S-131 Physical Infrastructure

*Needs from the US Coast Pilot, Canadian SD, Norwegian SD, Denmark & Greenland Pilot, and UKHO*

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**SOURCE**: *Primary*: Harbour masters.

*Secondary*: Sailing Directions/Coast Pilot

**USE:** back of the bridge; to optimize the berth-to-berth route planning process

**AUDIENCE**: shipping companies, brokers and other in the industry.

**PURPOSE**: for efficient harbour call. as well as having a smooth transition into berthing position.

**NEEDS**: Knowing a priori the services offered for berthing procedure and alongside. Knowing all the services they need while at port are available and accessible

**FUNCTIONALITY**: The data will be able to be **filtered** according to needs (to help reduce the cognitive burden on the mariner)

**PORTRAYAL**: presented in a way that is compact, organised and easily accessible.

# Aids To Navigation

## Justifications for use

### Denmark/Greenland

In Denmark and specially in Greenland we have a lot for description on harbors and approach. Specially the approach is important since Greenland doesn’t have a lot of navigation aids so textual navigation description are needed.

### US Coast Pilot

Generic descriptions for aids marking the approach to a channel entrance, navigation channels and an entire waterway. Need description of Large Navigational buoys (LNBs) and Major lights (with nominal range of 10 miles or more) are described more completely. Need to describe daymarks on major lights. (Descriptions and coordinates should agree with list of lights…would be ideal to have same content/format to make sure data integration is seamless). To explain how to activate sound signals.

## Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| featureName | featurnNameType | Common name for the aid | ***Manistee North Pierhead Light*** |
| aidType | ENUM | Aids that generally would be necessary for textual descriptions | Light, aerolight, Racon, Range, … |
| Description | text | Generic description that isn’t found in any other attribute for this type. | ***047º*** *lighted range* |
| Coordinates | LatLngType | Geographic coordinates | *70º17.3'N., 161º 54.5'W* |
| locationDescription | text | Referencing the location from prominent feature; miles above the mouth, at a specific point or town  etc. | *2.5 miles south of Icy Cape* |
| isSeasonal | boolean | whether the aid is seasonal in nature. |  |
| isMaintainedSeasonally | Boolean | Whether or not the aid is maintained seasonally or year-round |  |
| isLighted | boolean | Whether or not the aid is lighted |  |
| aidStructure | Text | Type of structure the aid is mounted on | *Tower; a cylindrical structure on top of a square*  *building* |
| distanceAboveWater | Int | How high up the aid signal is above water. | *265* |
| distanceAboveWaterUnits | ENUM | Units for the measurement | Feet, metres |
| hasSoundSignal | Boolean | Whether the aid includes a mariner radio activated sound signal |  |
| soundActivationDesc | Text | Description of the operation of sound signal on an ATON | *keying the microphone five times* |
| soundActivationChannel | Text | Channel associated with description | *83A* |
| soundActivationFrequency | ENUM | Frequency associated with description | VHF-FM, |
| locationDescription | Text | Referencing the location from prominent feature; | *2.5 miles south of Icy Cape (70º17.3'N., 161º 54.5'W.)* |

Note: the use of Boolean is helpful to not have to do string text searching for desired component.

# Bridge

## Justifications for use

### US Coast Pilot

Used to inform mariner of how to call in for opening, times of openings, and general route planning. Information should also be enough to print out the bridges tables in a publication.

## Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| featureName | featurnName Type | Common name for the bridge | *The Atlantic Beach (State Route 1182) highway bridge* |
| verticalClearance | text |  | *13; 40 feet down and 135 feet up* |
| verticalClearanceUnit | ENUM |  | *Feet* |
| horizontalClearance | int |  | *28* |
| horizontalClearanceUnit | ENUM |  | *Foot* |
| categoryOfBridge | ENUM | Categories for the type of bridge | fixed, suspension, bascule, swing, vertical lift, removable  span, retractile or pontoon), |
| positionMaintained | ENUM | If a non-fixed bridge, in what position is it maintained? | *Open,*  *Closed* |
| locationDescription | text | Referencing the location from prominent feature; miles above the mouth, at a specific point or town  etc. | *over Bogue Sound at Mile 206.7; connecting Bokeelia Island with Pine Island* |
| categoryOfTraffic | ENUM |  | highway, railroad, pipeline or foot |
| operatingProcedures | Text |  |  |
| safetyInfo | Text | Description of warnings and when it is safe to pass through the draw. |  |
| regulationRef | text | A reference to an associated regulation | ***33 CFR 117.1 through 117.49*** |
| controllingEntity | Authority Association | The entity responsible for controlling the lock | radiotelephone info associated with controlling entity…so these are prob not really needed. |
| radiotelephone | radioTelephoneInfo | Complex attribute with all info needed to call for service |
| constructionInfo | constructionInfoType | All construction information related to the bridge |  |
| specialOrders | specialOrder type | Orders issued; specified by year of issue and order number, |  |

