not having the force of law, issued by an international organisation or a national or local administration.
7	Mariner Report, Confirmed	Reported by mariner(s) and confirmed by another source.
8	Mariner Report, Not Confirmed	Reported by mariner(s) but not confirmed.
9	Industry Publications and Reports	Shipping and other industry publications, including graphics, charts and web sites.
10	Remotely Sensed Images	Information obtained from satellite images.
11	Photographs	Information obtained from photographs.
12	Products Issued by HO Services	Information obtained from products issued by Hydrographic Offices.
13	News Media	Information obtained from news media.
14	Traffic Data	Information obtained from the analysis of traffic data.

18.120 Supply Service

Definition : Classification of services for the provision of materials, goods, utilities, or personal services to vessels, passengers, or crew.

Type : enumeration

CamelCase : supplyService

Alias :

Remarks : Describes an enumeration or codelist listing specific services.

Code	Label	Definition
1	Shore Power	The provision of shoreside electrical power to a ship at berth while its main and auxiliary engines are shut down.
2	Fuel Oil Bunkering	Transfer of fuel oil to the fuel compartments of a ship.
3	LNG Bunkering	Transfer of liquefied natural gas to the fuel compartments of a ship.
4	Lubricants	Substances capable of reducing friction, heat, and wear when introduced as a film between solid surfaces.
5	Steam	The gas into which water is changed by boiling.

Code	Label	Definition
6	Potable Water	Water which can be used for drinking and food preparation.
7	International Shore Connection	A universal hose connection for the supply of water for fighting fires.
8	Provisions	A place where food and other such supplies are available.
9	Chandler	A dealer in ships' supplies.
10	Mechanics Workshop	A place where mechanical repairs can be undertaken to engines or other vessel equipment.

18.121 Technical Port Service

Definition : Services for the adjustment of vessel equipment or for assessments pertaining to cargo, compliance with regulations, safety, or security.

Type : enumeration

CamelCase : technicalPortService

Alias :

Remarks :

Code	Label	Definition
1	Compensation of Magnetic Compass	The process of neutralizing or reducing to a minimum the magnetic effects the vessel itself exerts on a magnetic compass. It is based on the principle that the magnetic effect of the iron and steel of the vessel can be counterbalanced by means of magnets and soft iron placed near the compass. Also called compass adjustment, compass compensation, or magnetic compensation.
2	Degaussing	Neutralization of the strength of the magnetic field of a vessel, by means of suitably arranged electric coils permanently installed in the vessel. See also Degaussing Cable.
3	Cargo Surveying	Inspection, evaluation or monitoring of the quantity, stowage, loading and unloading, and condition of cargo, and the effects of cargoes on vessel stability and safety.
4	Vetting	Assessment of quality and compliance with applicable law, regulations, and safety standards.

18.122 Telecommunication Carrier

Definition : The name of a provider or type of carrier for a telecommunication service. This service may include land line based, shore based or satellite based radio connections.

Type : text

CamelCase : telecommunicationCarrier

Alias :

Remarks :

18.123 Telecommunication Identifier

Definition : An identifier, such as words, numbers, letters, symbols, or any combination of those used to establish a contact to a particular person, organisation or service.

Type : text

CamelCase : telecommunicationIdentifier

Alias :

Remarks :

18.124 Telecommunication Service

Definition : Classification of methods of communication over a distance by electrical, electronic, or electromagnetic means.

Type : enumeration

CamelCase : telecommunicationService

Alias :

Remarks :

Code	Label	Definition
1	Voice	The transfer or exchange of information by using sounds that are being made by mouth and throat when speaking.
2	Facsimile	A system of transmitting and reproducing graphic matter (as printing or still pictures) by means of signals sent over telephone lines.
3	SMS	Short Message Service is a form of text messaging communication on phones and mobile phones.
4	Data	A representation of facts, concepts or instructions in a formalised manner suitable for communication, interpretation or processing.
5	Streamed Data	Data that is constantly received by and presented to an end-user while being delivered by a provider.
6	Telex	A system of communication in which messages are sent over long distances by using a telephone system and are printed by using a special machine (called a teletypewriter).
7	Telegraph	An apparatus, system or process for communication at a distance by electric transmission over wire.
8	Email	Messages and other data exchanged between individuals using computers in a network.

18.125 Terminal Identifier

Definition : The unique identifier for a given terminal.

Type : text

CamelCase : terminalIdentifier

Alias :

Remarks :

18.126 Text

Definition : A non-formatted digital text string.

Type : text

CamelCase : text

Alias : INFORM NINFOM

Remarks : Should be used, for example, to hold the information that is for short cautionary or explanatory notes. Therefore, text populated in text must not exceed 300 characters. Text may be in English, or in a national language. No formatting of text is possible within text. If formatted text, or text strings exceeding 300 characters, is required, then an alternate concept should be used.

18.127 Text Offset Bearing

Definition : The angular distance measured from true north that text associated with a feature is positioned from the feature in an end-user system.

Type : integer

CamelCase : textOffsetBearing

Alias :

Remarks :

Units: Degree of Arc **Definition**: 1° = (π/180) rad **Symbol**: °

Range: Lower Bound (Exclusive): 0 Upper Bound (Exclusive): 360

18.128 Text Offset Distance

Definition : The distance that text associated with a feature is positioned from the feature in an end-user system.

Type : integer

CamelCase : textOffsetDistance

Alias :

Remarks :

Units: Millimetre **Definition**: 1 metre = 1000 millimetres **Symbol**: mm

Range: Lower Bound (Exclusive): 0 Upper Bound (Inclusive): 50

18.129 Text Rotation

Definition : A statement that expresses if text associated with a feature is to be rotated in the ECDIS display or not.

