S-164

IHO Test Data Sets in ECDIS

Edition 1.0.0 – March 2023

Instruction Manual for the Use of IHO Test Data Sets in ECDIS

IHO

International Hydrographic Organization

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1 Introduction

1.1 Change Control History

Version Number	Date of Issue	Author(s)	Brief Description of Change(s)
1.0.0	01/03/2023	S100WG	Initial Draft
1.1.0	31/03/2023	S100WGTSM9	Updated following feedback from TSM9 meeting

1.2 Introduction

The International Hydrographic Organization (IHO) Test Data Sets (TDS) for Electronic Chart and Display Information System (ECDIS) have been produced to fulfil the requirement for a data set necessary to accomplish all ECDIS testing requirements as outlined in the IEC 61174 standard. The TDS has been published as IHO Publication Number 164 and consists of numerous data sets required for testing as well as this guide, the TDS Instruction Manual (TIM). The TIM provides supporting documentation about the organization, understanding, and use of the ENC TDS and is intended to be used along with the data sets included in the TDS. It aims to provide appropriate comments about each test including the information about the most suitable data elements, their location and the expected test results.

1.3 Acknowledgements

Edition 1.0.0 and its subsequent clarifications has been produced with assistance from many expert contributors and members of the IHO S-100 WG, the ENC Working Group (ENCWG), and associated expert contributors; their input during the drafting and revision process has been invaluable.

1.4 Acronyms and Terms

This publication makes extensive use of terms and acronyms described in the IHO S-32 Standard. Additionally, the following acronyms are frequently used:

TDS – Test Data Sets
TIM - TDS Instruction Manual
EUT – Equipment Under Test

1.5 References

This publication provides tests based on the requirements documented in IHO standards. References to the source for a specific test are provided within this document. As specified in the IEC 61174 standard the tests provided are used to ensure conformance to the ECDIS requirements laid out in the IMO performance standard for ECDIS.

Normative References:
IHO S-100 Edition 5.0.0
IHO S-98 Edition 1.0.0

Informative References:
IHO S-32 - Hydrographic Dictionary (provides ECDIS related definitions)
IHO S-65 – ENC Production Guidance

1.6 Preface to Edition 1.0.0

IHO S-164 is dependent for some of its content on the existence of comprehensive test datasets (which it documents) and systems which have implemented correctly the requirements of IHO S-100 (and allied) standards. As the initial version of S-164 few, if any, S-100 systems, with Duel Fuel mode enabled are in existence and many of the datasets are still under development. Therefore, many of the tests documented

do not contain reference screenshots from S-100 implementations – where this is the case screenshots have been noted with "**[TBD]**" ("to be determined"). As version 2.0.0 is developed, and implementation of S-100 matures these gaps will be filled in this manual. Until version 2.0.0 of this standard is created all screenshots should therefore be seen as indicative.

Additionally, references to both IEC61174 and IHO S-98 v1.0.0 should be viewed as indicative as both standards are in the process of revision at the time of publication of S-164 v1.0.0

As portrayal and feature catalogue contents are updated for the relevant product specifications screenshots will be updated with the latest portrayal images and, if necessary, tests for complex portrayal will be enhanced.

1.7 Key Documents Organizations and Relationships

The development and application of the TDS involves several organizations and related specifications (see Figure 1). The TDS was produced by the IHO to allow for the complete testing of ECDIS equipment (hardware and software) in respect of the ECDIS Performance Standard. The ECDIS Performance Standard is specified by the International Maritime Organization (IMO) in MSC.232(82), and methods for testing this standard are the responsibility of the International Electrotechnical Commission (IEC) which publishes these requirements in document IEC 61174.

All standards are subject to revision. Therefore, users of these standards must use the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid international standards.

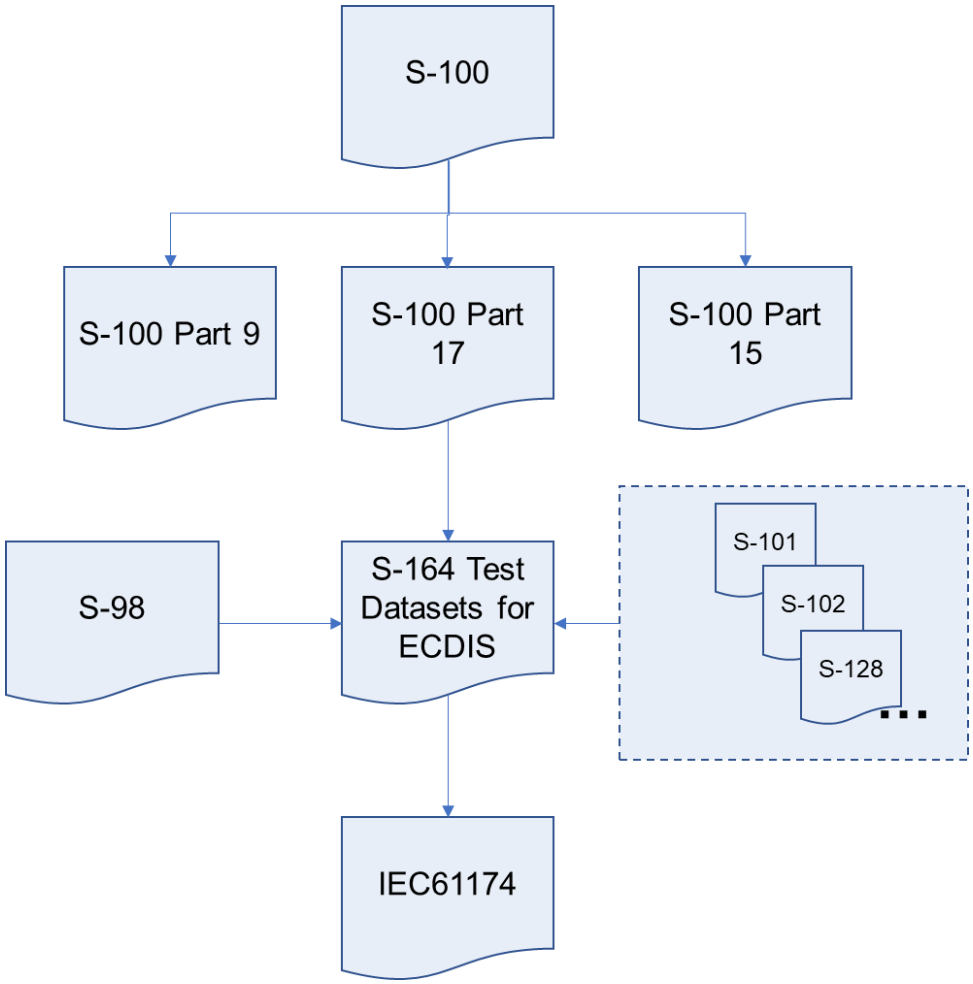


Figure 1 – The TDS and its relationship to other standards

The S-164 test data set contains both encrypted and unencrypted data. The inclusion of an encrypted dataset, conforming to S-100 Part 15, is so that ECDIS data loading and management operations can be

tested under IEC 61174. There are also unencrypted datasets which test visualisation and operational aspects of the ECDIS in respect of its compatibility with S-100 data in various forms. S-164 also contains datasets which test the dual fuel mode of ECDIS, mixing S-57 and S-101 electronic navigational charts.

1.8 Structure of the Instruction Manual

This document consists of an introduction followed by tests grouped into major sections in a task based layout. All tests are listed in a common format which is shown in the example below:

Test Reference	(S-164 reference)	**IHO Reference**	(S-100 Part 9/S-98)
Test description			
A short description of what the test covers.			
Setup			
The configuration required to perform the test including datasets to be loaded, settings to be applied and any other information as required. Where appropriate this should use the form centre the display on "location" set scale to "scale value".(within this document the scale value assumes the EUT has a screen of the minimum specified size) *Note: All Independent Mariner selectors must be switched Off, setup will specify when these selectors must be turned on to conduct a test.* *Where the term 'Select' is used in the test setup it refers to the selection of a named viewing group layer, selection of independent mariner selector or selection of named display category*			
Action			
The action which the test executor must perform.			
Results			
The result which the test executor must observe to complete the test.			

Where new tests, specific to the operation of the ECDIS under S-100 are concerned, the colour of the tables has been set as below for ease of use, e.g.

Test Reference	InitialCatalogues	**IHO Reference**	S-98 Annex C C-21.1
Test description			

1.9 Organization and Coverage of the TDS

The TDS contains a named directory for each section of the TIM which requires test data. Depending on the test requirement, the named folder contains an S100_ROOT directory containing the files of the exchange set (e.g CATALOG.XML), plus any required catalogues, updates or other optional/related files, e.g. .TIF, .TXT necessary).

Each exchange set also contains a README.TXT file, which may have additional information regarding the content or usage of the files.

The TDS data for encrypted data, located in section 2.6, contains multiple named exchange sets, each with their own S100_ROOT directory and full test scripts describing how to use the data.

The location (or path) of ENC exchange set and/or ENC dataset will be indicated using bold italic notation, e.g. ***PowerUp***..Tests are structured so that data is imported from standard S-100 exchange sets only, with no individual datasets requiring import. Datasets themselves are named individually in the tests for reference

where necessary. Exchange sets should contain necessary catalogues to perform tests.

Test datasets are arranged in a number of spatially disjoint schemes, with S-57 and S-100 datasets located in close proximity (for easing dual fuel testing).Examples of the schemes, and individual dataset names are illustrated in the following diagrams. These show the extent of the S-101 charts comprising the test datasets. Other S-100 products are layered on top of these datasets and are integrated with the named exchange sets referenced in each individual test.

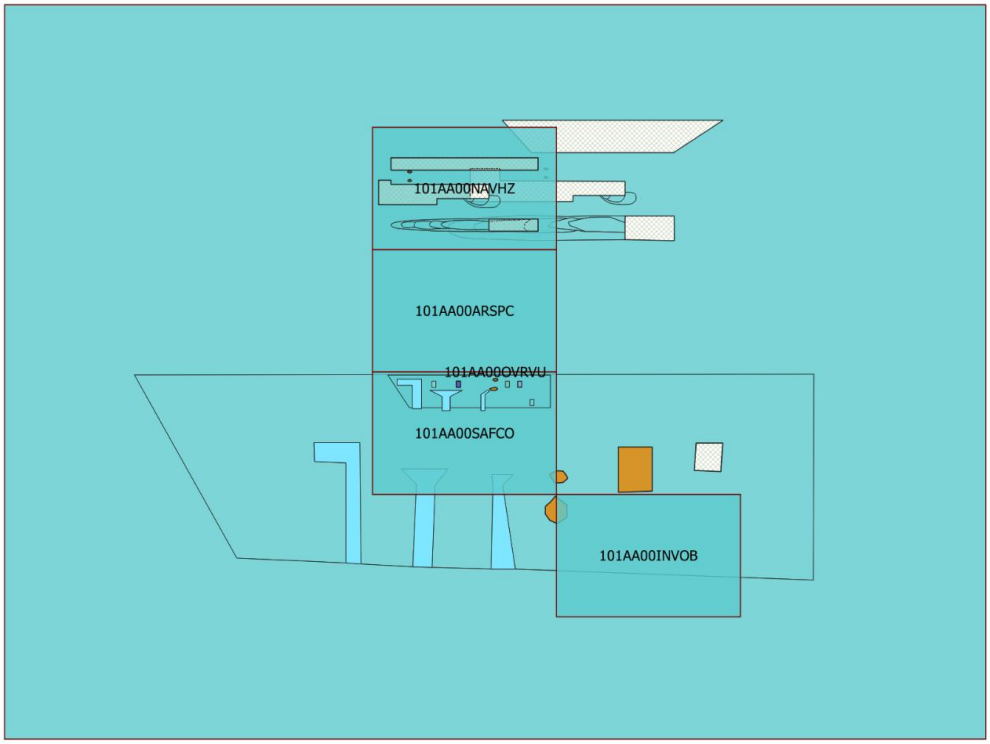
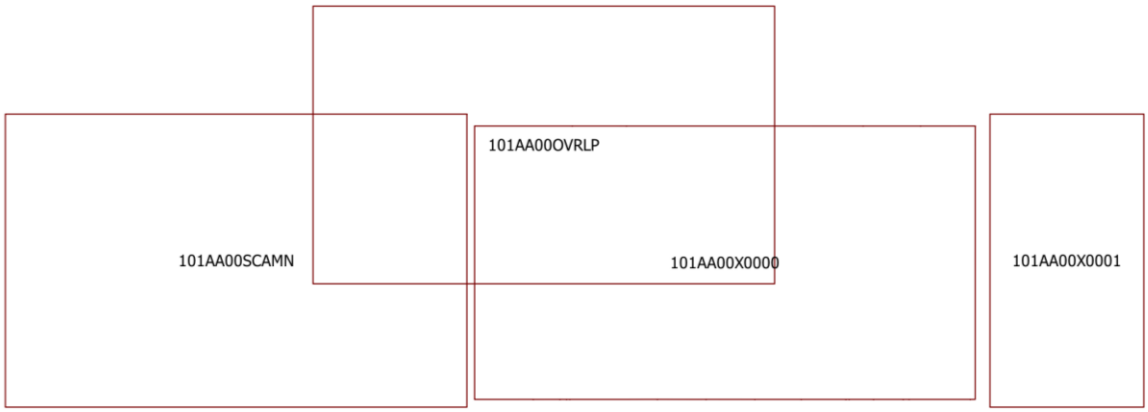


Figure 1: Data Scheming for Alert and Indication Tests



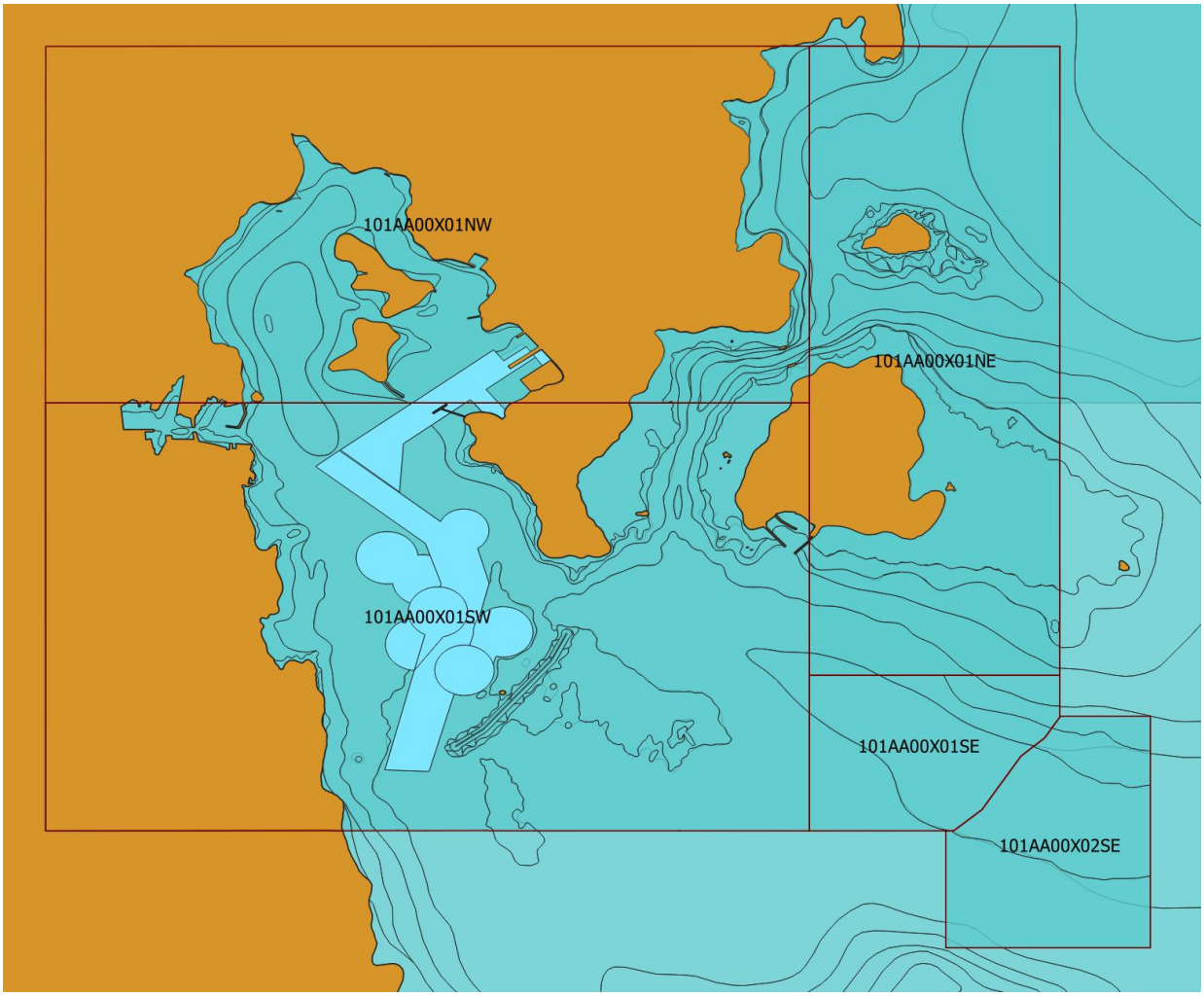
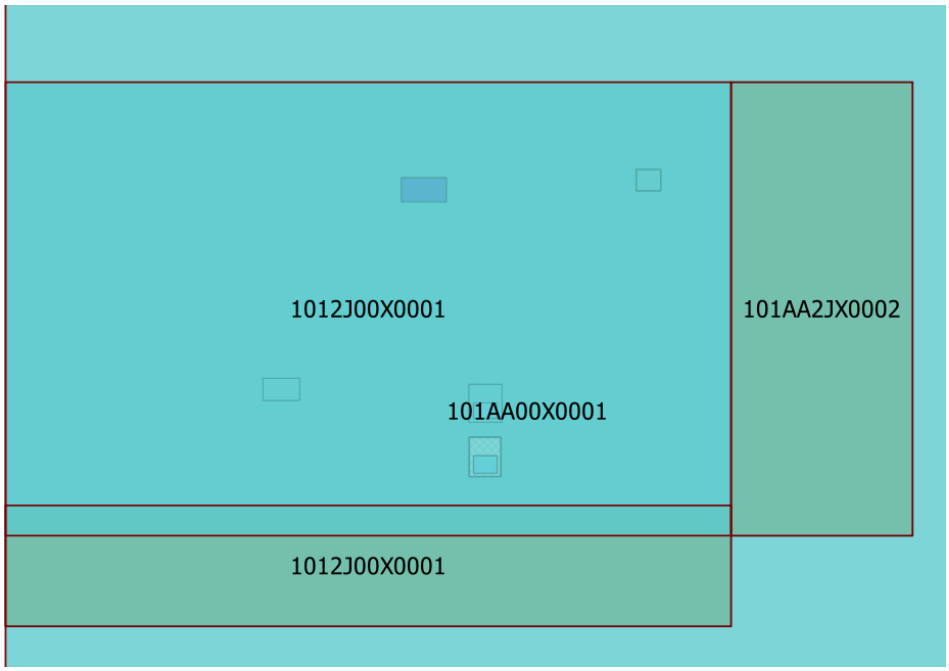


Figure 2: Cartographic cell overviews



S-164 Data Coverage scheming.

1.10 Required Test Items and Use of the TDS

This section lists the items required for the execution of Tests specified in this document and how the TDS should be used. The following items are required:

1. *IHO S-98 1.0.0 including an ECDIS Chart 1 and colour differentiation diagrams. If the manufacturer provides their own presentation library, Chart 1 has to be adapted accordingly.*

2. *IHO S-164 test data sets for ECDIS which includes both encrypted and unencrypted datasets, and updates, together with the associated instruction manual.*

ECDIS Chart 1 and colour differentiation diagrams must also be acquired and installed on the equipment under test (EUT) by the manufacturer, prior to the beginning of the tests.

The second item, the IHO TDS, is provided as part of S-164, including the encrypted data and its test scripts. This document is to be considered the “Instruction Manual”. The IHO TDS may be upgraded from time to time to correct residual anomalies and ensure that the results of the tests conform to the description in this Manual.

It is important to ensure that the tests are conducted with the latest version posted on the IHO web site at **http://www.iho.int > (ENCs & ECDIS).** The version number (currently v1.0.0) will remain the same as long as the corrections do not impact this document.

The third item on the list, a set of data in the format of the OEM System Database test data set, if supported, must be provided by the manufacturer.