**RadiotelephoneInfo type**

**Complex attribute**

|  |  |  |  |
| --- | --- | --- | --- |
| channelsMonitored | Text | VHF-FM radiotelephone channels monitored | 16 |
| channelsWorked | Text | VHF-FM radiotelephone channels worked | 10 |
| callSign | Text | The call sign | *KMZ-123* |

**constructionInfoType**

complex attribute

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| startDate | dateType | Date construction commenced | 2013 |
| endDate | dateType | Date construction projected to terminate | 2021 |
| generalnfo | Text | Any general information helpful to the mariner | *This bridge is under construction close south of the bascule bridge; upon completion, it will replace the bascule bridge.* |
| statusInfo | Text | Information specific to the current condition of the bridges that have been partially removed | *... bascule span maintained in the open position ...*  *... bascule span removed but piers remain ...*  *... bridge deck removed but piles remain ...* |

Portrayal info for tables:

Bridges info under construction highlighted with magenta tint (C=40, M=65, Y=11, K=0—60% opacity)

# Breakwaters and Jetties

## Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| Condition | text | General statement about condition (if the structure is deteriorating and endangers navigation) |  |
| Covers | Text | Mention if the structure covers at any state of the tide. | *the breakwater covers 2 feet;*  *It is reported that the breakwater covers at mean high water.* |
| Construction | Text |  |  |
| markedBy | Text/association to ATON |  |  |
| areDangerous | Bool | If they are dangerous when cover |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# Cables

## Overhead

### Justifications for use

#### US Coast Pilot

Overhead cables are described

### Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| chartFeature | Association/MRN | to chart feature representing the cable |  |
| mileage | Value | The mileage from a point or place of reference |  |
| mileageFromPlace | Association/MRN | The place of interest for the mileage description | *feet* |
| categoryOfCable | ENUM | The type of cable | power, telephone, television etc |
| authorizedClearance | int | Given to the nearest foot rounded down | *28* |
| authorizedClearanceUnit | ENUM |  | *foot* |
| authorizedClearanceSource | Text | Source of clearance value | *USACE* |

## Cable Ferries

US Coast Pilot describe the operating procedures in detail. (See Ferry Service)

### Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| Condition | text | General statement about condition (if the structure is deteriorating and endangers navigation) |  |
| Covers | Text | Mention if the structure covers at any state of the tide. |  |
| Construction | Text |  |  |
| markedBy | Text/association to ATON |  |  |

# Cranes

## Justifications for use

### Canada SD

## Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| cranesAvailable | Bool |  |  |
| liftingCapacity | Int |  |  |

# Floating Dry Docks

## Justifications for use

### US Coast Pilot

Described for large-vessel repair. Should be associated with a repair service (info association or complex attribute)

Canada – shipyard / dry dock

## Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| Length | Float | The clear width |  |
| lengthKeel | Float | The length over keel blocks |  |
| Width | Float | The clear width |  |
| depthControlling | Float | The controlling depth in the approach to the dock (if less than the depth in the dock) |  |
| DepthKeel | float | The depth over the keel blocks |  |
| depthSill | Float | The depth over the sill |  |
| Capacity | Float | The lifting capacity in tons |  |

# Graving Docks

## Justifications for use

### US Coast Pilot

Described for large-vessel repair. Should be associated with a repair service (info association or complex attribute)

## Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| Length | Int | The clear width |  |
| Width | Int | The clear width |  |
| depthControlling | Int | The controlling depth in the approach to the dock (if less than the depth in the dock) |  |
| Depth | Int | The depth |  |

# Grids

Should be associated with a repair service (info association or complex attribute)

# Geographic Names

The geographic names in these products should coincide with the names on the chart. Would be best to populate from the chart. Until syncing is ubiquitous in all HO’s we should allow for a alternative / corrected Name attribute for features where a chart name is different from the product/publication and has yet to be updated so both can be shown in text until the update is made.