Type : boolean

CamelCase : textRotation

Alias :

Remarks :

18.130 Text Type

Definition : The attribute from which a text string is derived.

Type : enumeration

CamelCase : textType

Alias :

Remarks :

Code	Label	Definition
1	Name	The individual name of a feature.

18.131 Thickness of Ice Capability

Definition : The thickness of ice that the ship can safely transit.

Type : integer

CamelCase : thicknessOfIceCapability

Alias :

Remarks :

Units: centimetres **Definition**: Centimetres (SI) **Symbol**: cm

Range: Lower Bound (Exclusive): 0 Upper Bound: (not specified)

18.132 Time of Day End

Definition : The time corresponding to the end of an active period.

Type : time

CamelCase : timeOfDayEnd

Alias :

Remarks : The time of day end must be encoded using 2 digits for the hour (hh), 2 digits for the minutes(mm) and 2 digits for the seconds (ss). This conforms to ISO 8601:2004.

18.133 Time of Day Start

Definition : The time corresponding to the start of an active period.

Type : time

CamelCase : timeOfDayStart

Alias :

Remarks : The time of day start must be encoded using 2 digits for the hour (hh), 2 digits for the minutes(mm) and 2 digits for the seconds (ss). This conforms to ISO 8601:2004.

18.134 Tug Information

Definition : Textual description of the types and capacities of available tugs.

Type : text

CamelCase : tugInformation

Alias :

Remarks :

18.135 UN Location Code

Definition : Used to encode the UN Location Code (http://www.unece.org/cefact/locode/service/location.html) or — in Europe — the Inland Ship Reporting Standard (ISRS) Code.

Type : text

CamelCase : uNLocationCode

Alias : unlocd

Remarks : The ISRS Code exists of: — UN country code (2 digits), — UN Location code (3 digits, “XXX” if not available), — Fairway section number (5 numerical digits, to be determined by the national authority; a side branch should have an own section number, when there are special restrictions, e.g. bridges), — terminal code or passage point code (5 alphanumerical digits, “00000” if not available), — fairway section hectometre (5 numerical digits, hectometre at the centre of the area, “00000” if not available). If the ISRS code is not available, the code of the Nordersoft RIS-Index may be used.

Max. length: 20

18.136 Uncertainty Fixed

Definition : The best estimate of the fixed horizontal or vertical accuracy component for positions, depths, heights, vertical distances and vertical clearances.

Type : real

CamelCase : uncertaintyFixed

Alias : POSACC SOUACC VERACC

Remarks :

Units: Metre **Definition**: The basic unit of length in the International System of Units (SI) system.
Symbol: m

18.137 Uncertainty Variable Factor

Definition : The factor to be applied to the variable component of an uncertainty equation so as to provide the best estimate of the variable horizontal or vertical accuracy component for positions, depths, heights, vertical distances and vertical clearances.

Type : real

CamelCase : uncertaintyVariableFactor

Alias :

Remarks :

18.138 Vertical Clearance Value

Definition : The vertical clearance measured from the horizontal plane towards the feature overhead.

Type : real

CamelCase : verticalClearanceValue

Alias : VERCLR VERCCL VERCOP VERCSA

Remarks :

Units: Metre **Definition**: The basic unit of length in the International System of Units (SI) system.
Symbol: m

Range: Lower Bound (Inclusive): 0.1 Upper Bound (Inclusive): 100.0

18.139 Vertical Datum

Definition : The reference level used for expressing the vertical measurements of points on the earth's surface. Also called datum level, reference plane, levelling datum, datum for sounding reduction, datum for heights.

Type : enumeration

CamelCase : verticalDatum

Alias : VERDAT Datum Level Reference Plane Levelling Datum Datum for Sounding Reduction Datum for Heights

Remarks :

Code	Label	Definition
1	Mean Low Water Springs	The average height of the low waters of spring tides. This level is used as a tidal datum in some areas. Also called spring low water.
2	Mean Lower Low Water Springs	The average height of lower low water springs at a place.
3	Mean Sea Level	The average height of the surface of the sea at a tide station for all stages of the tide over a 19-year period, usually determined from hourly height readings measured from a fixed predetermined reference level.
4	Lowest Low Water	An arbitrary level conforming to the lowest tide observed at a place, or some what lower.
5	Mean Low Water	The average height of all low waters at a place over a 19-year period.
6	Lowest Low Water Springs	An arbitrary level conforming to the lowest water level observed at a place at spring tides during a period of time shorter than 19 years.
7	Approximate Mean Low Water Springs	An arbitrary level, usually within 0.3m from that of Mean Low Water Springs (MLWS).
8	Indian Spring Low Water	An arbitrary tidal datum approximating the level of the mean of the lower low water at spring tides. It was first used in waters surrounding India.
9	Low Water Springs	An arbitrary level, approximating that of mean low water springs (MLWS).
10	Approximate Lowest Astronomical Tide	An arbitrary level, usually within 0.3m from that of Lowest Astronomical Tide (LAT).
11	Nearly Lowest Low Water	An arbitrary level approximating the lowest water level observed at a place, usually equivalent to the Indian Spring Low Water (ISLW).
12	Mean Lower Low Water	The average height of the lower low waters at a place over a 19-year period.
13	Low Water	The lowest level reached at a place by the water surface in one oscillation. Also called low tide.
14	Approximate Mean Low Water	An arbitrary level, usually within 0.3m from that of Mean Low Water (MLW).
15	Approximate Mean Lower Low Water	An arbitrary level, usually within 0.3m from that of Mean Lower Low Water (MLLW).
16	Mean High Water	The average height of all high waters at a place over a 19-year period.
17	Mean High Water Springs	The average height of the high waters of spring tides. Also called spring high water.
18	High Water	The highest level reached at a place by the water surface in one oscillation.