2 Chart Loading and Updating

2.1 Catalogue Loading and System Initialisation.

2.1.1 Initial Catalogues

Test Reference	InitialCatalogues	**IHO Reference**	S-98 Annex C C-21.1
Test description			
Loading of initial catalogues. This test loads initial feature, portrayal and interoperability catalogues independently and checks they are persistent in the ECDIS			
Setup			
Clear all ECDIS catalogues and data contents			
Action			
*Load the exchange set **PowerUpCatalogues***			
Results			
Verify the version of the S-101 feature catalogue and portrayal catalogue is correct. The correct information is shown in the following table:			

Catalogue	***Product***	***Version / Issue Date.***
Feature Catalogue	*S-101*	*TBD*
Portrayal Catalogue	*S-101*	*TBD*
Interoperability Catalogue		*TBD*

2.1.2 Load Invalid Feature Catalogue

Test Reference	InvalidCatalogues	**IHO Reference**	S-98 Annex C C-21.1
Test description			
Loading Corrupt Catalogues. This test ensures the ECDIS will detect invalid feature catalogue content and reject installation of potentially harmful machine readable files			
Setup			
*As per test InitialCatalogues (load exchange set **PowerUpCatalogues**)*			
Action			
*Load the exchange set **CorruptFeatureCatalogue**.*			
Results			
The catalogue installation process shall stop, the updated catalogue flagged as invalid, and the user provided with the error message "SSE128 Error installing <file name>. The format or content could not be validated and it could not be installed"			

2.1.3 Load Invalid portrayal Catalogue

Test Reference	InvalidPC	**IHO Reference**	S-98 Annex C C-21.1
Test description			
This test ensures the ECDIS will detect invalid content within catalogue content and reject installation of potentially harmful machine readable files.			
Setup			
As per test UpdateCatalogues			
Action			
*Load exchange set **CorruptPortrayalCatalogue**.*			
Results			
The catalogue installation process shall stop, the updated catalogue flagged as invalid, and the user provided with the error message "SSE128 Error installing <file name>. The format or content could not be validated and it could not be installed".			

2.1.4 Out of Sequence Catalogues

Test Reference	OutOfSequenceCatalogues	**IHO Reference**	S-98 Annex C C-21.1
Test description			
This test ensures the ECDIS will detect mismatches between installed catalogues content and datasets			
Setup			
*As per test InitialCatalogues (load exchange set **PowerUpCatalogues**)*			
Action			
*Load the exchange set **UpdatedCatalogueData***			
Results			
The catalogue installation process shall stop, issuing the user with the error message SSE133 "Version mismatch between 101AA00X0000 and 101FC_1.0.0. Only v1.0.1 is supported for this data"			

2.1.5 Load Valid Catalogue Update and Data

Test Reference	UpdateCatalogues	**IHO Reference**	S-98 Annex C C-21.1

Test description

EUT support for management and update of feature and portrayal catalogues. Installation of updated feature catalogues and associated datasets matching such catalogues

Setup

*As per test InitialCatalogues (load exchange set **PowerUpCatalogues**)*

Action

Load the following exchange sets:

1. ***PowerUpCatalogueUpdates***
2. *Navigate to Position XX XX.XX, YY YY.YY at viewing scale 1:ZZ,000*
3. *Cursor pick feature at position XX XX.XX, YY YY.YY*
4. *Verify the versions of the catalogues installed.*

Results

The exchange sets shall install without any warning messages. The following versions shall be installed.

Catalogue	***Product***	***Version / Issue Date.***
Feature Catalogue	*S-101*	*1.0.1/20220610*
Portrayal Catalogue	*S-101*	*X.Y.Z1 / yyyymmdd*
Feature Catalogue	*S-101*	*1.0.2/20220610*
Portrayal Catalogue	*S-101*	*X.Y.Z2 / yyyymmdd*
Interoperability Catalogue		*1.0.0 / yyyymmdd*
Feature Catalogue	*S-102*	*2.0.0 / yyyymmdd*
Portrayal Catalogue	*S-102*	*2.0.0 / yyyymmdd*
Feature Catalogue	*S-104*	*2.0.0 / yyyymmdd*
Portrayal Catalogue	*S-104*	*2.0.0 / yyyymmdd*
Feature Catalogue	*S-111*	*2.0.0 / yyyymmdd*
Portrayal Catalogue	*S-111*	*2.0.0 / yyyymmdd*
Feature Catalogue	*S-128*	*2.0.0 / yyyymmdd*
Portrayal Catalogue	*S-128*	*2.0.0 / yyyymmdd*
Feature Catalogue	*S-129*	*2.0.0 / yyyymmdd*
Portrayal Catalogue	*S-129*	*2.0.0 / yyyymmdd*
Feature Catalogue	*S-124*	*2.0.0 / yyyymmdd*
Portrayal Catalogue	*S-124*	*2.0.0 / yyyymmdd*

At the defined position the following image shall be observed:

***[IMG: Two products side-by-side, original and updated FC/PC]**:*

The selected feature shall have the following attribution:
[IMG: Updated attribution for new FC]

2.1.6 Load new product catalogues

Test Reference	NewCatalogues	**IHO Reference**	S-98 Annex C C-21.1

Test description

This test ensures the ECDIS will correctly load new products (Catalogue and Dataset) into the System Database

Setup

*As per test InitialCatalogues (load exchange set **PowerUpCatalogues**)*

Action

*Load the exchange set **NewProduct**. This contains a new unseen (GML) product.*

Results

Verify:

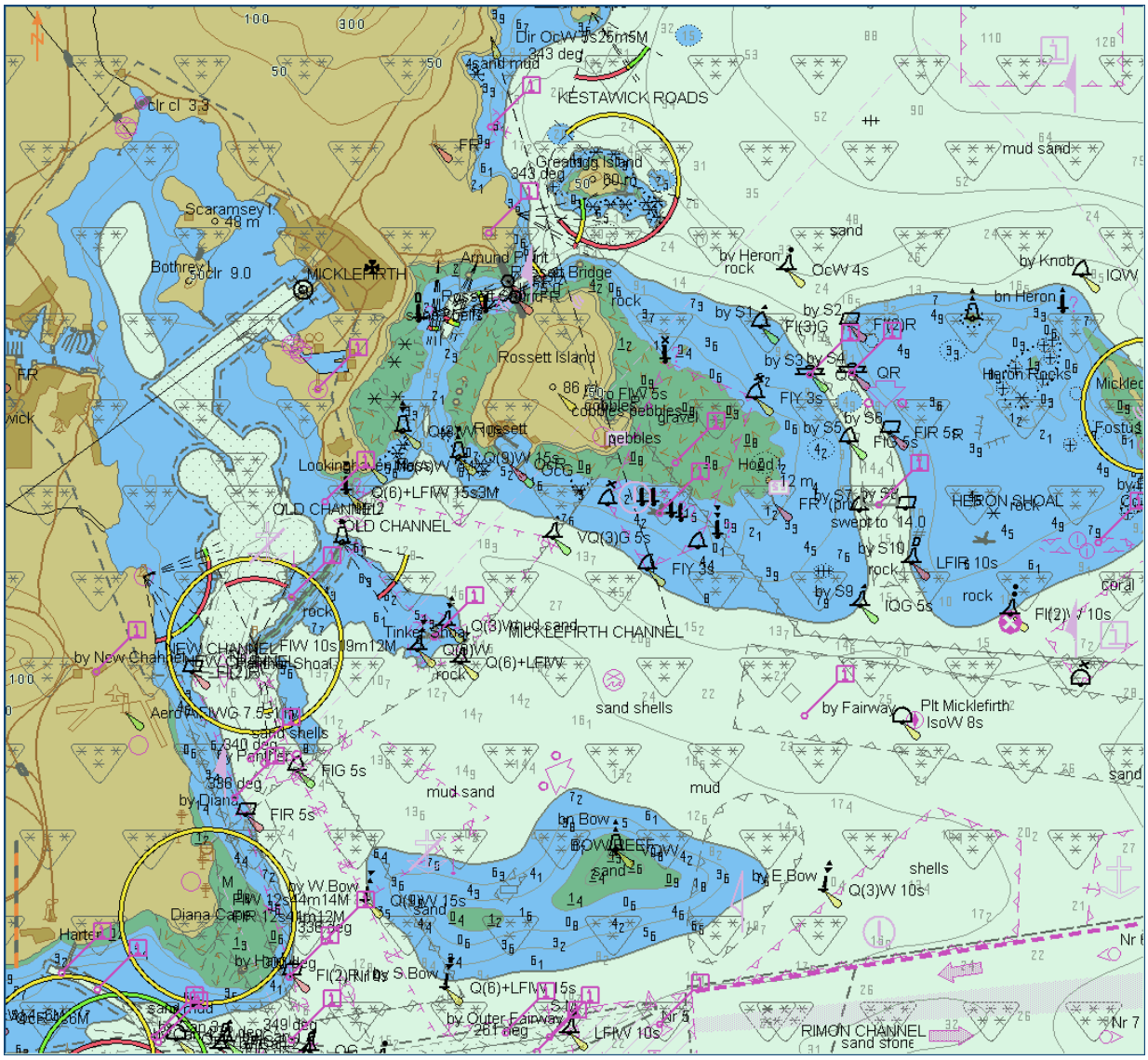
- The existence of the new product within the System Database
- The existence of the single dataset of the new product
- The portrayal of the new product at position (XX YY ZZ)

Catalogue	***Product***	***Version / Issue Date.***
Feature Catalogue	*S-164*	*2.0.0/20230201*
Portrayal Catalogue	*S-164*	*2.0.0/20230201*
Dataset	***Product***	***Issue Date***
164AA00NEWPROD.GML	*S-164*	*20230201*

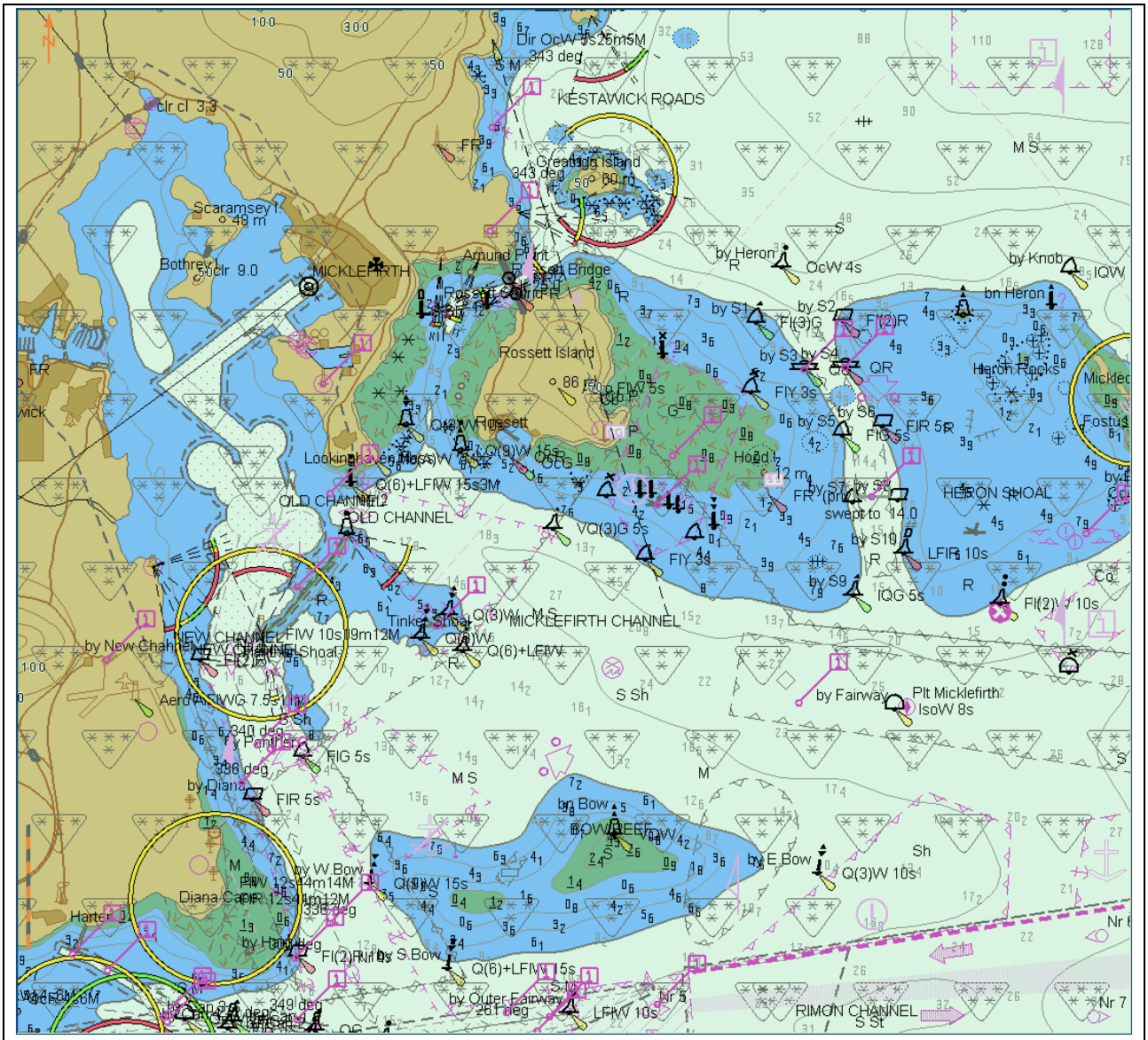
2.2 Loading of Unencrypted datasets

2.2.1 Preparation and Power Up

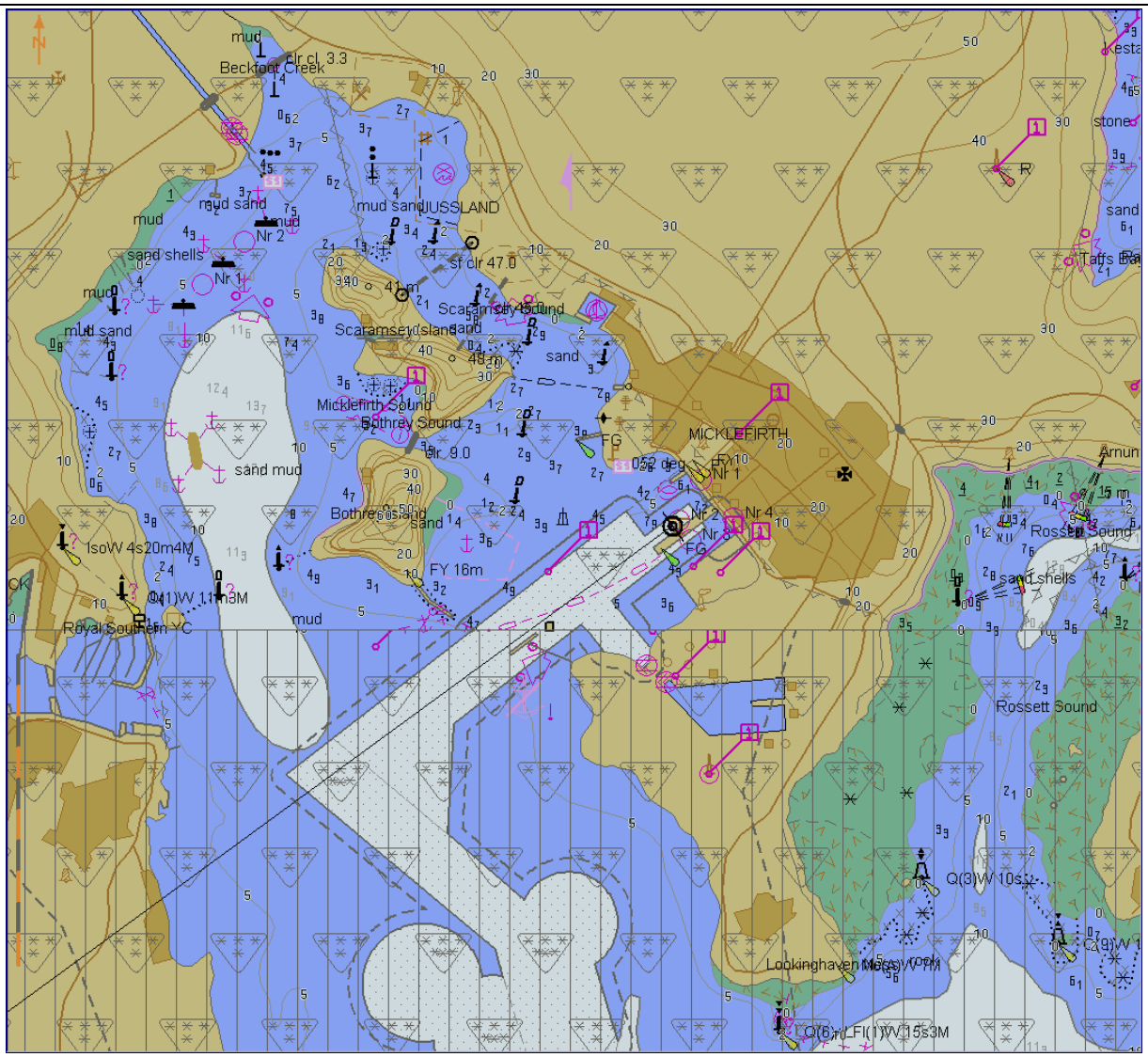
Test Reference	**InitialPowerUp** (2.1.1)	**IHO Reference**	IEC 61174/ 4.4.1
Test description			
Loading of initial datasets and indication of own ship stationary position.			
Setup			
Load the following exchange set: ***InitialPowerUp*** *with the following settings:* • *Select Display Category Other* • *Set the Safety Contour value to 8 m* • *Set the Safety Depth value to 8 m* • *Select Symbolized Boundaries* • *Select all Text groups* • *Select Accuracy* • *Select Highlight info* • *Select Highlight date dependent* • *Select simplified points = false* *Ship position 32°29.66'S, 060°55.86'E* *Heading 234.0 degrees*			
Action			
Load datasets and view the chart display.			
Results			
With the charts displayed the own ship shall be placed at the jetty in Micklefirth. ***[TBD]***			



After loading of 101AA00X0000.000, displayed scale 1:50 000 ***[TBD]***


KESTAWICK ROADS
Greatdigg Island
Scaramsey I.
Bothrey
MICKLEFIRTH
Rossett Bridge
Rossett Island
Rossett
OLD CHANNEL
MICKLEFIRTH CHANNEL
HERON SHOAL
Heron Rocks
by Heron
by Knob
by Fairway
Plt Micklefirth
IsoW 8s
by Diana
by Bow
BOW REEF
by E.Bow
by W.Bow
by S.Bow
by Outer Fairway
RIMON CHANNEL
Harter I.
Diana Cap

[TBD]



After loading of 101AA00X01NW.000, displayed scale 1:20 000 ***[TBD]***

- ***[TBD]Screenshots for display of S-102/S-104/S-100 under bridge***
- ***[TBD]Screenshot of S-124 and S-129 display for 101AA00X01NW.000 area***

2.2.2 Number and date in System Database

Test Reference	PowerUp	**IHO Reference**	IEC 61174/ 4.4.1
Test description			
Loading of initial datasets and confirmation of information in System Database.			
Setup			
*Load the exchange set **PowerUp***			
Action			

Check that in the chart library the information about the datasets is provided as follows

ENC	Edition (EDTN)	Update number (UPDN)	Update Application Date (UADT)	Issue Date (ISDT)
101AA00X0000.000	2	0	20210409	20210409
101AA00X01NE.000	1	0	20210406	20210406
101AA00X01NW.000	2	0	20210406	20210406
101AA00X01SE.000	1	0	20210406	20210406
101AA00X01SW.000	1	0	20210408	20210408
101AA00X02SE.000	1	0	20210407	20210407
104AA00X01NW.H5	1	0	20210406	20210406
102AA00X01NW.H5	1	0	20210406	20210406
111AA00X01NW.H5	1	0	20210406	20210406
124AA00X01NW.GML	1	0	20210406	20210406
129AA00X01NW.GML	1	0	20210406	20210406

Results
The information in the System Database shall be identical to the above table.

2.2.3 Load additional dataseta and check System Database

Test Reference	AdditionalCell	**IHO Reference**	IEC 61174/ 4.4.1
Test description			
Loading additional cell and confirmation of its addition to the chart library.			
Setup			
*As for test **PowerUp** 2.1.2*			
Action			
*Load the exchange set **AdditionalCell*** *Check that in the System Database the details of the dataset have been added.*			
Results			
The information in the System Database shall reflect the cell loaded and the coverage shall have changed accordingly.			

2.2.4 Remove dataset and check chart library

Test Reference	RemoveCell	**IHO Reference**	IEC 61174/ 4.4.1
Test description			
Removing a cell and confirmation of its removal from the chart library.			
Setup			
As on completion of test AdditionalCell			
Action			
Remove the following cell 101AA00X0001.000 *Check that in the chart library the details of the cell have been removed.*			
Results			
The information in the chart library shall reflect the cell removed and the chart coverage shall have changed accordingly.			

2.2.5 Loading of Corrupted Data

Test Reference	CorruptData	**IHO Reference**	IEC 61174/ 4.4.1
Test description			
Testing the ECDIS correctly rejects corrupted data			
Setup			
Action			
Load the following exchange set: ***CorruptData***			
Results			
The EUT shall generate a warning when loading datasets 101AA00X01NE and 124AA00X01NE and reject installation of these two datasets.			