# Loading/Unloading Facilities

Canada

# Locks

Should be associated with a repair service (info association or complex attribute)

## Justifications for use

### US Coast Pilot

## Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| commonName | featureName Type | name for the feature; descriptive or common | *the Seaway* |
| Length | Int | Length of the lock; *The*  *maximum overall length authorized, in feet* | *730* |
| Width | Int | Width of the lock; *extreme breadth authorized, in feet* | *76* |
| depthOverSills | Int | Depth over sills; *The maximum permissible draft, in feet* | *26* |
| verticalLift | Int | The vertical lift in terms “above the water” (or some agreed upon standard)  *Note: perhaps units of measurement could be given in metadata for consistency across all items?* | *116* |
| Clearance | Text | Controlling clearance under any fixed overhead structures. (note: this might need 0..\* as a complex attribute to keep the clearance value and the structure and location of structure all together) |  |
| Applicability | Association | The vessels that fit the allowable dimensions (or non-applicable associating only vessel dimensions that are restricted) | *The maximum permissible draft in the Seaway locks is 26 feet.* |
| controllingEntity | Authority Association | The entity responsible for controlling the lock | radiotelephone info associated with controlling entity…so these are prob not really needed. |
| radiotelephone | radioTelephoneInfo | Complex attribute with all info needed to call for service |
| trafficControlDevices | Text | Mention traffic control devices  such as traffic lights or semaphores. |  |
| Regulation | Association | Association to applicable regulation |  |

# Marina

*We concluded that a Marina would contain 0..\* small-craft facilities and other items.*

# Marine Railway

### Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Example** |
| Name | featureName/association | The identifier for this object |  |
| Length | Float | The extreme length of small craft that can be hauled out by the marine railway |  |

# Mobile Hoists/Lifts

Should be associated with a repair service (info association or complex attribute) (use this term and not travelift – a brand name)

## Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| maxCapacity | Int | The tonnage capability |  |
| categoryOfLift | ENUM |  | Mobile hoist,  lift |
| wharveAssociation | aggregation | A part of wharf components |  |

## Mule

## Tractor

## Tower

# Offices/Building

## Justifications for use

### US Coast Pilot

Mention Coast Guard Sector offices, Captains of the Port, marine inspection offices and vessel documentation offices within the description of appropriate ports.

## Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| Name | Text | The Proper name of the station | ***Seattle Coast Guard Station*** |
| geolocation | Lat/lng | The geographic location of office |  |
| locationDescription | Text | The location with reference to a prominent feature shown on the chart (not by latitude and longitude) | *on the south side of Lake Washington Ship Canal, 0.8 mile from the western entrance.* |
| contactInfo | contactInformation | To display city or listing of addresses | *A marine inspection office and*  *a vessel documentation office are in New York City* |
| categoryOfOffice | ENUM | The category for this office | Coast guard  Marine inspection  Vessel documentation |
| searchRescue | Boolean | If the station has search-and-rescue capability (including air stations) |  |

Formatting notes: Coast Guard is always initially capitalized. When referring to a Coast Guard station by other than its proper name, *station* is not capitalized; *a Coast Guard station*. However, when the name of the station is utilized,

*station* is capitalized; *Cape May Coast Guard Station*.

# Small-Craft Facility

(what’s in the marina)

## Justifications for use

### US Coast Pilot

It is important that the locations on the waterfront of sources of marine supplies be specified.

Small-craft facilities: To be included in the Coast Pilot in the continental United States, at a minimum, they must offer the following goods and services: fuel (gasoline and/or diesel), pumpout facility (or access to a municipal facility), transient berths or moorings, and navigable depths (approach and alongside).

The information relating to a small-craft facility is generally described in the following order:

• availability of transient berths or moorings

• sewage pumpout

• launching ramp(s)

• lifts/hoists/marine railways

• winter storage

• depths (approach/alongside/in the basin)

Seems these items should compose a SCF. (a SCF consists of these items)

Greenland - type of workshops and what kind of work is done? Physical Infrastructure?

## Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| locationDescription | text | Referencing the location from prominent feature |  |
| repairsAvailable | Association to repairServices/or complex attribute |  |  |
| suppliesAvailable | supplyType (from Services) | 0..\* list of available items |  |
| Pumpout | Boolean |  |  |
| berthTransient | Boolean |  |  |
| mooringTransient | Boolean |  |  |
| electricity | Boolean |  |  |
| launchingRamps | boolean |  |  |
| lifts | Boolean |  |  |
| hoists | boolean |  |  |
| marineRailway | boolean |  |  |
| Winterstorage | Boolean |  |  |
| depthApproach | Float | Navigable depth for the approach |  |
| depthAlongside | Float | Depth alongside |  |

# Storage Facilities

## Cargo Shed

Canada

## Cold Storage

Canada

## Grain Elevator

Canada

## Warehouse

Canada

# Signals

## Storm signals

UKHO

## Traffic signals

UKHO

# Transport connections

Railway, highway - Canada

# Wharves

## Justifications for use

### US Coast Pilot

In major ports, deep-draft facilities (depths alongside of 15 feet or more) are described individually under the heading **Wharves**.

### Canada

some wharves have **cathodic protection system**

gangways

## Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| featureName | featurnName type | Name of the pier or wharf |  |
| Coordinates | Lat/lng | Geographic coordinates (comes from feature type) |  |
| locationBearing | locationBearingType | All necessary attributes to describe location with a bearing and distance from charted object |  |
| Operator | Text | Name of the operator if not included in, or apparent from the name of the facility |  |
| faceDetails | faceDetailsType | Components that describe the useable wharf faces |  |
| deckHeight | Float | Deck height |  |
| generalDescription | Text | General statement describing the item |  |
| categoryOfWharf | ENUM |  | Pier,  Wharf,  Barge facility,  Fishing wharf,  Government installation |
| AssociatedEquipment | Association to cargo-handling equipment | Equipment available for loading or discharging the vessel |  |
| equipmentDescription | Text | If no association or need to describe other shore0based cargo-handling equipment; mentioning largest crane, conveyor or gravity loading systems, etc. |  |
| noWater | Boolean | True when appropriate |  |
| noPower | Boolean | True when appropriate |  |
| Commodities | text | Ordered list of commodities handled at the terminal |  |
| commoditiesTransitType | ENUM | Ordered list of the commodities listing shipped or received | Shipped,  Received |
| associatedServices | Association | Services relative to the wharf cargo-handling |  |

Consist of: cargo-handing, cranes, services,

LocationBearing

|  |  |  |  |
| --- | --- | --- | --- |
| locationDistance | Text | distance from a charted object or a previously described pier | Should be a complex attribute to keep all variables together. |
| locationBearing | Text | Bearing from a charted object or a previously described pier |  |
| locationObject | Text/association to object | The object or a previously described pier for distance and bearing reference |  |

faceDetails

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Type** | **Description** | **Examples** |
| LengthUseable | text | Length of usable face |  |
| berthingCount | Int | Actual amount of usable berthing space along each face (using dolphins, shore moorings, etc.) |  |
| vesselLength | Float | Length of largest vessel that can be docked |  |
| depthAlongside | Float | depth alongside each usable face |  |

# Requested Actions

1. NIPWG/Physical Infrastructure Sub-WG invited to take note of the proposed Information within this document.
2. NOTE: from Denmark (Jens C) regarding the modeling process:  
   Enumeration/categories

Right now a lot of properties is an enumeration of a specific list as for instance all the different categories. In my opinion that is great but in the early stages of a model is would be great to have an “unknown” or “not specified” value so one could model all our entities and then just wait for the specific enumeration to come into the model.

1. Canada
   1. Give specific attributes desired for the following suggested services:
      1. Railway/highway
      2. Cargo Shed
      3. Cold Storage
      4. Grain Elevator
      5. Loading/Unloading Facilities
      6. Warehouse
2. UKHO
   1. Give specific attributes desired for the following suggested services:
      1. Traffic signals
      2. Storm signals