Code	Label	Definition
19	Approximate Mean Sea Level	An arbitrary level, usually within 0.3m from that of Mean Sea Level (MSL).
20	High Water Springs	An arbitrary level, approximating that of mean high water springs (MHWS).
21	Mean Higher High Water	The average height of higher high waters at a place over a 19-year period.
22	Equinoctial Spring Low Water	The level of low water springs near the time of an equinox.
23	Lowest Astronomical Tide	The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.
24	Local Datum	An arbitrary datum defined by a local harbour authority, from which levels and tidal heights are measured by this authority.
25	International Great Lakes Datum 1985	A vertical reference system with its zero based on the mean water level at Rimouski/Pointe-au-Pere, Quebec, over the period 1970 to 1988.
26	Mean Water Level	The average of all hourly water levels over the available period of record.
27	Lower Low Water Large Tide	The average of the lowest low waters, one from each of 19 years of observations.
28	Higher High Water Large Tide	The average of the highest high waters, one from each of 19 years of observations.
29	Nearly Highest High Water	An arbitrary level approximating the highest water level observed at a place, usually equivalent to the high water springs.
30	Highest Astronomical Tide	The highest tidal level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.
44	Baltic Sea Chart Datum 2000	The datum refers to each Baltic country's realization of the European Vertical Reference System (EVRS) with land-uplift epoch 2000, which is connected to the Normaal Amsterdams Peil (NAP).

18.140 Vertical Length

Definition : The total vertical length of a feature.

Type : real

CamelCase : verticalLength

Alias : VERLEN

Remarks :

Units: Metre **Definition**: The basic unit of length in the International System of Units (SI) system. **Symbol**: m

Range: Lower Bound (Exclusive): 0.0 Upper Bound: (not specified)

18.141 Vessel Performance

Definition : A description of the required handling characteristics of a vessel including hull design, main and auxiliary machinery, cargo handling equipment, navigation equipment and manoeuvring behaviour.

Type : text

CamelCase : vesselPerformance

Alias :

Remarks :

18.142 Vessels Characteristics

Definition : Characteristics of vessels.

Type : enumeration

CamelCase : vesselsCharacteristics

Alias : VSLCAR

Remarks :

Code	Label	Definition
1	Length Overall	The maximum length of the ship.
2	Length at Waterline	The ship's length measured at the waterline.
3	Breadth	The width or beam of the vessel.
4	Draught	The depth of water necessary to float a vessel fully loaded.
6	Displacement Tonnage	A measurement of the weight of the vessel, usually used for warships. (Merchant ships are usually measured based on the volume of cargo space; see tonnage). Displacement is expressed either in long tons of 2,240 pounds or metric tonnes of 1,000 kg. Since the two units are very close in size (2,240 pounds = 1,016 kg and 1,000 kg = 2,205 pounds), it is common not to distinguish between them. To preserve secrecy, nations sometimes misstate a warship's displacement.
7	Displacement Tonnage, Light	The weight of the ship excluding cargo, fuel, ballast, stores, passengers, and crew, but with water in the boilers to steaming level.
8	Displacement Tonnage, Loaded	The weight of the ship including cargo, passengers, fuel, water, stores, dunnage and such other items necessary for use on a voyage, which brings the vessel down to her load draft.
9	Deadweight Tonnage	The difference between displacement, light and displacement, loaded. A measure of the ship's total carrying capacity.
10	Gross Tonnage	The entire internal cubic capacity of the ship expressed in tons of 100 cubic feet to the ton, except certain spaces with are exempted such as: peak and other tanks for water ballast, open forecastle bridge and poop, access of hatchways, certain light and air spaces, domes of skylights, condenser, anchor gear, steering gear, wheel house, galley and cabin for passengers.
11	Net Tonnage	Obtained from the gross tonnage by deducting crew and navigating spaces and allowances for propulsion machinery.
12	Panama Canal/ Universal Measurement System Net Tonnage	The Panama Canal/Universal Measurement System (PC/UMS) is based on net tonnage, modified for Panama Canal purposes. PC/UMS is based on a mathematical formula to calculate a vessel's total volume; a PC/UMS net ton is equivalent to 100 cubic feet of capacity.
13	Suez Canal Net Tonnage	The Suez Canal Net Tonnage (SCNT) is derived with a number of modifications from the former net register tonnage of the Moorsom System and was established by the International Commission of Constantinople in its Protocol of 18 December 1873. It is still in use, as amended by the Rules of Navigation of the Suez Canal Authority, and is registered in the Suez Canal Tonnage Certificate.

18.143 Vessels Characteristics Unit

Definition : The unit used for vessel characteristics attribute.