2.3 Automatic updates of Unencrypted ENCs

2.3.1 Loading corrupted update

Test Reference	CorruptUpdate	**IHO Reference**	IEC 61174/ 4.4.2
Test description			
Loading corrupt update files.			
Setup			
Load the following exchange set: ***PowerUp***			
Action			
Load the following exchange set: ***CorruptUpdates***			
Results			
The update process shall stop, the update flagged as invalid, and the user provided with an appropriate message.			

2.3.2 Loading sequential update

Test Reference	SequentialUpdate	**IHO Reference**	IEC 61174/ 4.4.2
Test description			
Loading correct sequential update files.			
Setup			
Load the exchange set ***PowerUp*** *Load the following 5 updates one by one and check the plots after each successfully applied update to create the same results as the S-164 plots.* *.001* *Update review date range: 1st May 2011 – 21st May 2011* *.002* *Update review date range: 1st Dec 2014 – 1st Mar 2015* *.003* *Update review date range: 1st Sep 2015 – 14th Sep 2015* *.004* *Update review date range: 15th Sep 2015 – 30th Sep 2015* *.005* *Update review date range: 1st Oct 2015 – 14th Oct 2015*			
Action			
Load the following five updates from the exchange set: - ***SequentialUpdate***			

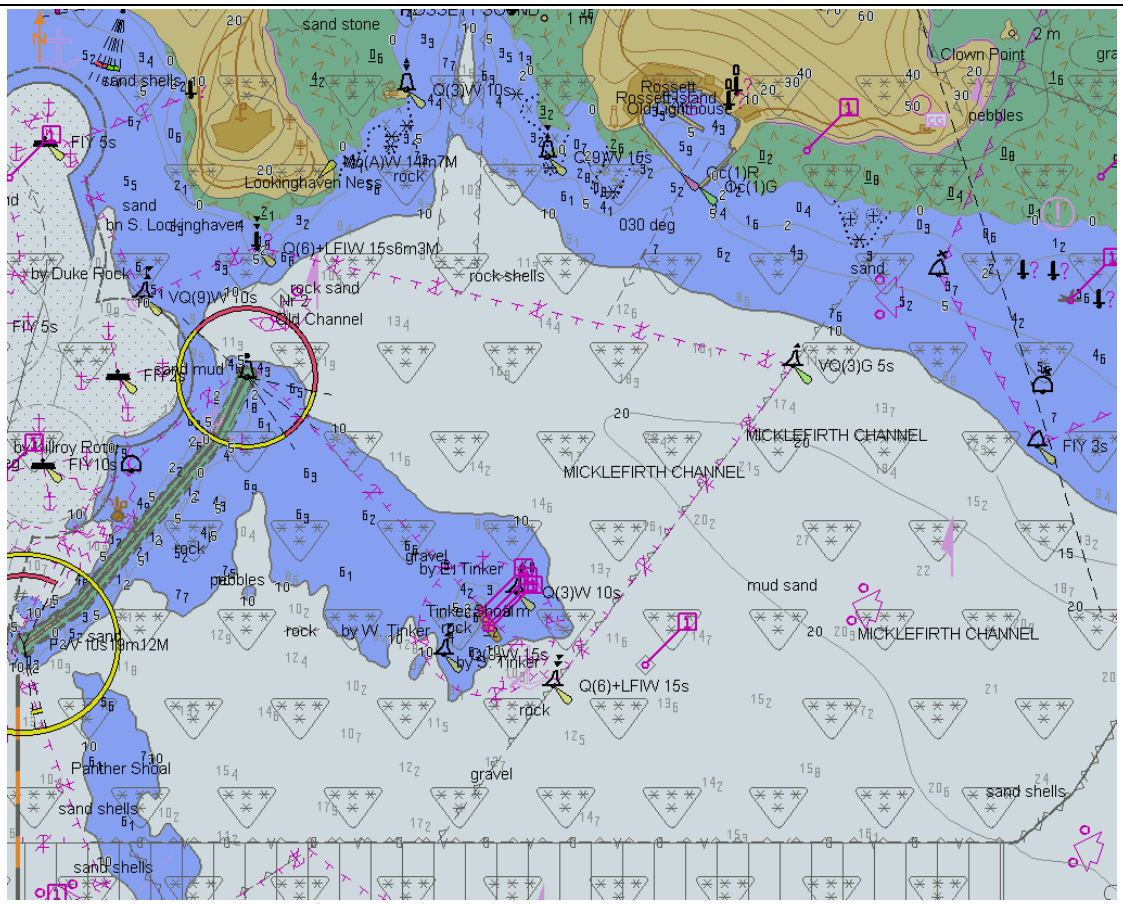
Results

The update process shall install all updates (up to update no. 5) and indicate it in an appropriate summary report which shall contain the following information:

- *identification of issuing authority;*
- *update numbers of the update files;*
- *identifiers of datasets affected;*
- *edition number and date of involved;*
- *number of updates in the affected datasets.*

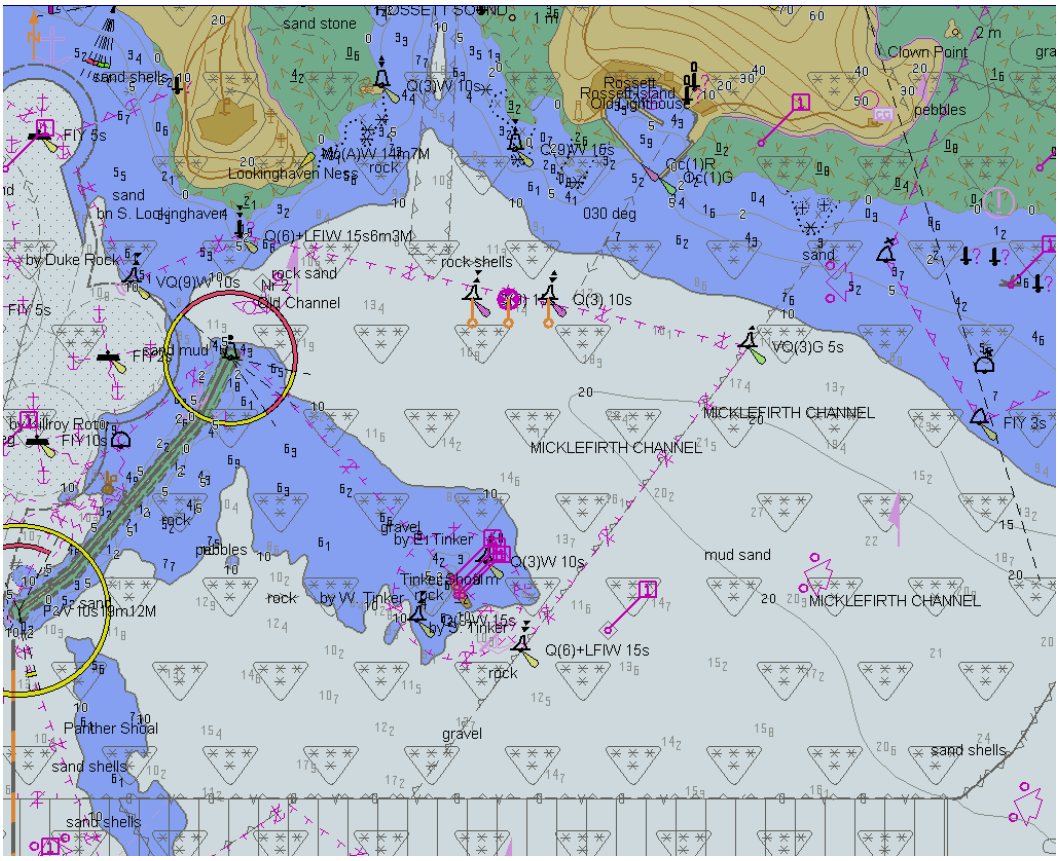
Review of updates shall be performed after the update process is completed and the updates have been applied. Review the updates by selecting the given date range and confirm that display is as available in the corresponding screen plot.

Note Manufacturers can use their own algorithms for calculating the position of centred symbols.

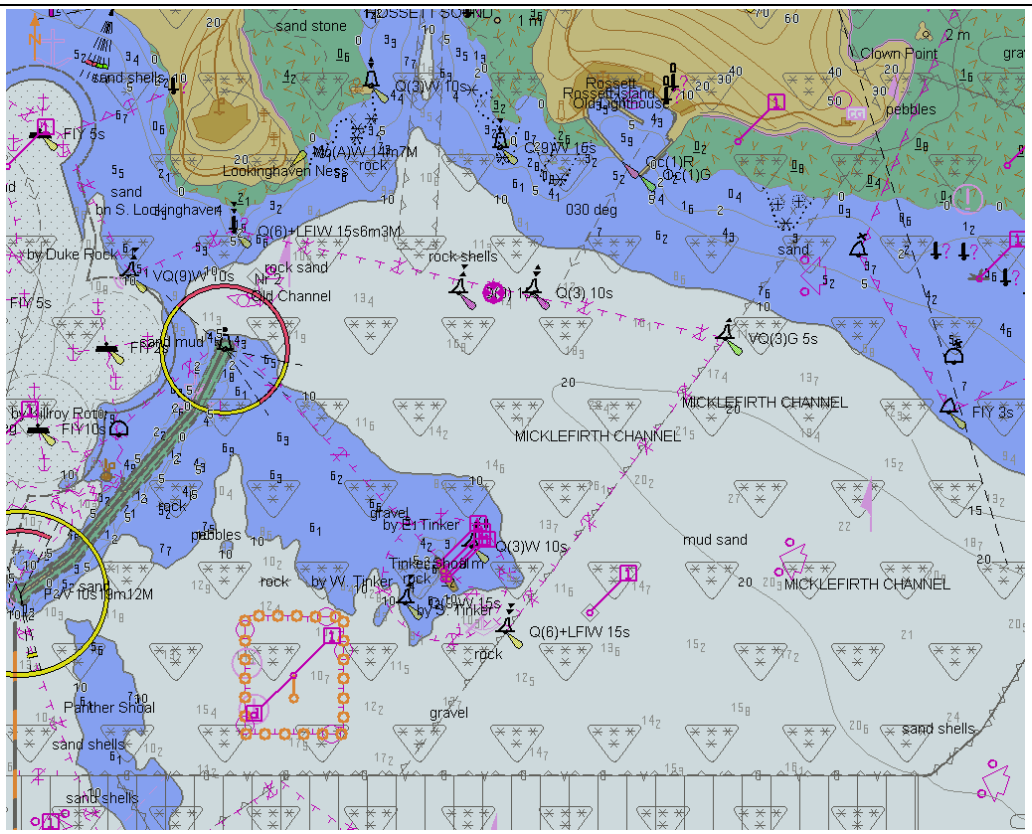


*Before loading of updates, displayed scale 1:20 000**[TBD]***

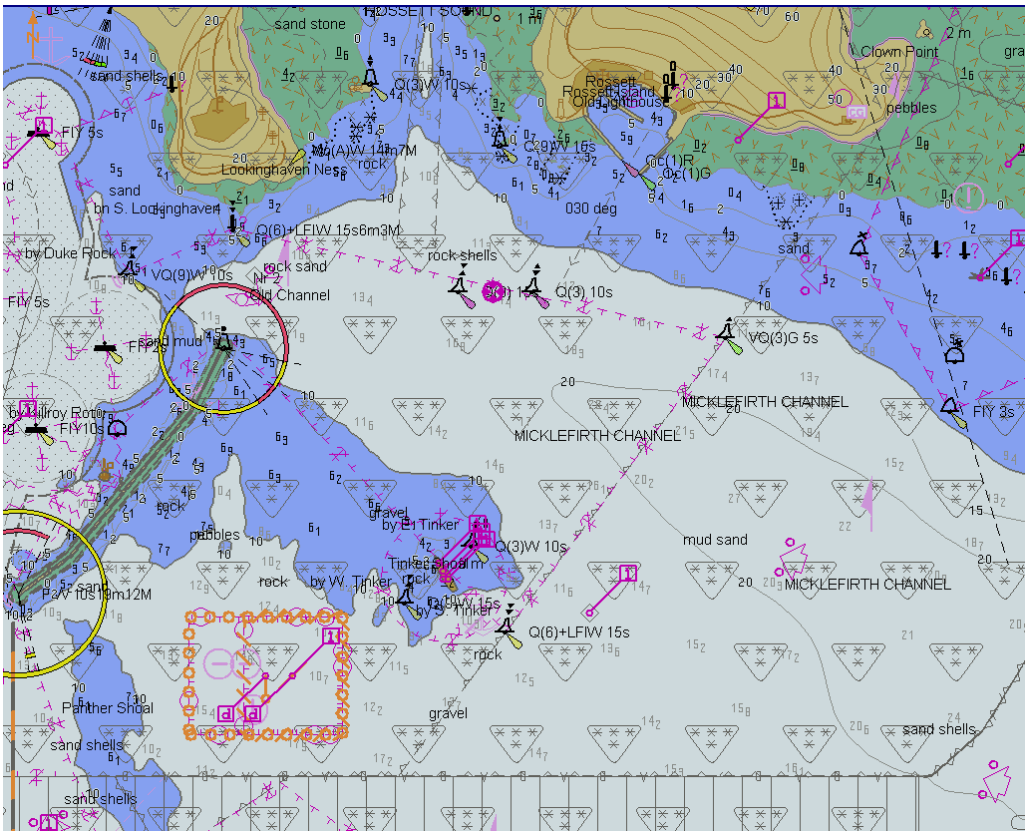
.



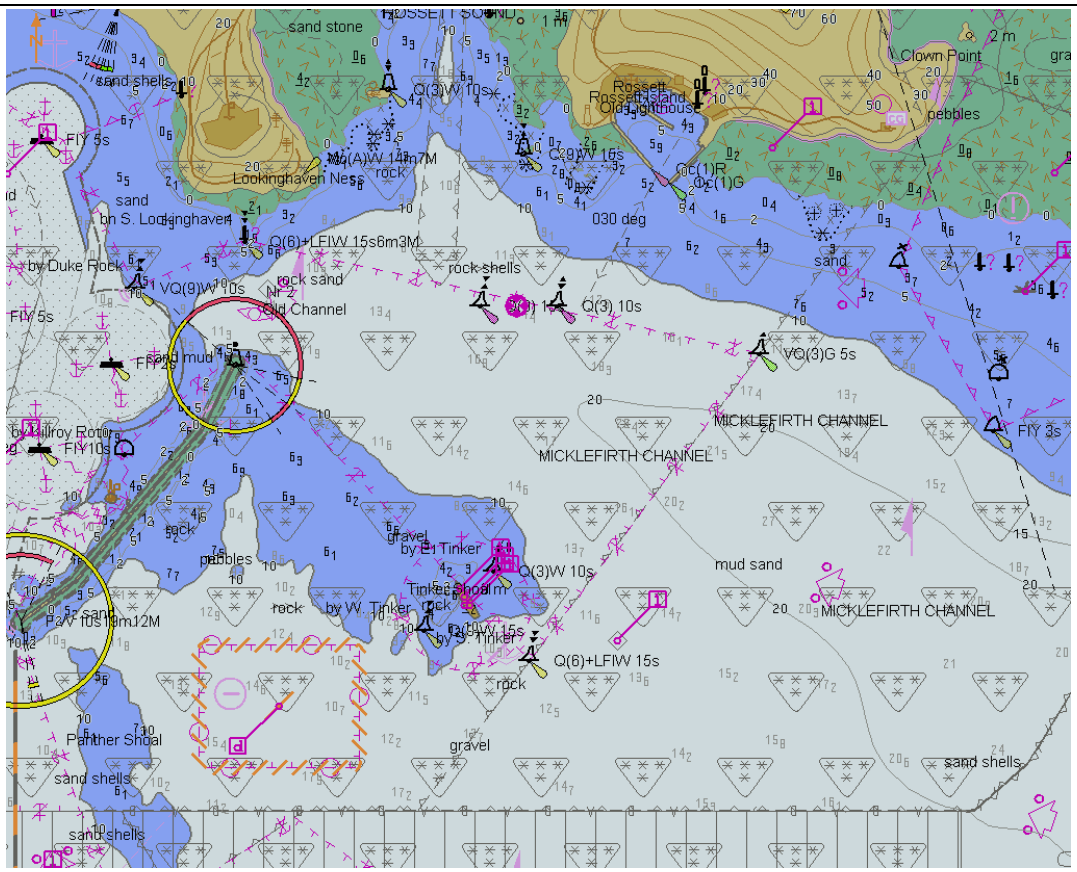
*[**TBD**]After loading of 101AA00X01SW.001, displayed scale 1:20 000, date range include 9thMay 2021*



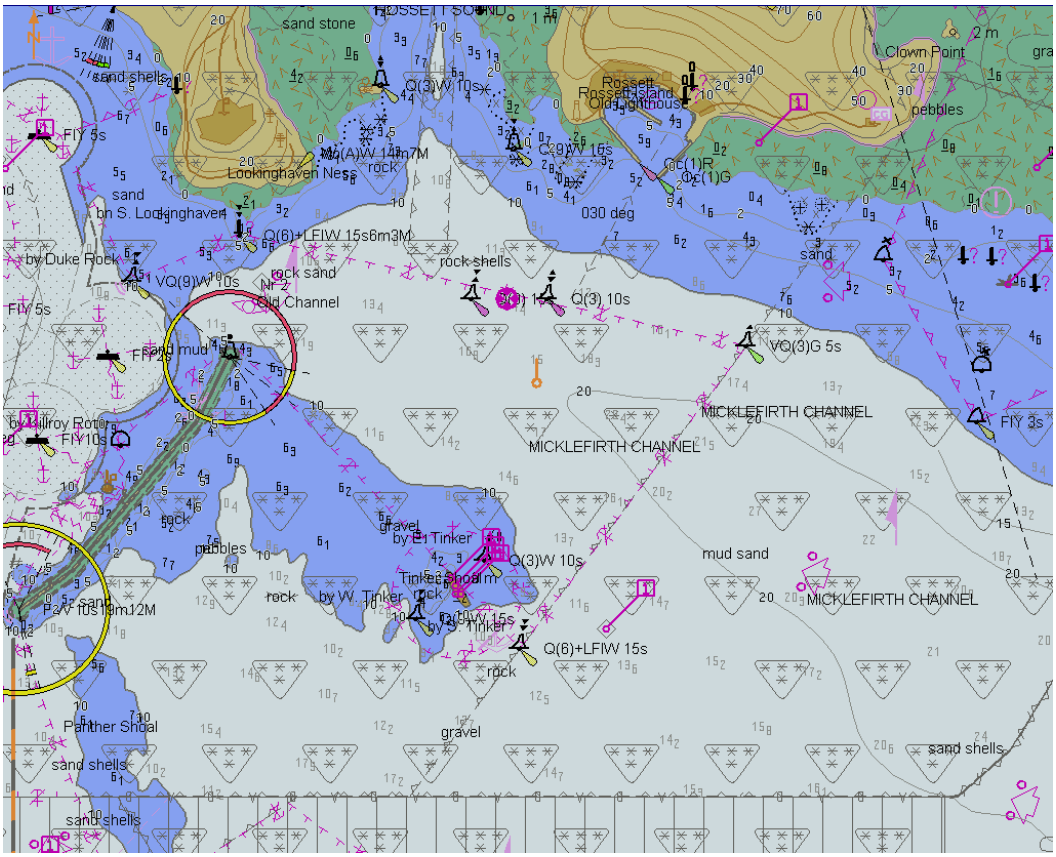
*[**TBD**]After loading of 101AA00X01SW.002, displayed scale 1:20 000, date range 1st Jan 2015-21st Feb 2015*



*[**TBD**]After loading of 101AA00X01SW.003, displayed scale 1:20 000, date range include 8th Sep 2015*



*[**TBD**]After loading of 101AA00X01SW.004, displayed scale 1:20 000, date range include 22nd Sep 2015*



*[**TBD**]After loading of 101AA00X01SW.005, displayed scale 1:20 000, date range include 6th Oct 2015*

2.3.3 Loading update in an invalid sequence

Test Reference	InvalidSequence	**IHO Reference**	IEC61174/ 4.4.2
Test description			
Loading update files in an invalid sequence.			
Setup			
*Load the exchange set **PowerUp***			
Action			
Load the following five update exchange sets: ***InvalidSequence00x** with x=1,2,3,4,5*			
Results			
The update process shall install the updates up to update no. 3 and reject the installation of updates no. 4 and 5 with a permanent indication, "Chart information not up-to-date" when this chart is in use (either displayed or used as largest scale available for the chart related alerts and indications) until the not up-to-date situation is removed by successful application of a re-issue, a new edition or complete sequence of updates.			

2.3.4 Loading update of newer edition

Test Reference	NewerEdition	**IHO Reference**	IEC 61174/ 6.8.16.1

Test description

Loading update file of a newer edition than base dataset installed.