Type : enumeration

CamelCase : vesselsCharacteristicsUnit

Alias : VSLUNT

Remarks :

Code	Label	Definition
1	Metres	The basic unit of length in the International System of Units (SI) system.
3	Metric Ton	The tonne or metric ton (U.S.), often redundantly referred to as a metric tonne, is a unit of mass equal to 1,000 kg (2,205 lb) or approximately the mass of one cubic metre of water at four degrees Celsius. It is sometimes abbreviated as mt in the United States, but this conflicts with other SI symbols. The tonne is not a unit in the International System of Units (SI), but is accepted for use with the SI. In SI units and prefixes, the tonne is a megagram (Mg). The Imperial and US customary units comparable to the tonne are both spelled ton in English, though they differ in mass. Pronunciation of tonne (the word used in the UK) and ton is usually identical, but is not too confusing unless accuracy is important as the tonne and UK long ton differ by only 1.6.
4	Ton	Long ton (weight ton or imperial ton) is the name for the unit called the “ton” in the avoirdupois or Imperial system of measurements, as used in the United Kingdom and several other Commonwealth countries. It has been mostly replaced by the tonne, and in the United States by the short ton. One long ton is equal to 2,240 pounds (1,016 kg) or 35 cubic feet (0.9911 m) of salt water with a density of 64 lb/ft (1.025 g/ml). It has some limited use in the United States, most commonly in measuring the displacement of ships, and was the unit prescribed for warships by the Washington Naval Treaty for example battleships were limited to a mass of 35,000 long tons (36,000 t; 39,000 ST).
5	Short Ton	A unit of weight equal to 2,000 pounds (907.18474 kg). In the United States it is often called simply ton without distinguishing it from the metric ton (tonne, 1,000 kilograms) or the long ton (2,240 pounds / 1,016.0469088 kilograms); rather, the other two are specifically noted. There are, however, some US applications for which unspecified tons normally means long tons (for example, Navy ships) or metric tons (world grain production figures). Both the long and short ton are defined as 20 hundredweights, but a hundredweight is 100 pounds (45.359237 kg) in the US system (short or net hundredweight) and 112 pounds (50.80234544 kg) in the Imperial system (long or gross hundredweight).
6	Gross Ton	Gross tonnage (GT) is a function of the volume of all ship’s enclosed spaces (from keel to funnel) measured to the outside of the hull framing. There is a sliding scale factor. So GT is a kind of capacity-derived index that is used to rank a ship for purposes of determining manning, safety and other statutory requirements and is expressed simply as GT, which is a unitless entity, even though its derivation is tied to the cubic meter unit of volumetric capacity.Tonnage measurements are now governed by an IMO Convention (International Convention on Tonnage Measurement of Ships, 1969 (London-Rules)), which applies to all ships built after July 1982. In accordance with the Convention, the correct term to use now is GT, which is a function of the moulded volume of all enclosed spaces of the ship.
7	Net Ton	Net tonnage (NT) is based on a calculation of the volume of all cargo spaces of the ship. It indicates a vessels earning space and is a function of the moulded volume of all cargo spaces of the ship.
9	Suez Canal Net Tonnage	The Suez Canal Net Tonnage (SCNT) is derived with a number of modifications from the former net register tonnage of the Moorsom System and was established by the International Commission of Constantinople in its Protocol of 18 December 1873. It is still in use, as amended by the Rules of Navigation of the Suez Canal Authority, and is registered in the Suez Canal Tonnage Certificate.

18.144 Vessels Characteristics Value

Definition : The value of a particular characteristic such as a dimension or tonnage of a vessel.

Type : real

CamelCase : vesselsCharacteristicsValue

Alias :

Remarks : Indicates range limits in expressions characterizing vessels by dimensions and tonnages. The unit of measure, characteristic, and comparison operator (greater, less, etc.) are encoded separately.

18.145 Visitors Mooring

Definition : A mooring set aside for the use of visiting vessels.

Type : boolean

CamelCase : visitorsMooring

Alias :

Remarks :

18.146 Waste Disposal Service

Definition : Service for the reception of residues, polluting substances, refuse, oily wastes, and by-products from ships.

Type : enumeration

CamelCase : wasteDisposalService

Alias :

Remarks :

Code	Label	Definition
1	MARPOL Annex I Oily Bilge Water	The service with facility to receive oil related waste/residue of the type “Oily bilge water” as specified in MARPOL Annex I.
2	MARPOL Annex I Oily Residues	The service with facility to receive oil related waste/residue of the type “Oily Residues (sludge)” as specified in MARPOL Annex I.
3	MARPOL Annex I Oily Tank Washings	The service with facility to receive oil related waste/residue of the type “Oily tank washings (slops)” as specified in MARPOL Annex I.
4	MARPOL Annex I Dirty Ballast Water	The service with facility to receive oil related waste/residue of the type “Dirty ballast water” as specified in MARPOL Annex I.
5	MARPOL Annex I Scale and Sludge from Tank Cleaning	The service with facility to receive oil related waste/residue of the type “Scale and sludge from tank cleaning” as specified in MARPOL Annex I.
6	MARPOL Annex I Other Oily Waste	The service with facility to receive oil related waste/residue of the type “Other” as specified in MARPOL Annex I.
7	MARPOL Annex II Category X	The service with facility to receive chemical/Noxious liquid substances related waste/residue of the type “Category X” as specified in MARPOL Annex II.
8	MARPOL Annex II Category Y	The service with facility to receive chemical/Noxious liquid substances related waste/residue of the type “Category Y” as specified in MARPOL Annex II.

Code	Label	Definition
9	MARPOL Annex II Category Z	The service with facility to receive chemical/Noxious liquid substances related waste/residue of the type “Category Z” as specified in MARPOL Annex II.
10	MARPOL Annex II Category OS	The service with facility to receive chemical/Noxious liquid substances related waste/residue of the type “Other substance” as specified in MARPOL Annex II.
11	MARPOL Annex IV Sewage	The service with facility to receive waste/residue of the type “Sewage” as specified in MARPOL Annex IV.
12	MARPOL Annex V Plastics	The service with facility to receive garbage related waste/residue of the type “Plastics”, as specified in MARPOL Annex V
13	MARPOL Annex V Food Wastes	The service with facility to receive garbage related waste/residue of the type “Food wastes”, as specified in MARPOL Annex V
14	MARPOL Annex V Domestic Wastes	The service with facility to receive garbage related waste/residue of the type “Domestic wastes”, as specified in MARPOL Annex V
15	MARPOL Annex V Cooking Oil	The service with facility to receive garbage related waste/residue of the type “Cooking oil”, as specified in MARPOL Annex V
16	MARPOL Annex V Incinerator Ashes	The service with facility to receive garbage related waste/residue of the type “Incinerator ashes”, as specified in MARPOL Annex V
17	MARPOL Annex V Operational Wastes	The service with facility to receive garbage related waste/residue of the type “Operational wastes”, as specified in MARPOL Annex V
18	MARPOL Annex V Animal Carcasses	The service with facility to receive garbage related waste/residue of the type “Animal carcasses”, as specified in MARPOL Annex V
19	MARPOL Annex V Fishing Gear	The service with facility to receive garbage related waste/residue of the type “Fishing gear”, as specified in MARPOL Annex V
20	MARPOL Annex V E-Waste	The service with facility to receive garbage related waste/residue of the type “E-waste”, as specified in MARPOL Annex V
21	MARPOL Annex V Cargo Residues — non-HME	The service with facility to receive garbage related waste/residue of the type “Cargo residues not determined to be harmful to the marine environment”, as specified in MARPOL Annex V
22	MARPOL Annex V Cargo Residues — HME	The service with facility to receive garbage related waste/residue of the type “Cargo residues harmful to the marine environment”, as specified in MARPOL Annex V
23	MARPOL Annex VI Ozone-Depleting Substances	The service with facility to receive air pollution related waste/residue of the type “Ozone-depleting substances” as specified in MARPOL Annex VI.
24	MARPOL Annex VI Exhaust Gas-Cleaning Residues	The service with facility to receive air pollution related waste/residue of the type “Exhaust gas-cleaning residues” as specified in MARPOL Annex VI.

18.147 Action or Activity

Definition : The action or activity of a vessel.

Type : S100_CodeList

CamelCase : actionOrActivity

Alias :

Remarks : codeListType=open enumeration; encoding=other: [something]

Code	Label	Definition
1	Navigating With a Pilot	Carrying a qualified pilot as part of the vessel navigation team.
2	Entering Port	Navigating a vessel into a port.
3	Leaving Port	Navigating a vessel out of a port.
4	Berthing	Attaching a vessel to a wharf or jetty.
5	Slipping	Detaching a vessel from a wharf or jetty.
6	Anchoring	Attaching a vessel to the seabed by means of an anchor and cable.
7	Weighing Anchor	Detaching a vessel from the seabed by recovering an anchor and cable.
8	Transiting	Navigating a vessel along a route or through a narrow gap, such as under a bridge or through a lock.
9	Overtaking	Navigating a vessel past another traveling broadly in the same direction.
10	Reporting	Providing details such as the name, location or intentions of a vessel.
11	Working Cargo	Loading or unloading cargo.
12	Landing	Placing crew or passengers on shore.
13	Diving	A signal or message warning of diving activity.
14	Fishing	Hunting or catching fish.
15	Discharging Overboard	Releasing anything into the sea; often ballast water; or spoil from dredging elsewhere.
16	Passing	Navigating a vessel past another travelling broadly in the opposite direction.
17	Ballast Water Exchange	Discharge and uptake of ballast water.
18	Hull Cleaning	The removal or treatment of biofouling (accumulation of aquatic organisms including microfouling and macrofouling) from a ship’s submerged surfaces, including hull and niche areas, conducted either in-water or during dry-docking. The process includes both proactive cleaning (periodic removal of microfouling) and reactive cleaning (removal of micro- and macrofouling as corrective action).
19	Scientific Research	The conduct of observational, sampling, or experimental activities by authorised personnel to collect scientific or environmental data, which may involve the deployment of scientific instruments, collection of biological or geological samples, or in-water survey operations.
20	Tourism	Organised recreational visitation and leisure activities in marine areas, including sight-seeing, wildlife observation, glass-bottom vessel tours, and guided nature excursions conducted by commercial or permitted operators.
21	Education	Structured activities conducted for training, awareness, or interpretive purposes involving groups or individuals learning about the marine environment, including guided educational programs, school activities, and field instruction conducted within designated marine areas.
22	Infrastructure Maintenance	Inspection, repair, or upkeep of existing marine or coastal infrastructure such as wharves, piers, pipelines, moorings, subsea cables, navigational aids, or coastal protection structures, including minor works that do not expand the original footprint.

18.148 Category of RxN

Definition : The principal subject matter of regulations, restrictions, recommendations or nautical information.

Type : S100_CodeList

CamelCase : categoryOfRxN

Alias :

Remarks : codeListType=open enumeration; encoding=other: [something]

Code	Label	Definition
1	Navigation	The process of directing the movement of a craft from one point to another.
2	Communication	Transmitting and/or receiving electronic communication signals.
3	Environmental Protection	Pertaining to environmental protection.
4	Wildlife Protection	Pertaining to wildlife protection.
5	Security	Pertaining to security.
6	Customs	The agency or establishment for collecting duties, tolls.
7	Cargo Operation	Pertaining to cargo operations.
8	Refuge	Pertaining to a place of safety or refuge.
9	Health	The authority with responsibility for checking the validity of the health declaration of a vessel and for declaring free pratique.
10	Natural Resources or Exploitation	Pertaining to natural resources or exploitation.
11	Port	Person or corporation, owners of, or entrusted with or invested with the power of managing a port. May be called a Harbour Board, Port Trust, Port Commission, Harbour Commission, Marine Department.
12	Finance	An authority with responsibility for the control and movement of money.
13	Agriculture	The science, art, or practice of cultivating the soil, producing crops, and raising livestock and in varying degrees the preparation and marketing of the resulting products.