Setup

As result of test 2.2.3

Note: Following dataset is already loaded*:*

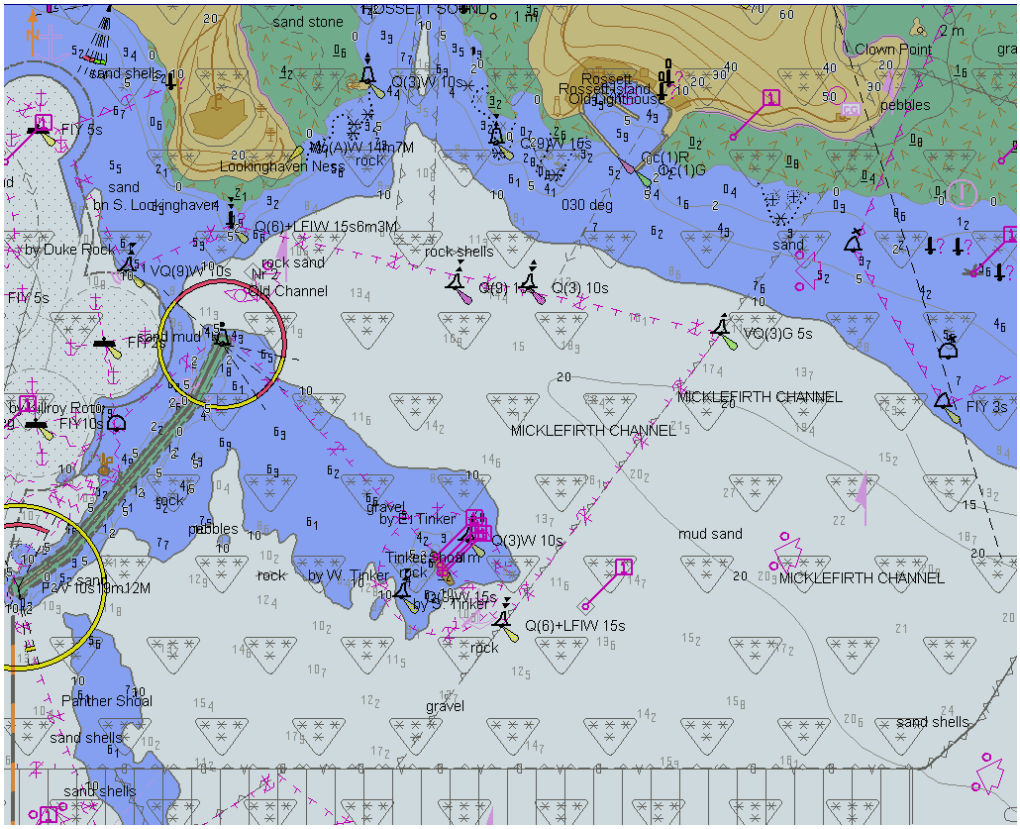
- *101AA00X01SW.000 (edition 1)*

Action

1. *Load the following update exchange set:*
   ***NewUpdate**, contains 101AA00X01SW.001 (edition 2)*
2. *Display installed chart.*
3. *Install the following exchange sets:*
   ***GoodBaseCells** 101AA00X01SW.000 (edition 2)*
   ***NewUpdate** 101AA00X01SW.001 (edition 2)*
4. *Display installed chart.*

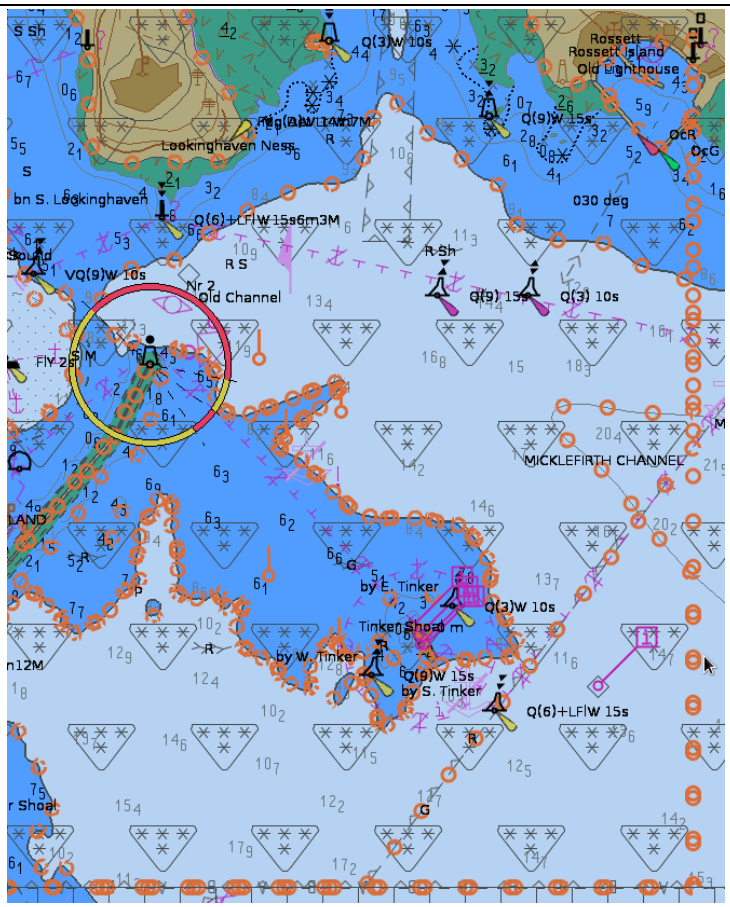
Results

1. *The update process shall refuse to install the update and inform the user that chart data of a newer edition are available.*
2. *A permanent indication "Chart information not up to date" shall be available in the chart display area when such a chart is in use (either displayed on chart area or used as largest scale available for chart related alerts and indications).*
3. *Base cell and update shall be installed without any warning or error.*
4. *The "Chart information not up to date" message no longer displayed.*

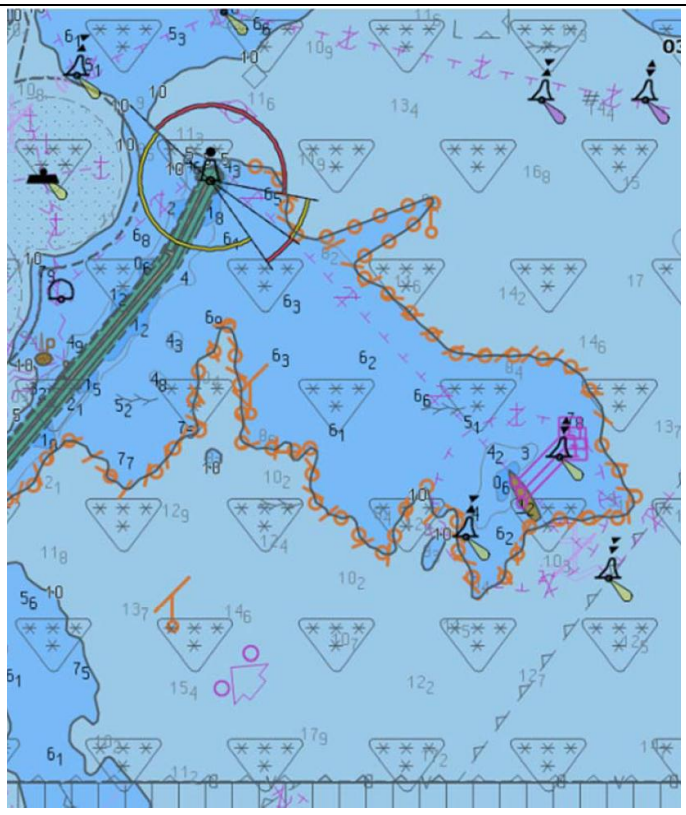


***[TBD]**After loading of 101AA00X01SW.000 2nd edition, displayed scale 1:20 000*

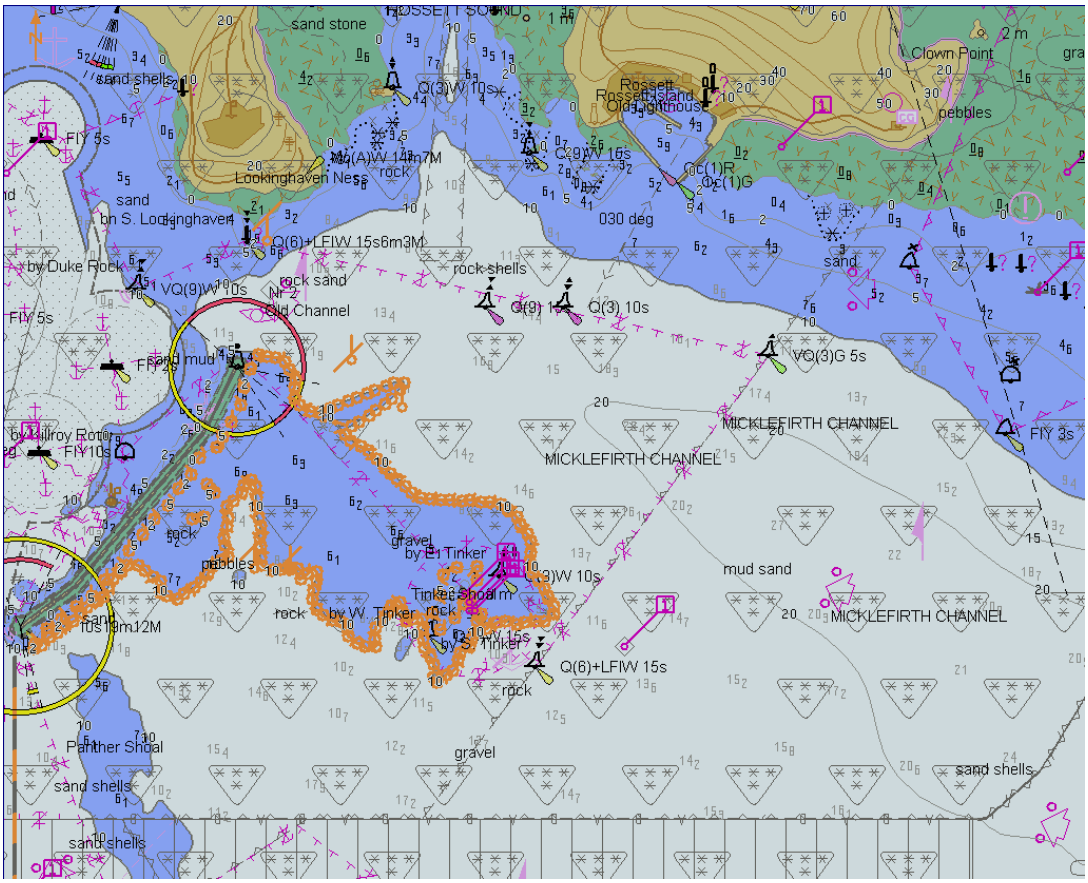
Note: Screen plot is based on the full text NATSUR attribute. To reduce undue clutter in the ECDIS chart display, the use of the abbreviations of the NATSUR attribute is recommended.



***[TBD]**After loading of 101AA00X01SW.001 2nd edition, displayed scale 1:20 000, all features and their geometries being subject to this update review are highlighted*



***[TBD]**After loading of 101AA00X01SW.001 2nd edition, displayed scale 1:20 000, update review highlight filtered for real changes (example 1)*



***[TBD]**After loading of 101AA00X01SW.001 2nd edition, displayed scale 1:20 000, update review highlight filtered for real changes (example 2)*

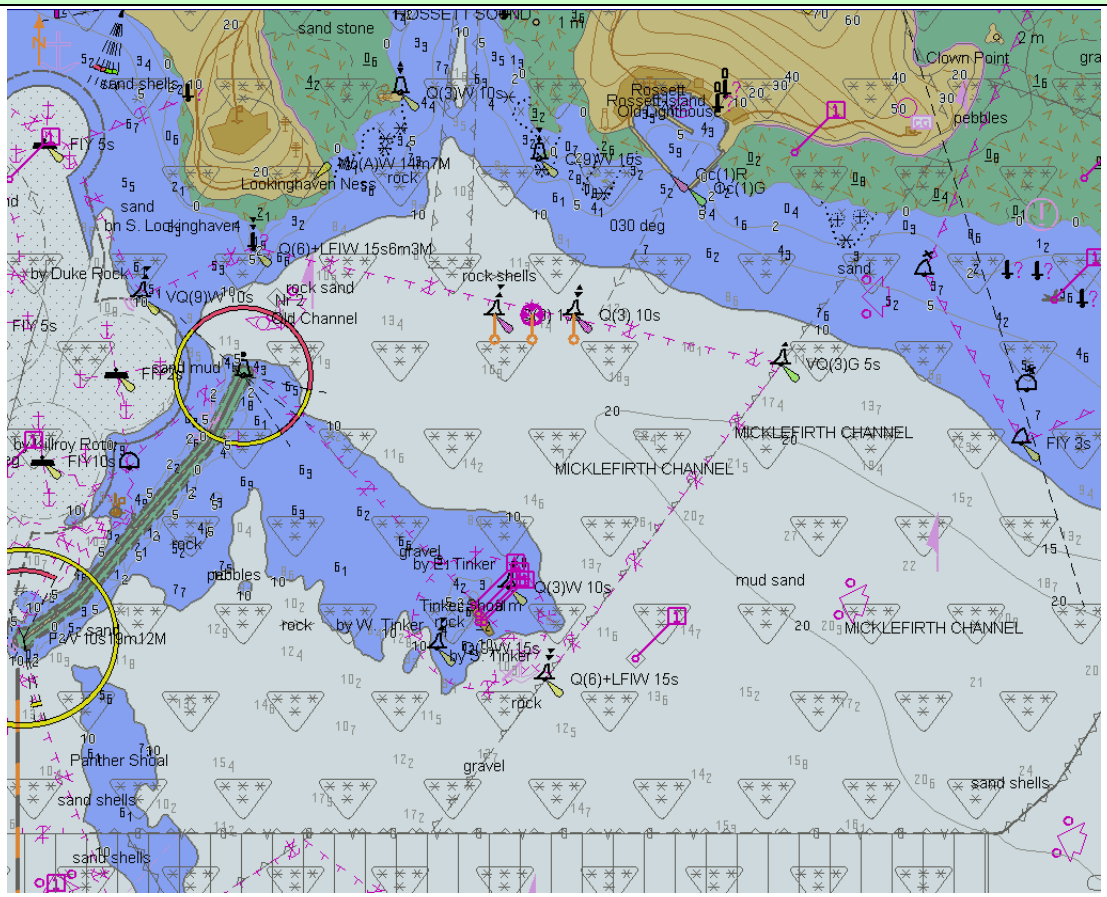
2.3.5 Loading update of older edition

Test Reference	OlderEdition	**IHO Reference**	IEC 61174/ 4.4.2
Test description			
Loading update file of an older edition than base dataset installed.			
Setup			
Install the following exchange sets: ***GoodBaseCells** 101AA00X01SW.000 and 124AA00X01SW.GML (edition 2)*			
Action			
Install the following exchange set: - ***OldUpdate** 101AA00X01SW.000 and 124AA00X01SW.GML (edition 1)*			
Results			
The update shall not be applied successfully and the system shall provide an indication (either on screen or in an error log) the reason the update was not applied, for example "Incorrect Edition Number 1 [of update]: expecting 2"			

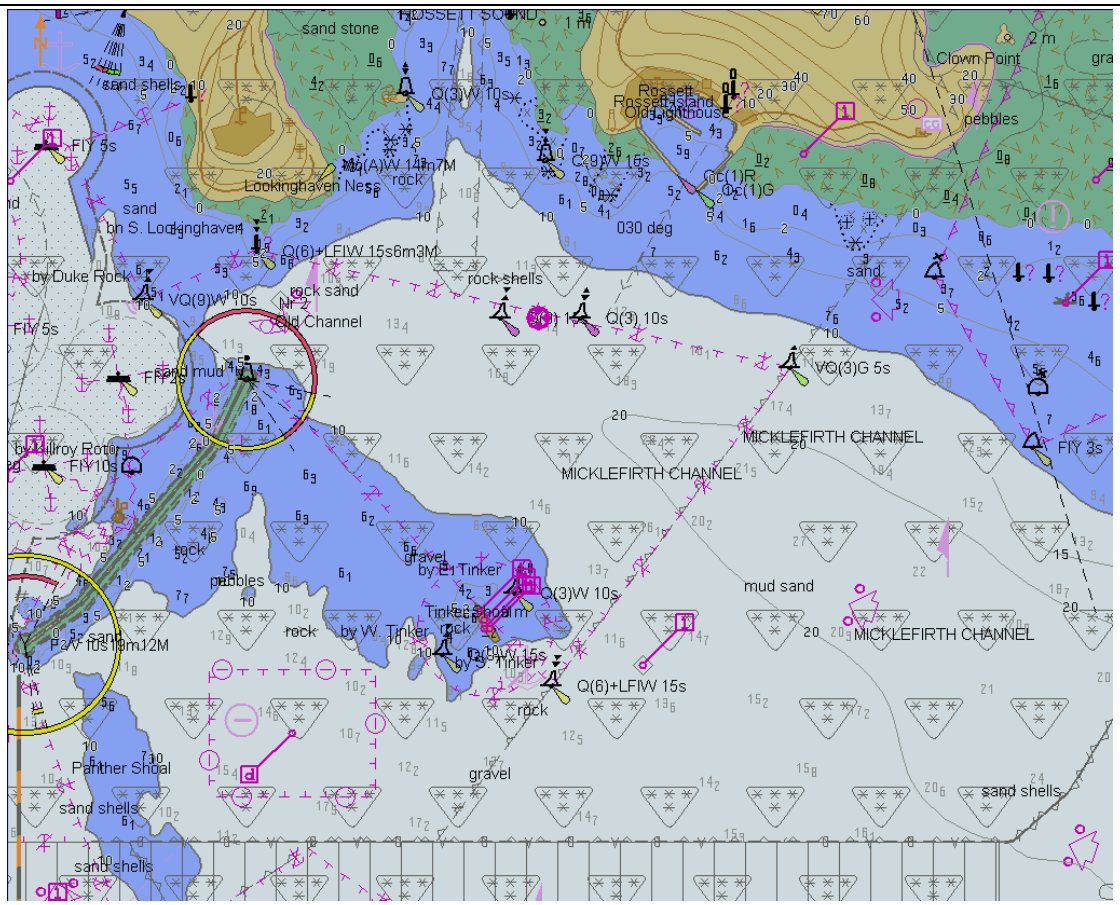
2.3.6 Loading a re-issue of a data set

Test Reference	ReIssue	**IHO Reference**	IEC 61174/ 4.4.2
Test description			
Loading a re-issue of an unencrypted data set.			
Setup			
*Load the exchange set **PowerUp***			

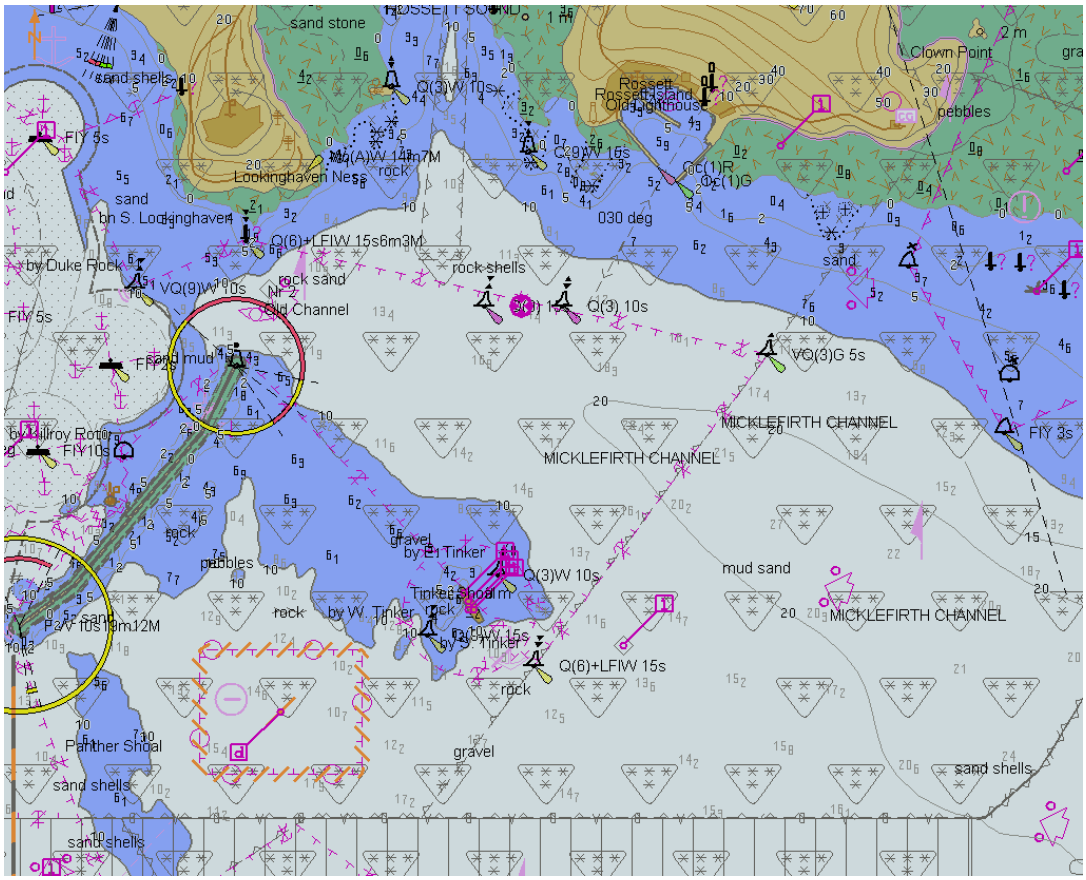
Action
Load the following update exchange sets in sequence: - ***ReIssue001*** - ***ReIssueX01SW*** - ***ReIssue004***
Results