18.149 Category of Vessel

Definition : Classification of vessels by function or use.

Type : S100_CodeList

CamelCase : categoryOfVessel

Alias :

Remarks : codeListType=open enumeration; encoding=other: [something]

Code	Label	Definition
1	General Cargo Vessel	A vessel which is designed for carrying general cargo, e.g. boxes, sacks.
2	Container Carrier	A vessel designed to carry ISO containers.
3	Tanker	A vessel which is designed for carrying liquid goods, for example oil or water.

Code	Label	Definition
4	Bulk Carrier	A vessel which is designed for carrying bulk goods, e.g. coal, ore or grain.
5	Passenger Vessel	A day trip or cabin vessel constructed and equipped to carry more than 12 passengers.
6	Roll-On Roll-Off	A vessel designed to allow road vehicles to be driven on and off; often a ferry.
7	Refrigerated Cargo Vessel	A vessel designed to carry refrigerated cargo.
8	Fishing Vessel	A vessel that is used and equipped for the fishing of living aquatic resources.
9	Service	A vessel which provides a service such as a tug, anchor handler, survey or supply vessel.
10	Warship	A vessel designed for the conduct of military operations.
11	Towed or Pushed Composite Unit	Either a tug and tow, or any combination of a tug providing propulsion to barges or vessels secured ahead or alongside.
12	Tug and Tow	A combination of tug(s) and non-powered tow(s).
13	Light Recreational	A pleasure boat or watercraft, or an excursion vessel used for short cruises such as whale watching.
14	Semi-Submersible Offshore Installation	An installation which is designed to float at all times and which is normally anchored in position when deployed in the offshore gas and oil industry.
15	Jack-Up Exploration or Project Installation	An exploration or project installation with legs which can be raised and lowered. The legs are raised when the installation is re-positioned. When stationary the legs are lowered to the sea floor and the working platform is raised clear of the sea surface.
16	Livestock Carrier	A vessel designed to carry large quantities of live animals.
17	Sport Fishing	A vessel used in fishing for pleasure or competition.

18.150 Security-Safety-Emergency Service

Definition : Protective services, law enforcement, or services for responding to sudden danger.

Type : S100_CodeList

CamelCase : securitySafetyEmergencyService

Alias :

Remarks : codelistType=openEnumeration

Code	Label	Definition
1	Coast Guard	Organization keeping watch on shipping and coastal waters according to governmental law; normally the authority with responsibility for search and rescue.
2	Customs	The agency or establishment for collecting duties, tolls.
3	Environmental Emergency Information Centre	Office for reporting or obtaining information about sudden dangers to the environment such as spillage of polluting or hazardous substances.
4	Emergency Coordination Centre	An office or organisation for reporting or coordinating response to emergencies.
5	Guard and/or Security Service	A place where a vessel is patrolled by a security service or stored in a secure lockup.

Code	Label	Definition
6	Immigration	The authority controlling people entering a country.
7	Police	The department of government, or civil force, charged with maintaining public order.
8	Sea Rescue Control	A unit responsible for promoting efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

18.151 Transport Connection

Definition : Classification of services for the conveyance of persons and/or goods, according to means of transport, nature of path, or representative installation.

Type : S100_CodeList

CamelCase : transportConnection

Alias : Transportation Service

Remarks : codelistType=openEnumeration

Code	Label	Definition
2	Heliport	A small airport for the use of helicopters and some other vertical lift aircraft. Heliports typically contain one or more touchdown and liftoff areas and also have facilities such as fuel or hangars. In some larger towns and cities, customs facilities may also be available.
3	Helipad	A small landing surface for helicopters, with minimal or no supporting installations or facilities.
4	Hired Boat	Small boat with crew that may be hired for single journeys.
5	Bus Station	A building where buses and coaches regularly stop to take on and/or let off passengers, especially for long-distance travel.
6	Ferry	A vessel for transporting passengers, vehicles, and/or goods across a stretch of water, especially as a regular service.
8	Motorway	A limited access dual carriageway road specially designed for fast long-distance traffic and subject to special regulations concerning its use. It may have more than two lanes.
9	Launch	Large open or half decked boat.
11	Inland Waterway Transport	The carriage of goods or passengers using navigable waterways such as canals, rivers, lakes, or other stretch of water that is not part of the sea.
12	Short Sea Transportation	The carriage of specified types of cargo between qualifying ports. The types of cargo and/or qualifying ports are generally specified by law or government regulation.
13	Marine Highway	Specially designated commercially navigable routes in coastal, inland, and intracoastal waters, frequently as waterborne relievers to congested landside routes.

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19 Complex Attributes

19.1 Bearing Information

Definition : A bearing is the direction one object is from another object.

CamelCase : bearingInformation

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
cardinalDirection	enumeration	0,1
distance	real	0,1
information	Complex	0,*
orientation	Complex	0,1

19.2 Cargo Services Description

Definition : Description of services related to the goods or items carried by vessels.

CamelCase : cargoServicesDescription

Alias :

Remarks : Textual or narrative description of cargo services.

Sub-attributes :

Sub-Attribute	Type	Multiplicity
textContent	Complex	1,*

19.3 Construction Information

Definition : A description of construction or other development in a location where the work will affect vessel operations such as navigation, maneuvering or docking/berthing.

CamelCase : constructionInformation

Alias : Development Information

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
fixedDateRange	Complex	0,1
condition	enumeration	0,1
development	text	1,1
locationByText	text	0,1
textContent	Complex	0,*

19.4 Contact Address

Definition : Direction or superscription of a letter, package, etc., specifying the name of the place to which it is directed, and optionally a contact person or organisation who should receive it.

CamelCase : contactAddress

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
deliveryPoint	text	0,* (ordered)
cityName	text	0,1
administrativeDivision	text	0,1
countryName	text	0,1
postalCode	text	0,1

19.5 Depths Description

Definition : Textual description of the characteristics and notable matters pertaining to depths in an area.

CamelCase : depthsDescription

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
categoryOfDepthsDescription	enumeration	1,1
textContent	Complex	1,*

19.6 Facilities Layout Description

Definition : Textual description of the layout of port facilities.

CamelCase : facilitiesLayoutDescription

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
textContent	Complex	1,*

19.7 Feature Name

Definition : Provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings.

CamelCase : featureName

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
language	text	1,1
name	text	1,1
nameUsage	enumeration	0,1

19.8 Fixed Date Range

Definition : An active period of a single fixed event or occurrence, as the date range between discrete start and end dates.

CamelCase : fixedDateRange

Alias :

Remarks : Dates must be encoded in the format YYYYMMDD; using 4 digits for the calendar year (YYYY) and, optionally, 2 digits for the month (MM) (for example April = 04) and 2 digits for the day (DD). When no specific month and/or day is required/known, the values are replaced with dashes (-). The date range of a recurring event or occurrence must be encoded using periodicDateRange.

Sub-attributes :

Sub-Attribute	Type	Multiplicity
dateStart	S100_TruncatedDate	0,1
dateEnd	S100_TruncatedDate	0,1

19.9 Frequency Pair

Definition : A pair of frequencies for transmitting and receiving radio signals. The shore station transmits and receives on the frequencies indicated.

CamelCase : frequencyPair

Alias : FRQPAR

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
frequencyShoreStationReceives	integer	0,1
frequencyShoreStationTransmits	integer	1,1

19.10 General Harbour Information

Definition : General information about the port or harbour area.

CamelCase : generalHarbourInformation

Alias : General Port Information

Remarks : Describes a collection of information designed to give a general overview of harbour related Information.

Sub-attributes :

Sub-Attribute	Type	Multiplicity
generalPortDescription	Complex	0,1
facilitiesLayoutDescription	Complex	0,1
limitsDescription	Complex	0,1
constructionInformation	Complex	0,*
cargoServicesDescription	Complex	0,1
weatherResource	Complex	0,*

19.11 General Port Description

Definition : General, introductory information about the port.

CamelCase : generalPortDescription

Alias : General Harbour Description

Remarks : General statement about the port, including social/political aspects, which could have an impact on the mariner's/company's safety or professional reputation. The information covered by this should be confined to information not contained in any other place in the data.

Sub-attributes :

Sub-Attribute	Type	Multiplicity
textContent	Complex	1,*

19.12 Graphic

Definition : Pictorial information such as a photograph, sketch or other graphic, optionally accompanied by descriptive information about the graphic and the location relative to its subject from which it was made.

CamelCase : graphic

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
pictorialRepresentation	text	1,*
pictureCaption	text	0,1
sourceDate	date	0,1
pictureInformation	text	0,1
bearingInformation	Complex	0,1

19.13 Horizontal Position Uncertainty

Definition : The best estimate of the accuracy of a position.

CamelCase : horizontalPositionUncertainty

Alias : POSACC

Remarks : The expected input is the maximum of the two-dimensional error. The error is assumed to be positive and negative.

Sub-attributes :

Sub-Attribute	Type	Multiplicity
uncertaintyFixed	real	1,1
uncertaintyVariableFactor	real	0,1

19.14 Information

Definition : Textual information about the feature. The information may be provided as a string of text or as a file name of a single external text file that contains the text.

CamelCase : information

Alias : INFORM

Remarks : At least one of the sub-attributes file reference or text must be populated.The sub-attribute file reference is generally used for long text strings or those that require formatting, however, there is no restriction on the type of text (except for lexical level) that can be held in files referenced by sub-attribute file reference.

Sub-attributes :

Sub-Attribute	Type	Multiplicity
fileLocator	text	0,1
fileReference	text	0,1
headline	text	0,* (ordered)
language	text	0,1
text	text	0,1

19.15 Landmark Description

Definition : Textual description of selected landmarks that have significance in an area.

CamelCase : landmarkDescription

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
textContent	Complex	1,*

19.16 Limits Description

Definition : Description of the area covered by the information specified.

CamelCase : limitsDescription

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
textContent	Complex	1,*

19.17 Major Light Description

Definition : A description of navigationally significant lights essential for marking landfalls, offshore dangers, shipping routes, port access channels or protection of the marine environment.

CamelCase : majorLightDescription

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
textContent	Complex	1,*

19.18 Marked By

Definition : Description of the aids to navigation used to mark an area or object.

CamelCase : markedBy

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
textContent	Complex	1,*

19.19 Offshore Mark Description

Definition : Description of aids to navigation or prominent marks located away from the shore.

CamelCase : offshoreMarkDescription

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
textContent	Complex	1,*

19.20 Online Resource

Definition : Information about online sources from which a resource or data can be obtained.

CamelCase : onlineResource

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
linkage	URI	1,1
protocol	text	0,1
applicationProfile	text	0,1
nameOfResource	text	0,1
onlineResourceDescription	text	0,1
onlineFunction	enumeration	0,1
protocolRequest	text	0,1

19.21 Orientation

Definition : (1) The angular distance measured from true north to the major axis of the feature. (2) In ECDIS, the mode in which information on the ECDIS is being presented. Typical modes include: north-up — as shown on a nautical chart, north is at the top of the display; Ships head-up — based on the actual heading of the ship, (e.g. Ships gyrocompass); course-up display — based on the course or route being taken.