*[**TBD**]After loading of 101AA00X01SW.001 1st edition, displayed scale 1:20 000*



***[TBD]**After loading of 101AA00X01SW.000 re-issue, edition 1, update 3, displayed scale 1:20 000*



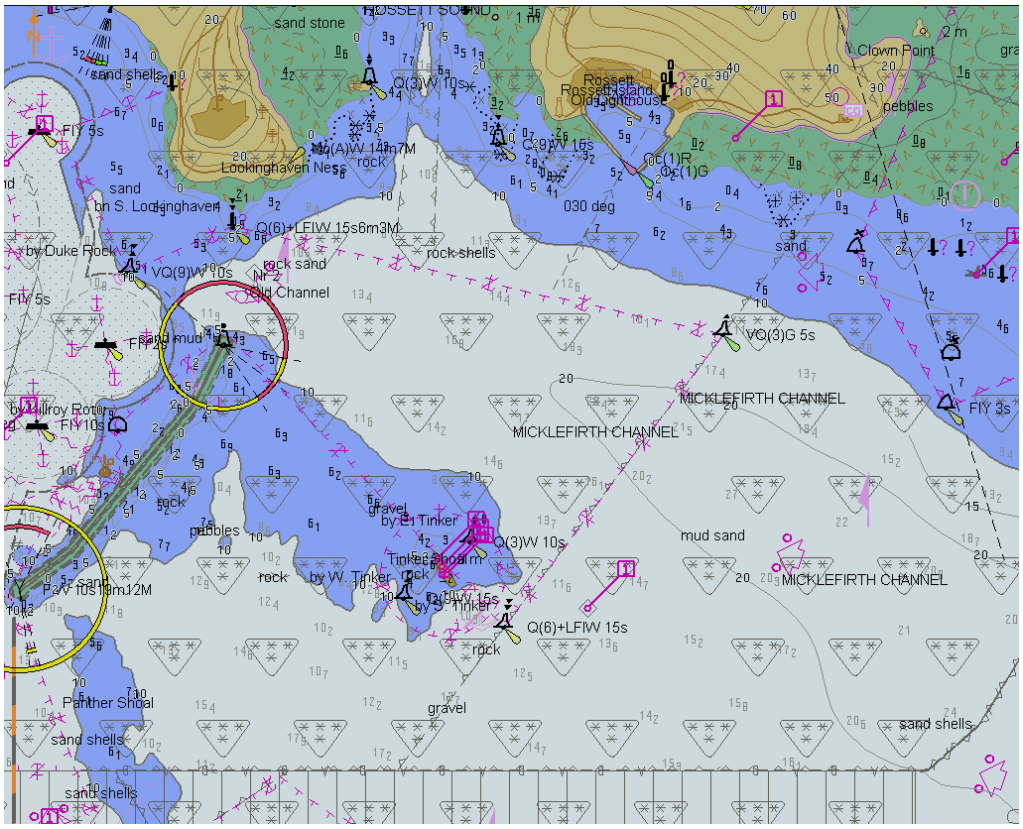
***[TBD]**After loading of 101AA00X01SW.004, displayed scale 1:20 000*

2.3.7 Rejection of automatic update

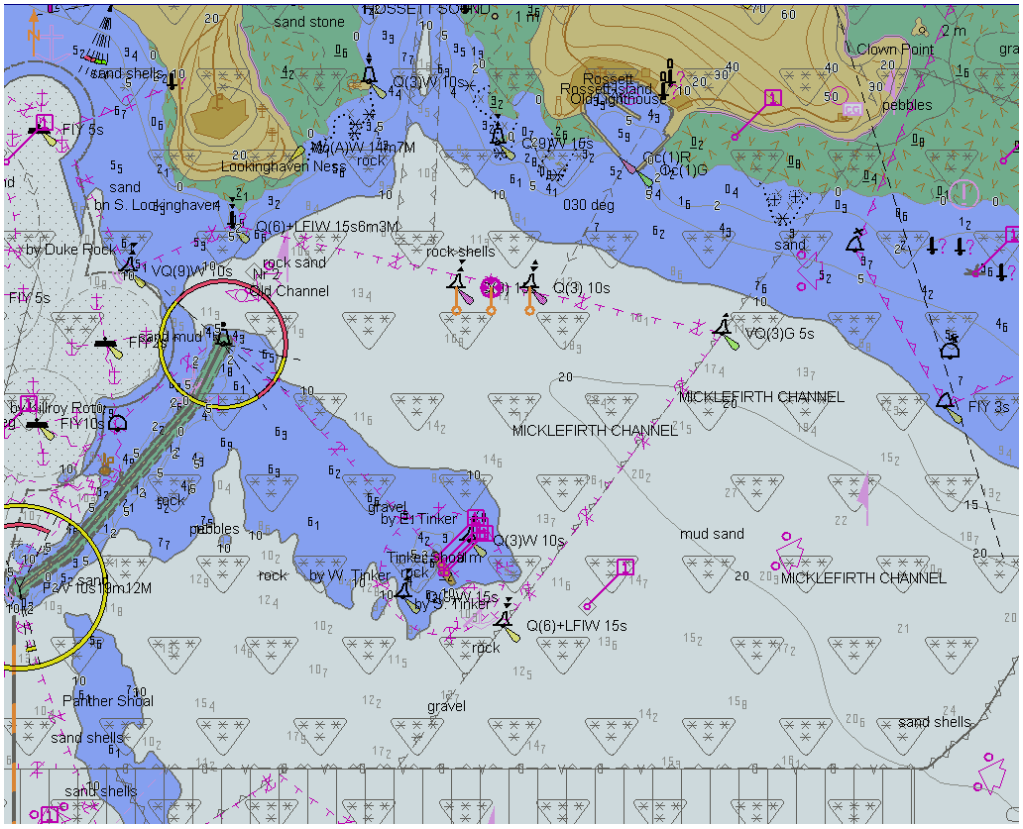
Test Reference	UpdateRejection	**IHO Reference**	IEC 61174/ 4.4.2
Test description			
Manual rejection of an automatic update.			
Setup			
*Load the exchange set **PowerUp***			
Action			
*Load the following update from the exchange set **SequentialUpdate**:* *101AA00X01SW.001 (edition 1, update 1)* *After loading of the update, manually annotate the features of the update as rejected using the deletion available in the manual update method.*			

Results

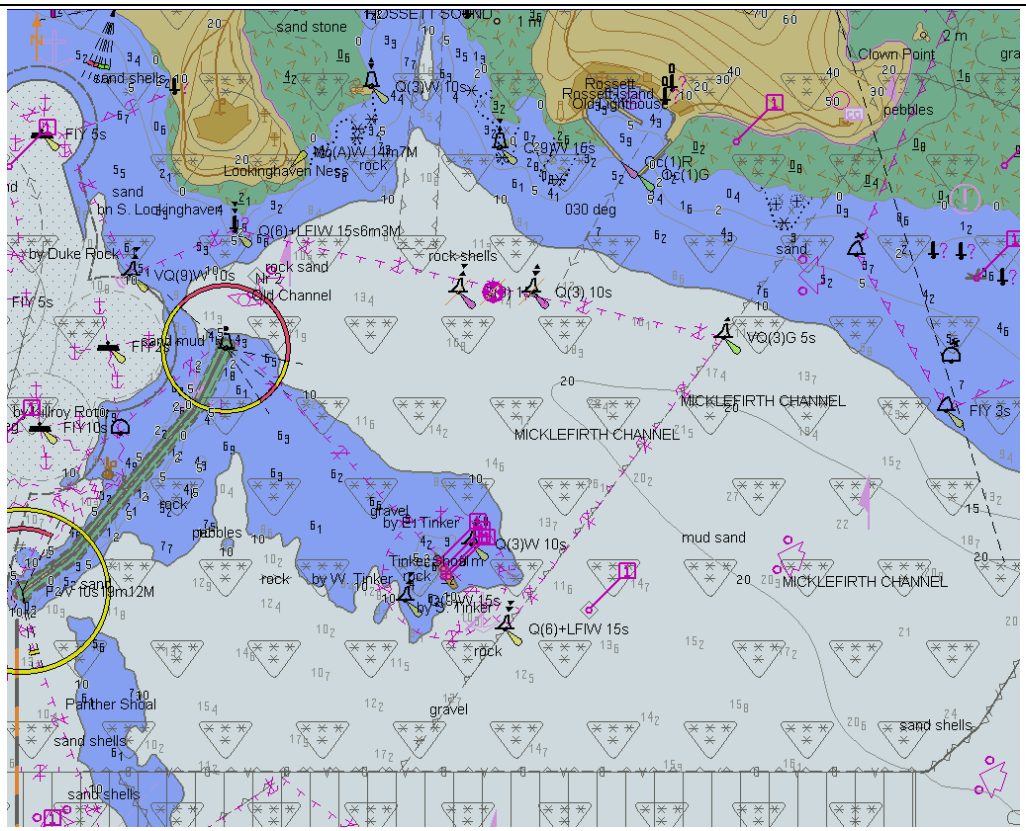
The features from the update shall remain in display as annotated by the deletion mark of the manual update method.



[TBD]*Before loading of update, displayed scale 1:20 000*



[TBD]*After loading of 101AA00X01SW.001, displayed scale 1:20 000*



*[**TBD**]After update 1 has been manually annotated as rejected by the Mariner, displayed scale 1:20 000*

2.4 Manual Updates

Test Reference	ManualUpdates	**IHO Reference**	IEC 61174/ 6.8.17
Test description			
Manual updates			
Setup			
*Load the exchange set **PowerUp*** - *Select Display Category Standard* - *Set the Safety Contour value to 8 m* - *Set the Safety Depth value to 8 m* - *Select Symbolized Boundaries* - *Select Simpified Symbols = false* - *Select Highlight date dependent* - *Select Spot soundings*			
Action			
1. *Using the editing tools available with the EUT, make the following changes and include a short textual description of the action to a-g:* *a. insert a dangerous wreck near: 32 31.5S, 60 57.3E* *b. insert East Cardinal buoys including topmarks near: 32 31.5S, 60 57.46E* *c. insert West Cardinal buoy including topmark near: 32 31.5S, 60 57.16E;* *d. insert a prohibited entry area between Panther and Tinker Shoals timed to come into force at 20220220;* *e. insert a cautionary area in the same location being in force from date of issue to 20220220;* *f. insert 15 metre sounding at 32 31.7S, 60 57.4E.* *g. delete fog signal of cardinal buoy at 32 31.444S, 60 55.842E* *2. Set viewing date before 20220220. Display chart cell with manual updates.* *3. Set viewing date after 20220220. Display chart cell with manual updates.*			

4. Using the editing tools available with the EUT, make the following changes and include a short textual description of the action to h-j:

h. extend western limits of the prohibited entry area;

i. delete cautionary area;

j. *move cardinal buoy at 32 31.444S, 60 55.842E, including top mark and light, to 32 31.500S, 60 55.700E.*

5. Set viewing date before 20220220. Display chart cell with manual updates.

6. Set viewing date after 20220220. Display chart cell with manual updates.

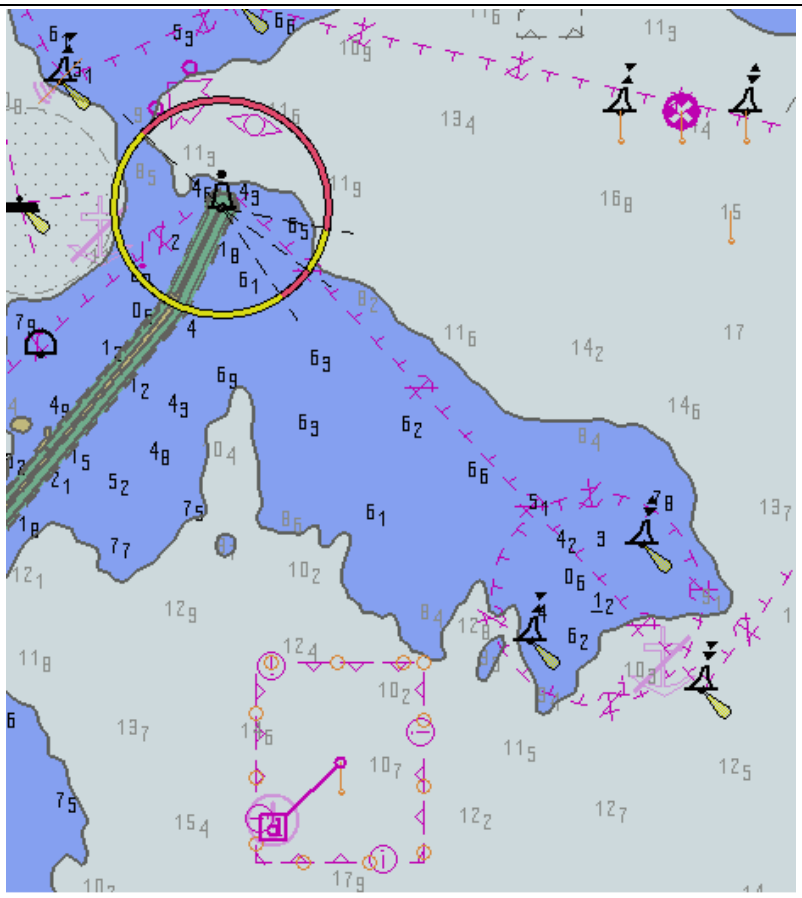
7. Review manual updates.

8. Retrieve textual description from record.

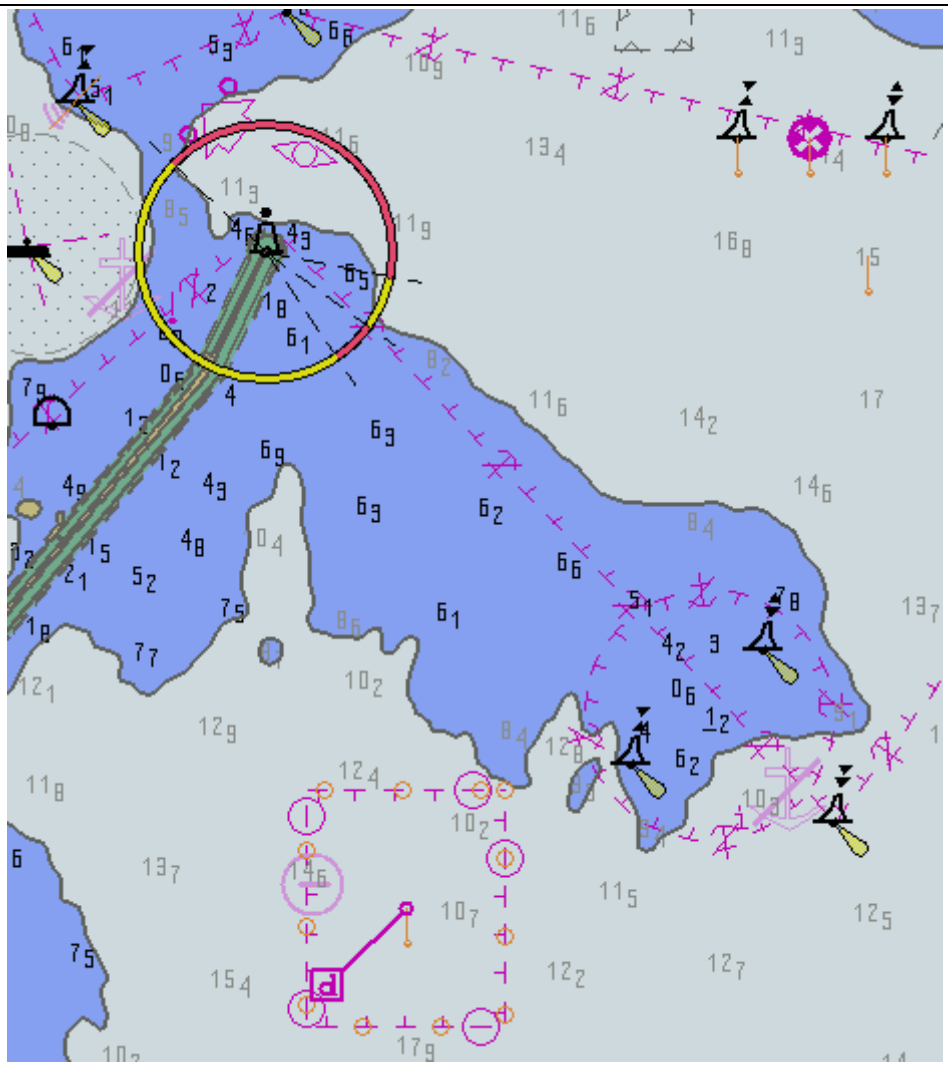
9. Remove all manual updates from display and review them (system time and date may need to be adjusted for verification).

Results

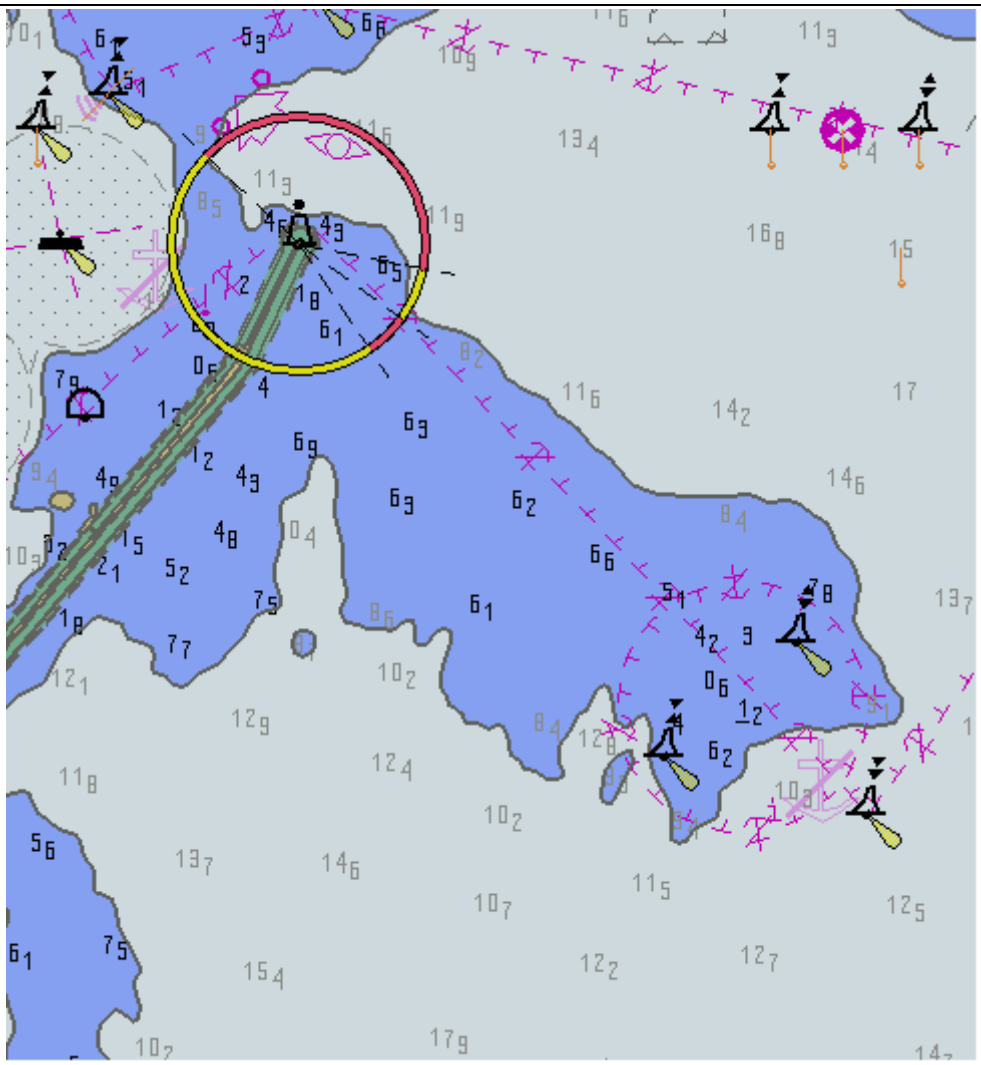
2. Set viewing date before 20220220. The ENC in the ECDIS should match the corresponding graphical plot shown below. Manual updates shall be distinguishable as described in ***S-98 XXX-XXX***