CamelCase : orientation

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
orientationUncertainty	real	0,1
orientationValue	real	1,1

19.22 Periodic Date Range

Definition : The active period of a recurring event or occurrence.

CamelCase : periodicDateRange

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
dateStart	S100_TruncatedDate	1,1
dateEnd	S100_TruncatedDate	1,1

19.23 RxN Code

Definition : A summary of the impact of the most common types of regulation, restriction, recommendation and nautical information on a vessel.

CamelCase : rxNCode

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
categoryOfRxN	S100_CodeList	0,1
actionOrActivity	S100_CodeList	0,1
headline	text	0,* (ordered)

19.24 Schedule by Day of Week

Definition : The nature and timings of a daily schedule by days of the week.

CamelCase : scheduleByDayOfWeek

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
categoryOfSchedule	enumeration	0,1
text	text	0,1
timeIntervalsByDayOfWeek	Complex	1,*

19.25 Source Indication

Definition : Information about the source document, publication, or reference from which object data or textual material included or referenced in a dataset are derived.

CamelCase : sourceIndication

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
categoryOfAuthority	enumeration	0,1
countryName	text	0,1
source	text	0,1
sourceType	enumeration	0,1
reportedDate	S100_TruncatedDate	0,1
featureName	Complex	0,*

19.26 Spatial Accuracy

Definition : Provides an indication of the vertical and horizontal positional uncertainty of bathymetric data, optionally within a specified date range.

CamelCase : spatialAccuracy

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
fixedDateRange	Complex	0,1
horizontalPositionUncertainty	Complex	0,1
verticalUncertainty	Complex	0,1

19.27 Survey Date Range

Definition : The complex attribute describes the period of the hydrographic survey, as the time between its sub-attributes.

CamelCase : surveyDateRange

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
dateStart	S100_TruncatedDate	0,1
dateEnd	S100_TruncatedDate	1,1

19.28 Telecommunications

Definition : A means or channel of communicating at a distance by electrical or electromagnetic means such as telegraphy, telephony, or broadcasting.

CamelCase : telecommunications

Alias :

Remarks : If no value is populated for the sub-attribute telecommunication service, this means the service is by voice communication. If no value is populated for the sub-attribute telecommunication carrier, this means the service is by land line communication.

Sub-attributes :

Sub-Attribute	Type	Multiplicity
categoryOfCommunicationPreference	enumeration	0,1
telecommunicationIdentifier	text	1,1
telecommunicationCarrier	text	0,1
contactInstructions	text	0,1
telecommunicationService	enumeration	0,*

19.29 Text Content

Definition : Textual material, or a pointer to a resource providing textual material. May be accompanied by basic information about its source and relationship to the source.

CamelCase : textContent

Alias : TXTCON

Remarks : Exactly one of sub-attributes onlineResource or information must be completed in one instance of textContent. Product specifications may restrict the use or content of onlineResource for security. For example, a product specification may forbid populating onlineResource. Product specification authors must consider whether applications using the data product may be prevented from accessing off-system resources by security policies.

Sub-attributes :

Sub-Attribute	Type	Multiplicity
categoryOfText	enumeration	0,1
information	Complex	0,*
onlineResource	Complex	0,1
sourceIndication	Complex	0,*

19.30 Time Intervals by Day of Week

Definition : The regular weekly operation times of a service or schedule.

CamelCase : timeIntervalsByDayOfWeek

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
dayOfWeek	enumeration	0,7 (ordered)
dayOfWeekIsRange	boolean	0,1
timeOfDayStart	time	0,* (ordered)
timeOfDayEnd	time	0,* (ordered)

19.31 Useful Mark Description

Definition : Description of Aids to Navigation or prominent marks which are usually clearly visible and identifiable enough to be used in determining location or direction.

CamelCase : usefulMarkDescription

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
textContent	Complex	1,*

19.32 Vertical Uncertainty

Definition : The best estimate of the vertical accuracy of depths, heights, vertical distances and vertical clearances.

CamelCase : verticalUncertainty

Alias : VERACC

Remarks : Encodes the vertical uncertainty associated with any vertical measurement.

Sub-attributes :

Sub-Attribute	Type	Multiplicity
uncertaintyFixed	real	1,1
uncertaintyVariableFactor	real	0,1

19.33 Vessel Measurements Specification

Definition : Combinations of values of measurable characteristics or dimensions of vessels, used to specify size and tonnage ranges.

CamelCase : vesselMeasurementsSpecification

Alias :

Remarks : Combines (i) specifications of vessels' measurable characteristics (length, beam, tonnages, etc.), (ii) limit values for the specified characteristics (with units), (iii) arithmetical comparison operators (greater than, etc.), and (iv) logical operators (AND/OR) to define a subset of vessels characterized by the specified ranges. For example, the combination (draught, 10.5, metres, greaterThan) describes "vessels with draught greater than 10.5 metres".

Sub-attributes :

Sub-Attribute	Type	Multiplicity
comparisonOperator	enumeration	1,1
vesselsCharacteristics	enumeration	1,1
vesselsCharacteristicsValue	real	1,1
vesselsCharacteristicsUnit	enumeration	1,1

19.34 Weather Resource

Definition : Links for relevant weather related information.

CamelCase : weatherResource

Alias :

Remarks :

Sub-attributes :

Sub-Attribute	Type	Multiplicity
onlineResource	Complex	0,1
dynamicResource	enumeration	0,1
textContent	Complex	0,1

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