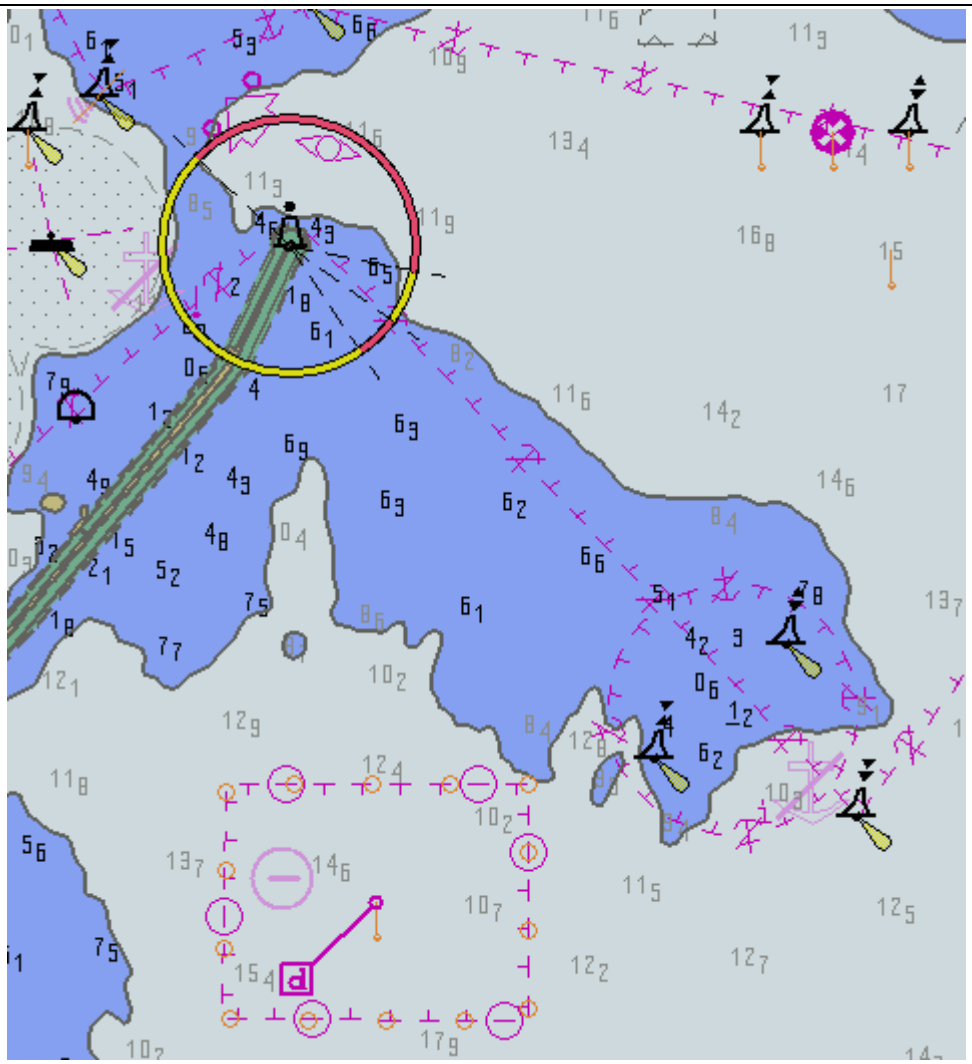
[TBD]



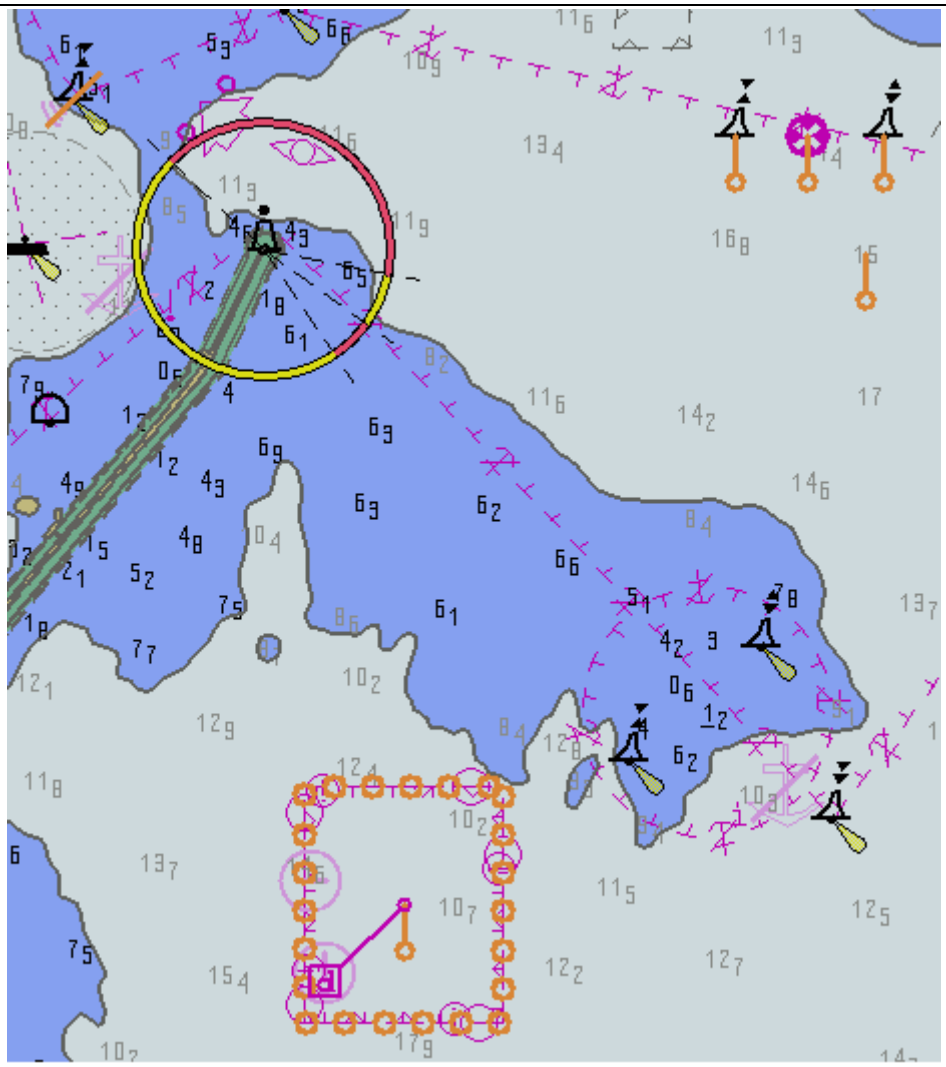
*[**TBD**]3. Set viewing date after 20150220. The ENC in the ECDIS should match the corresponding graphical plot shown above.*



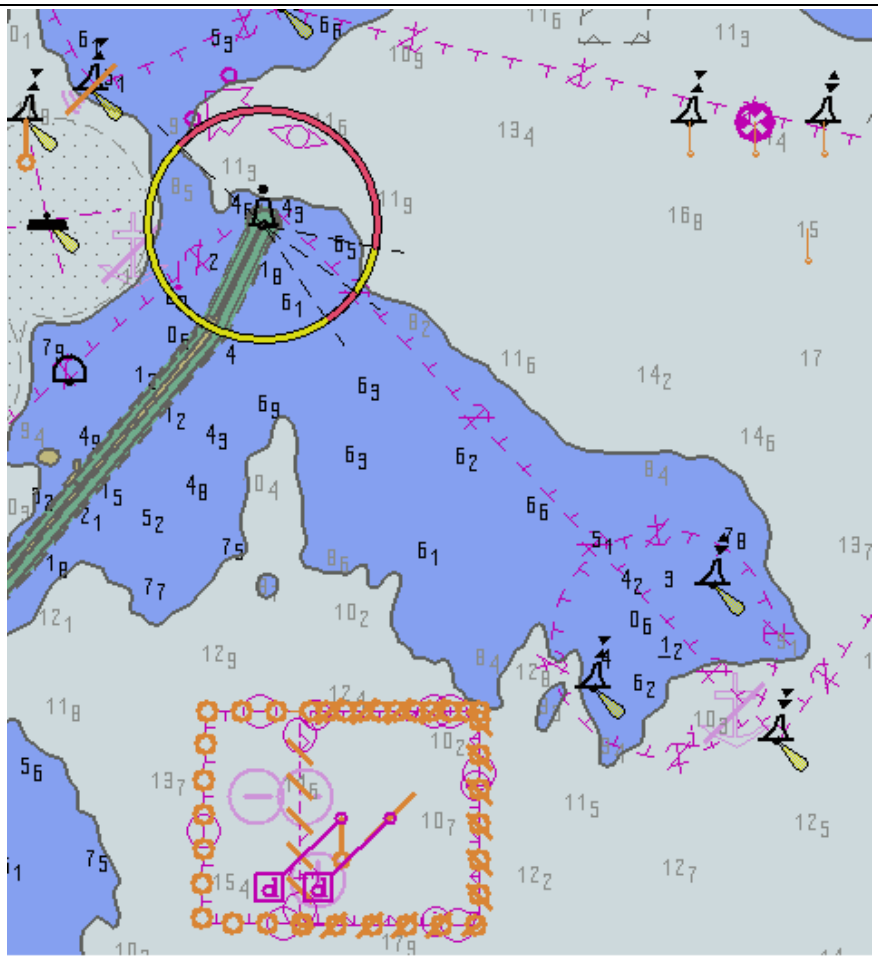
[TBD]*5. Set viewing date before 20220220. The ENC in the ECDIS should match the corresponding graphical plot shown above.*



***[TBD]**6. Set viewing date after 20220220. The ENC in the ECDIS should match the corresponding graphical plot shown above.*



***[TBD]**7.a-g. Review of manual updates shall be available on demand. Above is review of updates a-g.*



[TBD]

7.h-j. Review of manual updates shall be available on demand. Above is review of updates h-j.

8. Textual description of manual update shall be retrievable from record.

9. Manual updates removed from the display during the last 3 months period shall be retained and shall be available for review.

2.5 Loading and Updating using SENC delivery (if provided)

Test Reference	SENCDelivery	**IHO Reference**	IEC 61174/ 6.8.16
Test description			
Loading and Updating using SYSTEM DATABASE delivery (if provided).			
Setup			
If the ECDIS supports SYSTEM DATABASE delivery (accepting a SYSTEM DATABASE resulting from conversion of ENC to SYSTEM DATABASE ashore, in accordance with IHO Resolution 4/2002 as amended (see IHO Publication M-3), then the manufacturer shall supply a SYSTEM DATABASE version of the IHO S-64 test data set for each SYSTEM DATABASE format for which SYSTEM DATABASE delivery is to be approved. *Note: The test data sets should be provided by the SYSTEM DATABASE producers for each SYSTEM DATABASE distributor approved for use with the EUT.*			
Action			
For each SYSTEM DATABASE delivery format perform the following tests from section 2.1 and 2.2 : *2.1.1, 2.1.2, 2.1.3, 2.1.4, (2.1.5);* *(2.2.1), 2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 2.2.8*			
Results			
For each SYSTEM DATABASE test data set supplied, there shall be compliance with the corresponding test results noting that the outcome of each resultant update stage should be identical to that which results from application of the updates supplied in the above mentioned tests. *The ECDIS shall provide an update mechanism for delivered SYSTEM DATABASEs that is not inferior to the update mechanism of ENCs.*			

2.6 Loading, Updating and Authentication of encrypted datasets

2.6.1 Organization of the Encrypted TDS

The tests for loading encrypted data are stored in the folder “Part15”. The test exchange sets are named and referred to in the tests by the exchange set name. Where permits, certificates or other elements are needed they are provided in the root folder of the exchange set. This section also includes tests of how the ECDIS performs data management functions for update, cancel/replace and reissued datasets and supplementary files.

Default test data parameters

The S-100 Part 15 data permits that accompany any encrypted test datasets have been generated for the User Permit specified below. To carry out the tests described in this document manufacturers will have to create systems compatible with the following manufacturer information and hardware ID (HW_ID) – these are taken from S-100 Edition 5.0.0 Part 15..

Manufacturer ID: (M_ID) = **859868**

Manufacturer Key: (M_KEY) = **4D5A79677065774A7343705272664F72**

Hardware ID: (HW_ID) = **40384B45B54596201114FE9904220101**

USERPERMIT = **AD1DAD797C966EC9F6A55B66ED98281599B3C7B1859868**

This is the official manufacturer information issued for and by the Scheme Administrator (IHO secretariat) and is provided expressly for the purpose of producing encrypted ENC test data. This data is provided specifically for the following purposes:

- OEM Type approval against the S-164 Test Data for Encrypted ENCs (This document).
- OEM and Data Server self certification of their systems against S-100 Part 15.
- OEM Type approval against the S-64 Test Data for Encrypted ENCs (This document).
- OEM and Data Server self certification of their systems against the S-63 Data Protection Scheme.

Test Certificate and Public Key

The official IHO Scheme Administrator Certificate (IHO.CRT) should be used in the test data unless a different certificate or public key file is specified in the test description.

2.6.2 ENC Licensing – Permit Management

2.5.2 a) Check permit string availability

Test Reference	InvalidPermit	**IHO Reference**	S-98 15-7.4
Test description			
Test how the system performs when loading a non-compliant permit file. Verify that the ECDIS returns the correct error message.			
Setup			
No pre-installed permits. *Test data used:* *1) PERMIT.XML file (empty file)* *2) TEXT.XML file (wrong name)* *Test data location:* ***InvalidPermitFile***			
Action			
1) Attempt to load a PERMIT.XML file with no cell permits listed. *2) Attempt to load a non compliant text file.*			
Results			
Security Scheme Error (SSE 111) and accompanying description is displayed in the system at permit installation. *i.e.* ***SSE 111 – Cell permit not found***			

2.5.2 b) ENC cell permit string incorrect format

Test Reference	IncorrectPermitFormat	**IHO Reference**	S-98 15-7.4
Test description			
ENC Licensing – Permit Management *ENC cell permit string incorrect format* *Test how the system performs when loading a PERMIT.XML file with an incorrectly formatted permit string. Verify that the ECDIS returns the correct error message.*			
Setup			
No pre-installed permits or ENCs in the System Database *Test data used:* *1) PERMIT.XML* *2) b) S100_ROOT (Exchange Set – 101GB00100001, 101GB00100002 plus updates)* *Test data location:*			
Action			
Load the permit file (PERMIT.XML) and then the exchange set (S100_ROOT) from the location above.			
Results			
Security Scheme Error (SSE 112) and accompanying description is displayed in the system at permit installation. That is, ***GB100012****, "****SSE 112 – Cell permit format is incorrect****" 101GB00100002, valid to 31st Dec 2018 installed OK* *(This message is only intended as indication of what should be displayed when a valid permit is installed.) Only 101GB00100002 (edition #13 update # 5) and updates should be loaded into the SYSTEM DATABASE. The permit string for 101GB00100001is the wrong length [The cell name has The permit string for 101GB00100002 is the correct length and is valid.*			

2.5.2 c) Validate permit CRC

Test Reference	InvalidPermitChecksum	**IHO Reference**	
Test description			
ENC Licensing – Permit Management Validate permit CRC: *Test how the system performs when installing an ENC permit with an invalid checksum. Verify the system checks for a valid permit checksum and reports the appropriate message.*			
Setup			
No pre-installed permits *Test data used:* *PERMIT.XML* *Test data location:* - ***ENCLicencingC1*** - ***ENCLicencingC2***			
Action			
Attempt to load the PERMIT.XML file from locations (a) and (b) above into the ECDIS.			
Results			
The system reports a CRC failure on 101GB00100001 accompanied by the appropriate error message as follows: *"**SSE 113 – Cell Permit is invalid (checksum is incorrect)**"* *In both cases the permit for 101GB00100002 imports without any error or warning.* *1) Cell 101GB00100001 has had its permit CRC changed from* 760CD6BA8AAEF1A0 to 760CD6BA8AAEE1A0*.* *2) Cell 101GB00100001 has had the encrypted cell keys 1 & 2 altered slightly.* *3) Cell 101GB00100002 has a valid permit CRC value for both tests.)*			

2.6.3 Missing PERMIT.XML signature

Test Reference	MissingPermitSignature	**IHO Reference**	(S-100 Part 9/S-98)
Test description			
This test checks that permits cannot be loaded from a PERMIT.XML without a valid PERMIT.SIG permit signature file also present.			
Setup			
No pre-installed permits *Test data used:* *PERMIT.XML* *Test data location:* - ***ENCLicencingH***			
Action			
Load PERMIT.XML			
Results			
Verify the ECDIS fails to load the permits contained in PERMIT.XML and a suitable error message is issued.			

2.6.4 Invalid PERMIT.XML signature (contained in PERMIT.SIG)

Test Reference	InvalidPermitSignature	**IHO Reference**	(S-100 Part 9/S-98)
Test description			
This test checks that permits cannot be loaded from a PERMIT.XML with an invalid PERMIT.SIG permit signature.			
Setup			
No pre-installed permits *Test data used:* *PERMIT.XML* *Test data location:* - ***ENCLicencingI***			
Action			
Load PERMIT.XML			
Results			
Verify the ECDIS fails to load the permits contained in PERMIT.XML and a suitable error message is issued.			

2.5.2 d) Check remaining permit expiry period

Test Reference	ExpiringPermit	**IHO Reference**	S-98 15-7.4
Test description			
Test how the system performs when loading permits that expire within the next 30 days. Verify that the ECDIS returns the correct warning message.			
Setup			
No pre-installed permits. *Test data used:* *PERMIT.XML* *The expiry date set in this test permit is 20221231 (31st December 2022).* *Test data location:* - *ENCLicencingD* *D:\IHO S-64 [S-63 TDS v1.2.1]\2 ENC Licencing\Test 2d*			
Action			
Set the computer Date/Time properties to 3rd Dec 2022 *Install the PERMIT.XML file:*			
Results			
The system must return a SSE 120 warning message as follows: *"**SSE 120 – Subscription service will expire in less than 30 days. Please contact your data supplier to renew the subscription licence**."*			

2.6.5 Incorrect User Permit in PERMIT.XML

Test Reference	InvalidPermitSignature	**IHO Reference**	(S-100 Part 9/S-98)
Test description			
This test checks that permits cannot be loaded from a PERMIT.XML with the wrong user permit contained.			
Setup			
No pre-installed permits *Test data used:* *PERMIT.XML* *Test data location:* - ***ENCLicencingJ***			
Action			
Load PERMIT.XML			
Results			
Verify the ECDIS fails to load the permits contained in PERMIT.XML with the following message *"**SSE 121 – Permits may be for another system or new permits may be required, please contact your data supplier to obtain a new licence**."*			

2.5.2 e) Check for expired permits

Test Reference	ExpiredPermits	**IHO Reference**	
Test description			
Test how the system performs when installing permits which have expired. Verify that the ECDIS returns the correct warning message.			
Setup			
No pre-installed permits. *Test data used:* *PERMIT.XML* *The expiry date set in this test permit is 20221231 (31st December 2022).* *Test data location:* - ***ENCLicencingE***			
Action			
Load the PERMIT.XML file. [Note The expiry dates for these permits are set to 31st Dec 2022. ***Set the computer Date/Time to 1st Jan 2023*** *and install the PERMIT.XML file]*			
Results			
The system must report the correct SSE 115 warning message as follows: *"****SSE 115 – Subscription service has expired. Please contact your data supplier to renew the subscription licence****."* *It should be possible to install expired permits but the system must display a permanent warning message to the user as described in S-98 XXX-XXXX 10.5.5 of S-63.*			

2.5.2 f) Permit installation and reporting

Test Reference	PermitInstallation	**IHO Reference**	S-98 15-7.4
Test description			
Test how the system performs when a valid set of ENC permits, with more than 30 days until expiry, is loaded. Confirm that the ECDIS installs valid permits and offers the user a meaningful report at the end of the process.			
Setup			
No pre-installed permits. *Test data used:* *PERMIT.XML* *Test data location:* - ***ENCLicencingF*** *The expiry dates for these permits are set to 31st Dec 2028.* ***Set the computer Date/Time prior to 1st Dec 2028*** *and install the PERMIT.XML file.*			
Action			
Load the file PERMIT.XML in the location stated above.			
Results			
The permit file must import without any errors or warnings. A report dialog should be available to the user so that they can confirm the successful import. *(10 ENC Cell permits are provided for this test created using the IHO manufacturer hardware ID and M_KEY.)*			

2.5.2 g) Management of permits from multiple data servers.

Test Reference	MultipleDataServers	**IHO Reference**	S-98 15-7.4
Test description			
Test how the system performs when loading permit files from two different data servers. Confirm that the ECDIS manages permits supplied from different data servers correctly and stores them independently of one another.			
Setup			
No pre-installed permits. *Test data used:* *PERMIT.XML* *Test data location:* - ***ENCLicencingG1*** - ***ENCLicencingG2*** *There are two ENC cells common to both PERMIT.XML files. These common permits have been created using different encryption keys.*			
Action			
Load the PERMIT.XML file at the test data location (a) above. *Load the PERMIT.XML file at the test data location (b) above.*			
Results			
The two independently supplied permits should be stored in a Data Server specific location within the ECDIS. These permits must be available to view the contents at the user's request. (There are two ENC cells common to both PERMIT.XML files. These common permits have been created using different encryption keys.)			

2.5.2 h) Management of installed permits

Test Reference	PermitManagement	**IHO Reference**	S-98 15-7.4
Test description			
Test whether the system enables user to manage their permit holdings. Confirm that users have the ability to selectively remove permits from the system.			
Setup			
Use the pre-installed permits from the previous test MultipleDataServers (*2.5.2g)* *Test data used:* *PERMIT.XML files loaded in the previous test* *Two permit files have been supplied with this test from two different Data Servers (DS). These have been designated GB and PM.*			
Action			
Attempt to remove one of the installed sets of permits from the system leaving the other one intact.			
Results			
The user must be able to delete permits from the system. Suitable warnings/confirmations must be given.			

2.5.4 b) Change and update installed certificate

Test Reference	InstallSACertificate	**IHO Reference**	S-98 15-4.1
Test description			
Confirm that the system can import a new certificate/public key and return a report informing the user of the fact. Validate the supplied exchange set against the SA certificate			
Setup			
Use the pre-installed information and data from the previous test 2.5.4a. *Test data used:* *1) IHO.CRT* *2) PERMIT.XML* *3) S100_ROOT (Exchange Set)* *Test data location:* - ***Authentication1B*** *The IHO Public key used for this is the same as that posted on their website at the time the test data was produced.*			
Action			
*Note: The certificate or public key file should be manually checked against the corresponding files on the IHO website (www.iho.int). See [**TBD**] in S-98.* *Depending on the system install the certificate and/or public key file(s).* *Install the PERMIT.XML and Install the exchange set from the location above.*			
Results			
1) The new certificate or public key file should load without error or warning, i.e. no SSE 126 message. A message should be displayed informing the user that the new file has been installed successfully. *2) The exchange set loads without any authentication failures.* *ENC cell 101GB00100004 (Edition #7, Update #1) installed without error or warning* *ENC cell 101GB00100005 (Edition #3, Update #2) installed without error or warning*			

2.5.4 c) No pre-installed certificate/public key on the system

Test Reference	MissingSACertificate	**IHO Reference**	S-98 15-4.1
Test description			
Test how the system performs when there is no pre-installed certificate. Confirm that the correct SSE 105 error message is displayed and that the system does not progress to the decompress/decrypt stage.			
Setup			
No pre-installed certificate, permits or ENC data. *Test data used:* *1) PERMIT.XML* *2) S100_ROOT (Exchange Set)* *Test data location:* - ***Authentication1C*** *IHO Public key used for this is the same as that posted on their website at the time this test data was produced.*			

Action
Install the permit file followed by the exchange set stored in the location above.
Results
The system must report a SSE 105 error message similar to the one below. *"**SSE 105 – SA Digital Certificate file is not available. A valid certificate can be obtained from the IHO website or your data supplier**."* *The system must abort at this point and not continue to install ENCs.* *ENC cell 101GB00100001 (Edition #3, Update #6) not installed. "SSE 105" Error Message* *ENC cell 101GB00100002 (Edition #13, Update #5) not installed. "SSE 105" Error Message*

2.5.4 d) Check SA Certificate Expiry Date

Test Reference	CertificateExpiry	**IHO Reference**	S-98 15-4.1
Test description			
Test how the system performs if the SA certificate (IHO.CRT) has expired. To confirm that the correct SSE 122 error message is displayed and that the system does not progress to the decompress/decrypt stage. *.*			
Setup			
No pre-installed certificate, permits or ENC data. *Test data used:* *IHO.CRT PERMIT.XML PERMIT.SIG* *S100_ROOT (Exchange Set)* *Test data location:* ***Authentication1DExpired*** ***Authentication1DCurrent*** *The IHO.CRT (Expired) certificate expired on 31st December 2014* *The IHO.CRT (Current) certificate expires on 29th August 2033*			
Action			
There are two folders one contains an expired certificate, an exchange set and a set of permits, the other a current certificate, an exchange set and a further set of permits. The system date should be set to a date between the expiry dates for (a) and (b) above. *1) Install the certificate and permits at location (a) above then attempt to load the exchange set.* *2) Then install the certificate and permits at location (b) above then attempt to load the exchange set (this test should result in the certificate & ExSet loading correctly). (Permits for this test expire on 31st Dec 2023)*			

Results
1) When installing the expired certificate the system must report a SSE 122 error message similar to the one below. *"**SSE 122 – SA Digital Certificate file has expired. A new SA Public Key (certificate) can be obtained from the IHO website or your data supplier**." When attempting to install the exchange set the system must report the required SSE 105 message stating that no valid certificate is installed in the ECDIS.* *2) When installing the current certificate this should install OK and load the ExSet without error or warning.* ***Current*** *ENC cell 101GB00100001 (Edition #3, Update #6) installed without errors and warnings* *ENC cell 101GB00100002 (Edition #13, Update #5) installed without errors and warnings* ***Expired*** *ENC cell 101GB00100001 (Edition #3, Update #1) not installed. "SSE 122 & 105" Error Messages* *ENC cell 101GB00100002 (Edition #12, Update #7) not installed. "SSE 122 & 105" Error* Messages

2.5.4 e) Incorrectly formatted certificate and public key files

Test Reference	InvalidSACertificate	**IHO Reference**	S-98 15-4.1
Test description			
Test how the system performs if the IHO digital certificate (IHO.CRT) is incorrectly formatted. Confirm that the correct SSE 108 error message is displayed and that the system does not progress to the decompress/decrypt stage.			
Setup			
No pre-installed certificate, permits or ENC data. *Test data used:* *IHO.CRT* *PERMIT.XML PERMIT.SIG* *S100_ROOT (Exchange Set)* *Test data location:* - ***Authentication1E*** *1) The SA certificate is corrupted and invalid.*			
Action			
Install the IHO.CRT file. Then attempt to load the exchange set using the permits provided.			
Results			
The system must report a SSE 108 error message similar to the one below. *"**SSE 108 – SA Digital Certificate file incorrect format. A valid certificate can be obtained from the IHO website or your data supplier**". When attempting to install the exchange set the system must report the required "**SSE 105 – SA Digital Certificate file is not available. A valid certificate can be obtained from the IHO website or your data supplier**."* *ENC cell 101GB00100001 (Edition #3, Update #6) not installed. "SSE 108 & 105" Error Messages* *ENC cell 101GB00100002 (Edition #13, Update #5) not installed. "SSE 108 & 105" Error Messages*			

2.7 Dataset Authentication

2.7.1 Missing Catalogue Signature.

Test Reference	MissingCatalogueSignature	**IHO Reference**	(S-100 Part 9/S-98)
Test description			
This test checks that exchange sets with an invalid catalogue signature file can not be loaded.			
Setup			
No pre-installed permits *Test data used:* *CATALOG.XML* *Test data location:* - ***Authentication3A*** *The exchange set is missing the CAT.SIG catalogue signature file.*			
Action			
*Load exchange set **MissingCatalogueSignature***			
Results			
Verify the ECDIS fails to install the exchange set contents and outputs a suitable error message.			

2.7.2 Invalid Catalogue Signature.

Test Reference	InvalidCatalogueSignature	**IHO Reference**	(S-100 Part 9/S-98)
Test description			
This test checks that exchange sets with an invalid catalogue signature file can not be loaded.			
Setup			
No pre-installed permits *Test data used:* *CATALOG.XML CAT.SIG* *Test data location:* - ***Authentication3B*** *The signature contained in CAT.SIG is invalid.*			
Action			
*Load exchange set **InvalidCatalogueSignature***			
Results			
Verify the ECDIS fails to install the exchange set contents and outputs a suitable error message.			

2.5.5 b) Authentication against a non SA certificate

Test Reference	NonSASignedData	**IHO Reference**	
Test description			
Test that the system will correctly reject data which is authenticated against a certificate which is not the Scheme Administrator.			
Setup			
No pre-installed certificate/public key, permits or ENC data. *Test data used:* *1) PERMIT.XML* *3) S100_ROOT (Exchange Set – 101GB0061021A, 101GB0061021B, 101GB0061032A)* *Test data location:* - ***Authentication2B*** *This test uses an exchange set where the data server certificate is self-signed (not by the SA).*			
Action			
Install certificate and/or public key, permit file and exchange set stored in the location above.			
Results			
The system must authenticate the exchange set against the certificate and/or public key stored on the system. The system must identify that the data has been authenticated against a public key not issued by the IHO acting as the SA. *An error message must be displayed as follows:* *"**SSE 126 – ENC is not authenticated by the IHO acting as the SA**"* ***This test should prevent the exchange set from being loaded.***			

2.7.3 Authentication via a domain coordinator.

Test Reference	AuthenticationDomainCoordinator	**IHO Reference**	(S-100 Part 9/S-98)
Test description			
S-100 Part 15 allows for domain coordinators and a chain of certification between the data server certificate and the SA. This test verifies the ECDIS is able to correctly import data which is authenticated by the SA via one or more domain coordinators.			
Setup			
No pre-installed certificate/public key, permits or ENC data. *Test data used:* *1) PERMIT.XML* *3) S100_ROOT (Exchange Set – 101GB0061021A, 101GB0061021B, 101GB0061032A)* *Test data location:* - ***AuthenticationDomainControllers***			
Action			
Install the IHO.CRT file, PERMIT.XML and ENC exchange set from the location described			
Results			
Verify the ECDIS correctly installs all cells.			

2.5.5 c) ENC signature validation

Test Reference	InvalidDatasetSignature	**IHO Reference**	
Test description			
Test how the system responds when validating an incorrectly signed dataset. Confirm that the correct SSE 109 message is displayed.			
Setup			
No pre-installed certificate/public key, permits or ENC data. *Test data used:* *1) IHO.CRT* *2) PERMIT.XML* *3) S100_ROOT (Exchange Set)* *Test data location:* - ***Authentication2C*** *The digital signature for 101GB0031620.000 is in the correct format but the signature is invalid. The digital signature for 101GB0031640.000 is in the correct format and is valid.*			
Action			
Install the IHO.CRT file, PERMIT.XML and ENC exchange set from the location described below.			

Results
*The system must display the correct SSE 109 error message for cell 101GB00301620 as follows: "**SSE 109 – ENC Signature is invalid**."* *The system must not load this dataset as its integrity may have been compromised.* *The system should validate the signature file for 101GB0031640 and load this cell in the normal way.* *ENC cell 101GB00301620 (Edition #3, Update #0) Not installed. Error message SSE 109*

2.5.5 d) ENC signature format validation

Test Reference	CorruptedSignature	**IHO Reference**	
Test description			
Test how the system responds when validating against an incorrectly formatted digital signature. Confirm that the correct SSE 124 message is displayed.			
Setup			
Use data installed from the previous test (2.5.5c) *Test data used:* *S100_ROOT (Exchange Set)* *Test data location* - ***Authentication2D*** *The digital signature for 101GB00301620.000 has a valid ENC signature and is correctly formatted. 101GB00301660.000 has an invalid (corrupted) digital signature.*			
Action			
Load the exchange set from the location above.			
Results			
*The system displays the correct SSE 124 error message for cell 101GB00301660 as follows: "**SSE 124 – ENC Signature format is incorrect**."* *The system must not load this cell as its integrity may have been compromised.* *The system should validate the signature file for 101GB00301620 and load this cell in the normal way.* *Some systems may report an SSE 109 (ENC Signature is invalid) error this is acceptable as the expected outcome is the same, i.e. the data file is rejected.* *ENC cell 101GB00301620 (Edition #3, Update #0) installed without error or warning* *ENC cell 101GB00301660 (Edition #5, Update #0) is not installed. Error message SSE124*			

2.5.5 e) Check authentication is continuous and complete

Test Reference	ContinuousAuthentication	**IHO Reference**	
Test description			
Tests that the system authenticates all signature files individually and continuously without hanging at an error. Check that the SSE 109 and SSE 124 messages are reported correctly.			

Setup
Use data installed from the previous test (with 101GB00301620 & 101GB00301660 already installed) *Test data used:* *1) PERMIT.XML* *2) S100_ROOT (Exchange Set)* *Test data location:* - ***Authentication2E*** *101GB00301820.000 (invalid signature) 101GB00301860.001 (Incorrect signature format)*
Action
Load the PERMIT.XML file and exchange set from the location above.
Results
The system must authenticate each ENC signature continuously in turn. It must report the following errors at the end of the process: *"**101GB00301820.000 – SSE 109 – ENC Signature is invalid**."* *"**101GB00301860.001 – SSE 124 – ENC Signature format is incorrect**."* *The system must load all ENC data files with authenticated digital signatures but not those that do not.* ***Some systems may report an SSE 109 (ENC Signature is invalid) error for both 101GB00301820.000 & 101GB00301860.001****. This is acceptable as the expected outcome is the same, i.e. the data file is rejected.* *Note: 101GB00301860.002 should also return a sequential update error as it was not possible to install 101GB00301860.001.* *e.g* *ENC cell 101GB301620 (Edition #3, Update #0) installed without error or warning* *ENC cell 101GB301640 (Edition #4, Update #0) installed without error or warning* *ENC cell 101GB301660 (Edition #5, Update #0) installed without error or warning* *ENC cell 101GB301820 (Edition #3, Update #0) is not installed. Error message SSE109* *ENC cell 101GB301840 (Edition #8, Update #1) installed without error or warning* *ENC cell 101GB301860 (Edition #3, Update #2) Base cell is installed without error or warning. Update #1 is not installed. Error message SSE 124*

2.5.5 f) Single exchange set with datasets signed by multiple data servers

Test Reference	MultipleDataServers	**IHO Reference**	

Test description

To test how the system performs when an exchange set contains digital signatures from multiple data servers. That is, datasets signed with different data server private keys and containing different SA signed dataserver certificates.

Setup

No pre-installed certificates, permits or ENCs.

Test data used:

1) IHO.CRT
2) PERMIT.XML
3) S100_ROOT (Exchange Set)

Test data location:

- ***Authentication2F***

ENC Signatures Signed by Data Server 1 (DS1) DS1 "s SA signed certificate	***ENC Signatures Signed by Data Server 2 (DS2) DS2 "s SA signed certificate***
101GB00301620.000, 101GB00301640.000, 101GB00301660.000, 101GB00301820.000, 101GB00301840.000	*101GB00301840.001 101GB00301860.000,001 & 002 101GB00302020.000 & 001*

Action

Install the certificate, permits and exchange set from the location above.

Results

The seven cells and accompanying updates must authenticate, decrypt and import to the ECDIS without any error or warning messages.

ENC cell 101GB00301620 (Edition #3, Update #0) installed without error or warning
ENC cell 101GB00301640 (Edition #4, Update #0) installed without error or warning
ENC cell 101GB00301660 (Edition #5, Update #0) installed without error or warning
ENC cell 101GB00301820 (Edition #3, Update #0) installed without error or warning
ENC cell 101GB00301840 (Edition #8, Update #1) installed without error or warning
ENC cell 101GB00301860 (Edition #3, Update #2) installed without error or warning
ENC cell 101GB00302020 (Edition #4, Update #1) installed without error or warning

2.7.4 Missing Certificate.

Test Reference	MissingCertificate	**IHO Reference**	(S-100 Part 9/S-98)

Test description

This test checks that exchange sets containing signatures but missing a data server certificate may not be loaded..

Setup

No pre-installed permits
Test data used:
CATALOG.XML CAT.SIG
Test data location:

- ***Authentication3C***

This exchange set contains data signed by two dataservers (as in MultipleDataServers) but DS2's SA signed data server certificate is missing.

Action

Install the certificate, permits and exchange set from the location above.

Results

The four cells signed by DS1 must authenticate, decrypt and import to the ECDIS without any error or warning messages. The cells and updates from DS2 must not be loaded and a suitable error message given.

ENC cell 101GB00301620 (Edition #3, Update #0) installed without error or warning
ENC cell 101GB00301640 (Edition #4, Update #0) installed without error or warning
ENC cell 101GB00301660 (Edition #5, Update #0) installed without error or warning
ENC cell 101GB00301820 (Edition #3, Update #0) installed without error or warning
ENC cell 101GB00301840 (Edition #8, Update #1) not installed
ENC cell 101GB00301860 (Edition #3, Update #2) not installed
ENC cell 101GB00302020 (Edition #4, Update #1) not installed

2.7.5 ENC Decryption

2.5.6 a) Install ENCs when pre-installed permits have expired

Test Reference	ExpiredPermits	**IHO Reference**	S-98 15-7.4
Test description			
To test how the system performs when importing new ENCs where the previously installed permits have expired.			
Setup			
Only the PERMIT.XML and IHO.CRT files installed from the location below. *Test data used:* *1) IHO.CRT* *2) PERMIT.XML* *3) S100_ROOT (Exchange Set - 101GB0061021A & 101GB0061021B)* *Test data location:* - ***DecryptionA***			
Action			
Install the exchange set from the location above. *Note: The computer clock must be to 1st Jan 2023.*			
Results			
The system must display the SSE 115 warning when importing the exchange set as follows: *"**SSE 115 – Subscription service has expired. Please contact your data supplier to renew the subscription licence**", (list affected cells)* *The system must display the following SSE 125 warning when viewing cells with expired permits:* *"**SSE 125 – The ENC permit for this cell has expired. This cell may be out of date and MUST NOT be used for NAVIGATION**".* *(Permits for this test are set to expire on 31st Dec 2022.)* *101GB0061021A (edition # 1 update # 1) should be installed.* *101GB0061021B (edition # 1 update # 1) should be installed.*			

2.5.6 b) Permit expiry within 30 days

Test Reference	ExpiringPermits	**IHO Reference**	
Test description			
To test how the system performs when importing new ENCs where the installed permits expire within 30 days.			
Setup			
No ENC data installed but with PERMIT.XML and IHO.CRT installed for previous test (2.5.6a). *Test data used:* *1) IHO.CRT (already installed)* *2) PERMIT.XML (already installed)* *3) S100_ROOT (Exchange Set - 101GB0061021A & 101GB0061021B)* *Test data location:* - ***EncryptionB***			
Action			
Set the computer clock between 1st Dec 2022 and 31st Dec 2022. *Install the exchange set from the location above.*			
Results			
The system must import the exchange set but display the appropriate SSE 120 warning message as follows (Permits in this test are set to expire on 31st Dec 2022): *"**SSE 120 – Subscription service will expire in less than 30 days. Please contact your data supplier to renew the subscription licence**."* *101GB0061021A (edition # 1 update # 1) should be installed (with "SSE 120").* *101GB0061021B (edition # 1 update # 1) should be installed (with "SSE 120").*			

2.5.6 c) Incorrect cell keys encrypted in the ENC permits

Test Reference	IncorrectCellKeys	**IHO Reference**	S-63 10.7.3
Test description			
1) Test how the system responds when loading ENCs encrypted with cell keys that are different to those used to generate the permits. Confirm that the correct SSE 121 error message is displayed. *2) Test that the system does not permanently halt for a single/multiple failures.* *3) Test that the system reports the number of successful/unsuccessful imports.*			
Setup			
No pre-installed permits or ENCs. Certificate from previous tests, 2.5.6a and 2.5.6b. *Test data used:* *1) IHO.CRT (Pre-installed)* *2) PERMIT.XML* *3) S100_ROOT (Exchange Set - 101GB0058910B, 101GB0058910C, 101GB0058911A, 101GB0058911B, 101GB0058913A, 101GB0058932A & 101GB0058932B)* *Test data location:* - ***EncryptionC***			
Action			
Install the permits and load the exchange set from the location above.			

Results
The system must check each installed permit in turn to see if there is a valid decryption key. If no valid key is available the system must report the appropriate SSE 121 error message as follows: *"**SSE 21 – Decryption failed no valid cell permit found. Permits may be for another system or new permits may be required, please contact your data supplier to obtain a new licence**."* *(Permits created from a different set of cell keys from those used to encrypt the test ENCs are as follows:- **101GB0058911A & 101GB0058911B**.)* *The system must not halt at an error but continue on to the next ENC.* *The system must report on successful/unsuccessful imports.* *101GB0058910B (edition # 1 update # 0) should be installed (without error or warning).* *101GB0058910C (edition # 2 update # 1) should be installed (without error or warning).* *101GB0058911A (edition # 1 update # 1) should not be installed (with "SSE 121").* *101GB0058911B (edition # 1 update # 0) should not be installed (with "SSE 121").* *101GB0058913A (edition # 1 update # 0) should be installed (without error or warning).* *101GB0058932A (edition # 1 update # 0) should be installed (without error or warning).* *101GB0058932B (edition # 1 update # 0) should be installed (without error or warning).*

2.5.6 d) Validate ENC data integrity

Test Reference	DataIntegrity	**IHO Reference**	
Test description			
Confirm that the system correctly validates decrypted ENCs and checks the integrity of each ENC data file. Confirm that the system reports the correct SSE 116 error message when the digital signature is incorrect or does not agree with the value contained in the corresponding CATALOG.XML record for the dataset. Also determine whether the system correctly reports the SSE 123 (sequential update error).			
Setup			
IHO.CRT from previous test (2.5.6c) but no pre-installed permits or ENCs. *Test data used:* *1) IHO.CRT (Pre-installed)* *2) PERMIT.XML* *3) S100_ROOT (Exchange Set – 101GB0040162A, 101GB0040162B, 101GB0040162C & 101GB0040164A)* *Test data location:* - ***EncryptionD***			
Action			
Install the ENC cell permits and exchange set from the location above.			
Results			
*1) The system must validate the digital signature of each dataset in the exchange set. The system must report the appropriate error message for all ENC files (see additional comments below) which fail to validate as follows: "**SSE 116 – Dataset <Dataset Name> Signature is incorrect. Contact your data supplier as ENC(s) may be corrupt or missing data**".* *2) The system must also report an error message for any validated ENC files that cannot be imported resulting from (1) as follows: "**SSE 123 – Non sequential update, previous update(s) missing try reloading from the base media. If the problem persists contact your data supplier".*** *(101GB0040162B.000 – digital signature altered manually in CATALOG.XML file* *101GB0040164A.003 – ENC data intentionally corrupted.)* *101GB0040162A (edition # 9 update # 3) should be installed (without error or warning).* *101GB0040162B (edition # 2 update # 1) should not be installed (with "SSE 116"followed by "SSE 123").* *101GB0040162C (edition # 1 update # 1) should be installed (without error or warning).* *101GB0040164A (edition # 1 update # 5) should be installed with only two updates (edition # 1 update # 2) (with "SSE 116" followed by "SSE 123").*			

2.8 Dataset Management

2.8.1 Encrypted ENCs supplied by different Data Servers

Test Reference	DataManagement	**IHO Reference**	

Test description

To test how the system performs when loading datasets from two different data servers who have their own unique SA signed certificates and encrypt using their own unique encryption keys.

Setup

IHO.CRT from previous test (2.5.6d) but no pre-installed permits or ENCs.

a) Data Server 1 (DS1)

Test data used:

1) IHO.CRT [Pre-installed]

2) PERMIT.XML

3) S100_ROOT (Exchange Set - 101GB00281600, 101GB00281800, 101GB00282000 & 101GB00283000)

Test data location:

- ***DataManagementA1***

b) Data Server 2 (DS2)

Test data used:

4) IHO.CRT [Pre-installed]

5) PERMIT.XML

6) S100_ROOT (Exchange Set - 101GB00283000, 101GB00283100, 101GB00283200 & 101GB00283300)

Test data location:

- ***DataManagementA2***

Action

Install the permits and exchange set for Data Server 1 (DS1), then install the permits and exchange set for DS2 from locations above.

Results

Both exchange sets authenticate against the same installed SA certificate and contain the correct data server certificate. The DSs' permits must be stored independently and decrypt the relevant exchange sets when loaded.

(In this test both Data Servers (DS) have ENC cell 101GB00283000 common to both. DS1 has 101GB00283000.000 – 002 and DS2 has 101GB00283000.000 – 004.

This test scenario considers how the ECDIS performs when a user obtains ENCs from two independent data providers.)

The system should be up to date as follows:

after installation of cells from DS1 (a):

101GB00281600 (edition # 1 update # 1)

101GB00281800 (edition # 1 update # 0)

101GB00282000 (edition # 1 update # 0)

101GB00283000 (edition # 1 update # 2)

after installation of cells from DS2 (b):

101GB00281600 (edition # 1 update # 1)

101GB00281800 (edition # 1 update # 0)

101GB00282000 (edition # 1 update # 0)

101GB00283000 (edition # 1 update # 4)

101GB00283100 (edition # 1 update # 3)

101GB00283200 (edition # 1 update # 0)

101GB00283300 (edition # 1 update # 0)

2.8.2 Loading additional dataset permits and cells from a different data provider

Test Reference	AdditionalPermits	**IHO Reference**	
Test description			
Check that a pre-existing licence subscription is not overwritten by the ECDIS for any subsequent additions. Confirm that any data already stored on the system is unaffected by any newly imported permits.			
Setup			
Use the data installed for test 2.5.7a for DS1 & 2 (assuming that the data loaded as per the expected results) *Test data used:* *1) IHO.CRT [Pre-installed]* *2) PERMIT.XML* *3) S100_ROOT (Exchange Set - 101GB00255000, 101GB00270000, 101GB00281600, 101GB00281800, 101GB00282000 & 101GB00283000)* *Test data location:* - ***DataManagementB***			
Action			
Install the permit file from the location above followed by the exchange set at the same location.			
Results			
The permit file must be merged with the previously installed one for the correct data server [DS1 - GB]. The exchange set must install all new cells as well as the updates for the previously installed ones [101GB00281600 & 101GB00281800]. The expected Status within the ECDIS is listed below. *The ENC cells loaded during test 2.5.7a for data server 2 [DS2] must still be viewable in the ECDIS to their expected state of correctness. The expected SYSTEM DATABASE status listed below shows the expected results against 2.5.7a [DS2].* *The permit file **only** contains new permits for cells 101GB00255000 & 101GB00270000. The exchange set contains the new cells and the cells from the previous test, **DataManagementA**] plus additional updates.* *This test scenario considers how the ECDIS performs when presented with a subset of new additional ENC permits from a specific data provider.* *The system should be up to date as follows:* *after installation of cells from DS1:* *101GB00255000 (edition # 3 update # 3) new cell should be installed.* *101GB00270000 (edition # 1 update # 1) new cell should be installed.* *101GB00281600 (edition # 1 update # 2) updated.* *101GB00281800 (edition # 1 update # 1) updated.* *101GB00282000 (edition # 1 update # 0)* *101GB00283000 (edition # 1 update # 4)* *installation of cells from DS2 unchanged from 2.5.7a:* *101GB00281600 (edition # 1 update # 2)* *101GB00281800 (edition # 1 update # 1)* *101GB00282000 (edition # 1 update # 0)* *101GB00283000 (edition # 1 update # 4)* *101GB00283100 (edition # 1 update # 3)* *101GB00283200 (edition # 1 update # 0)* *101GB00283300 (edition # 1 update # 0)*			

2.8.3 Test that the system operates correctly in a multiple data provider environment

Test Reference	ProviderChange	**IHO Reference**	S

Test description

Check that ENCs existing within both subscriptions do not cause corruption across service providers. Confirm that both providers information is managed independently without conflict.

Setup

IHO certificat installed from previous tests 2.5.7a & 2.5.7b. No pre-installed permits or ENCs.

a) Data Server 1 (DS1)

Test data used:

IHO.CRT [Pre-installed] PERMIT.XML
S100_ROOT (Exchange Set - 101GB00281600, 101GB00281800, 101GB00282000 & 101GB00283000)

Test data location:

- ***DataManagementC1***

b) Data Server 2 (DS2)

Test data used:

IHO.CRT [Pre-installed] PERMIT.XML
S100_ROOT (Exchange Set - 101GB00281600, 101GB00281800, 101GB00282000, 101GB00283000, 101GB00283100 & 101GB00283200)

Test data location:

- ***DataManagementC2***

2

Action

1) *Install the PERMIT.XML from location (a) above.*
2) *Load the Exchange Set (S100_ROOT) from (a).*
3) *Load the Exchange Set (S100_ROOT) from (b).*
4) *Install the PERMIT.XML from location (b)*
5) *Load the Exchange Set (S100_ROOT) from (b). This exchange set contains new base datasets and updates to previously installed cells. One cell is already installed with no updates. This test scenario considers how the ECDIS performs when the user changes from one data provider to another.*

Results

1. *Permits at (a) shall install without error or warning.*
2. *Exchange Set (S100_ROOT) at (a) shall load without error or warning.*
3. *Exchange Set (S100_ROOT) at (b) must **not** load as there are no valid permits for data server 2 [DS2] installed in the ECDIS. A SSE 110 warning must be displayed stating "**SSE 110 – Permits not available for this data provider**".*
4. *Permits at (b) shall install without error or warning.*
5. *Exchange Set (S100_ROOT) at (b) shall install the new bases and updates. Warning messages relating to "cells/updates already installed" may be displayed.*

The content of the ECDIS SYSTEM DATABASE must be the same as that described below

The system should be up to date as follows:
after installation of cells from DS1:
101GB00281600 (edition # 1 update # 1)
101GB00281800 (edition # 1 update # 0)
101GB00282000 (edition # 1 update # 0)
101GB00283000 (edition # 1 update # 2)

After installation of cells from DS2:
101GB00281600 (edition # 1 update # 2)
101GB00281800 (edition # 1 update # 1)
101GB00282000 (edition # 1 update # 0)
101GB00283000 (edition # 1 update # 4)
101GB00283100 (edition # 1 update # 3)
101GB00283200 (edition # 1 update # 0)

2.9 ECDIS management of data services.

2.9.1 ECDIS management of cancelled cells

Test Reference	CancelledDatasets	**IHO Reference**	
Test description			
To test how the system responds when a dataset is cancelled.			
Setup			
IHO certificate/public key installed from previous test 2.5.7c. No pre-installed permits or ENCs. *Test data used:* *1) IHO.CRT [Pre-installed]* *2) PERMIT.XML* *3) S100_ROOT (2 Exchange Sets - 101GB00251200 101GB00255000, 101GB00280200, 101GB00301620)* *Test data location:* - ***DataManagementCancelBase*** - ***DataManagementCancelUpdate***			
Action			
Install the ENC permits. Load the exchange set ***DataManagementCancelBase*** *then update using the exchange set* ***DataManagementCancelUpdate*** *Attempt to view all imported cells in the ECDIS and determine their status.*			
Results			
The system shall report any cell(s) that have been identified as cancelled at load time. *(Cell 101GB00280200 is cancelled.)* *A message shall be displayed informing the user of the cell name.* *Depending on the method adopted by the OEM for managing cancelled cells one of the following conditions shall be observed:* *1. The cancelled cell cannot be viewed in the ECDIS* *2. The cancelled cell can be viewed in the ECDIS with the warning message defined in S-63 and specified below:* *"Cell <name> has been cancelled and may not be up to date. Under no circumstances should it be used for primary navigation".* *Clarification: Systems that remove cells without consulting the user do not have to provide a warning message at load time.* *The system should be up to date as follows: after installation of cells from 2.5.7d [Base]:* *101GB00251200 (edition # 1 update # 4)* *101GB00255000 (edition # 2 update # 2)* *101GB00280200 (edition # 2 update # 0)* *101GB00301620 (edition # 2 update # 1)* *After installation of cells from 2.5.7d [Update]:* *101GB00251200 (edition # 1 update # 8)* *101GB00255000 (edition # 3 update # 0)* *101GB00280200 cancelled cell (101GB00280200) should be reported by the system and either removed from the system database or displayed with the appropriate warning.* *101GB00301620 (edition # 2 update # 4)*			

2.9.2 ECDIS Display of Replacement ENC Cells

Test Reference	CancelReplace	**IHO Reference**	

Test description

To test how the system responds when a cell is cancelled and replaced in a service..

*101GB00380620 is cancelled and replaced by 101GB00383710 & 101GB00383720 [**Fileless Cancel]***
*101GB00380720 is cancelled and replaced by 101GB00389320 **[by Cancellation Update]***

Setup

Status as per successful completion of test 2.5.7 d)
Test data used:
1) IHO.CRT [Pre-installed]
2) PERMIT.XML
3) S100_ROOT (2 Exchange Sets - 101GB00380620, 101GB00380720, 101GB0040162A, 101GB0040162B & 101GB0040182A)
Test data location:

- ***DataManagementCancelReplaceBase***
- ***DataManagementCancelReplaceUpdate***

Action

*Install the ENC permits. Load the exchange set **DataManagementCancelReplaceBase** then update using the exchange set **DataManagementCancelReplaceUpdate***

Attempt to view all imported cells in the ECDIS and determine their status.

Results

The system must report any cell(s) that have been identified as cancelled at load time. A message must be displayed as specified in test 2.5.7 d). Replacement cells must be presented to the user as follows: "Cell <name> has been cancelled and has been replaced by cell(s), <name1>; <name2>."

.

Test	Cell Name	Exchange Set Content		Expected SYSTEM DATABASE Content		Notes
		Edition N°	Update N°	Edition N°	Update N°	
Base	101GB00380620	2	0	2	0	All ENC cells installed without error or warning
	101GB00380720	2	0	2	0	
	101GB0040162A	8	3	8	3	
	101GB0040162B	1	1	1	1	
	101GB0040182A	1	4	1	4	
Update	101GB00251200	1	8	1	8	Cells from the previous test (same status)
	101GB00255000	3	0	3	0	
	101GB00280200	2	1	2	1	
	101GB00301620	2	4	2	4	
	101GB00380620	2	1	cancelled		Messages should be displayed as for previous test plus message relating to replaced cells: 101GB00380620 is cancelled and replaced by 101GB00383710 & 101GB00383720 101GB00380720 is cancelled and replaced by 101GB00389320
	101GB00380720	2	1	cancelled		
	101GB0040162A	9	0	9	0	
	101GB0040162B	2	1	2	1	
	101GB0040182A	1	5	1	5	

2.9.3 ECDIS management of ENC re-issued datasets

Test Reference	Reissues	**IHO Reference**	

Test description

To test how the system responds when a cell is published as a re-issue. Confirm that the system operates correctly as defined in the S-63 standard. (The PRODUCTS.TXT file has "Base cell update number" field in each cell record that identifies and flags the update that carries any re-issued cell)

Setup

IHO certificate/public key installed from previous test
No pre-installed permits or ENCs.
Test data used:
1) IHO.CRT [Pre-installed]
2) PERMIT.XML
3) Base [Exchange Set – 101GB00303040]
4) Update [Exchange Set – 101GB00303040 & 101GB0050162D]
Test data location:

- ***DataManagementF1***
- ***DataManagementF2***

Action

*Install the ENC permits. Load the exchange set **DataManagementF1** then update using the exchange set **DataManagementF2***

Results

The system must load the base exchange set and then the re-issued cells (101GB00303040 & 101GB0050162D) on the update as though they were a new data set or a new edition of a data set. The system must also install the subsequent updates 101GB00303040 [Ed 11 Up10] and 101GB0050162D [Ed 6 Up 6].

101GB0050162D is a re-issue with no previous history, i.e. new cell. 101GB00303040 is a re-issued cell with history, i.e. base cell already installed in the ECDIS. Both re-issued cells have subsequent updates to test the loading sequence is continuous.

Test	Cell Name	Exchange Set Content		Expected SYSTEM DATABASE Content		Comments
		Edition N°	Update N°	Edition N°	Update N°	
2.5.7f [Base]	101GB00303040	11	9	11	9	Edition 11 of 101GB00303040 installed with updates 1-9
2.5.7f [Update]	101GB00303040	11	10	11	10	101GB0050162D is straight re-issue with no previous history, i.e. new cell. 101GB00303040 is a re-issued cell with history, i.e. base cell already installed in the ECDIS.
	101GB0050162D	6	6	6	6	

2.9.4 ECDIS management of Exchange Sets

Test Reference	ECDISManagement	**IHO Reference**	
Test description			
To confirm the user is informed when there is incompatibility between installed ENCs and an applied update exchange set.			

Setup

No permits or ENCs installed
Test data used:
1) IHO.CRT [Pre-installed from previous tests]
2) PERMIT.XML
3) Exchange Sets DataManagementG1, DataManagementG2, DataManagementG3
*4) Update exchange set **DataManagementG4***
Test data location:

- ***DataManagementG1, DataManagementG2, DataManagementG3, DataManagementG4***

7g

Action

Install permits and load the exchange sets listed.

Results

***DataManagementG1, DataManagementG2 and DataManagementG4** should load without error. However when loading **DataManagementG4** the system should install some ENC updates without error but the system must return an appropriate error message that the exchange set is incompatible with existing installed data.*
Note: Systems must appropriately manage the import of data from different Data Servers and store information of installed data. When loading new data systems should check that the S-128 revision information is compatible with that which is already installed and report any inconsistencies.
Users should only be prompted to install licenced datasets
[The system will also display continuity errors as a result of non sequential loading when attempting to load and install the updates for 101GB0040162A, 101GB0040184A, 101GB0040186D & 101GB00101GB0040202A.]
DataManagementG4** used in this test is dated 20 July 2016 and pre dates **DataManagementG3

Test	Cell Name	Exchange Set Content		Expected ECDIS Content		Comments
		Edition N°	Update N°	Edition N°	Update N°	
DataManagementG1	101GB00302840	22	16	22	16	
	101GB00303220	4	6	4	6	
	101GB00303420	3	9	3	9	
	101GB00303460	11	0	11	0	
DataManagementG2	101GB0040162A	9	0	9	0	Cells installed for this exchange set but with the incompatibility warning
	101GB0040184A	2	3	2	3	
	101GB0040186D	1	1	1	1	
	101GB0040202A	4	0	4	0	
DataManagementG3	101GB0050162B	10	7	10	7	
	101GB0050162C	9	5	9	5	
	101GB0050162D	5	2	5	2	
	101GB0050182A	2	1	2	1	
DataManagementG4	101GB00302840	23	4	23	4	NE installed from WK37/07 ***DataManagementG4***
	101GB00303220	4	7	4	7	
	101GB00303420	3	12	3	12	
	101GB00303460	11	1	11	1	
	101GB0040162A	9	5	9	0	Cells not updated due to incompatible S-128
	101GB0040184A	3	5	2	3	
	101GB0040186D	1	7	1	1	Cell not updated due to non-sequential update

	101GB0040202A	5	2	4	0	Cell not updated due to incompatible S-128
	101GB0050162B	11	0	11	0	NE installed from ***DataManagementG4***
	101GB0050162C					No updates for this cell
	101GB0050162D					No updates for this cell
	101GB0050182A	2	2	2	2	

2.9.5 Update of Supplementary Files

Test Reference	SupplementaryFiles	**IHO Reference**	(S-100 Part 9/S-98)
Test description			
This test verifies the ECDIS can update files which support datasets			
Setup			
No pre-installed permits or ENCs. *Test data used:* *1) IHO.CRT [Pre-installed]* *2) PERMIT.XML* *3) Base **DataManagementSF1*** *4) Update**DataManagementSF2*** *Test data location:* - ***DataManagementSF1*** - ***DataManagementSF2***			
Action			
Install permits and load the exchange sets listed			
Results			
1. Select the note encoded using TXTDSC (text description) (fcaution area at 32°34.74'S 061°08.92'E); *2. The content of the note should be as follows:* ***[Updated note content]*** *This note content is updated via a direct replacement in the Update exchange set, without an explicit update to the ENC dataset.*			

*[**More test scenarios for management of supporting resource are likely in this section]***

2.10 ECDIS Update Status Report

2.10.1 ENC Update Status Report

Test Reference	UpdateStatusReportENC	**IHO Reference**	S-98 Annex C, Appendix C-3
Test description			
Confirm that the ECDIS is capable of executing the ENC Update status report as documented in S-98 Annex C, Appendix C-3			
Setup			
*Load the exchange set **PowerUp*** *Set system time to 10th February 2019*			
Action			
Ensure ECDIS has data installed. Locate and execute the Update Status Report and inspect output. If ECDIS also supports route filtering of the Status Report then construct a route intersecting with the cells loaded and run the Status Report with the route filtered option.			
Results			
Verify that the update Status Report can be filtered to display only Electronic Navigational Charts (S-101) *The ECDIS should report the status of all ENCs loaded in accordance with S-98 XXX-XXX. It should use the issue date of the latest delivered S-128 dataset as the reference date and should display its reference date as* 9th February *2019 .* *The datasets should show in the report as "up to date". Then reset the system time to a* 1st April 2019 *– rerun the report, all the datasets should show as "not up to date".*			

2.10.2 ENP Update Status Report

Test Reference	UpdateStatusReportENP	**IHO Reference**	S-98 Annex C, Appendix C-3
Test description			
Confirm that the ECDIS is capable of executing the ENP Update status report as documented in S-98 Annex C, Appendix C-3			
Setup			
As for UpdateStatusReportENC			
Action			
Ensure ECDIS has data installed. Locate and execute the Update Status Report and inspect output. Select ENP Update Status report. *If ECDIS also supports route filtering of the Status Report then construct a route intersecting with the cells loaded and run the Status Report with the route filtered option.*			
Results			
Verify that the update Status Report can be filtered to display only Electronic Navigational Publications with the following products shown - *S-124* - *S-129* *The ECDIS should report the status of the ENP datasets loaded in accordance with S-98 Annex C, Appendix C-3. It should use the issue date of the latest delivered S-128 dataset as the reference date and should display its reference date as* 9th February *2019 .* *The datasets should show in the report as "up to date". Then reset the system time to a* 1st April 2019 *– rerun the report, all the datasets should show as "not up to date".*			

2.10.3 Missing Revision information.

Test Reference	MissingRevisionInformation	**IHO Reference**	S-98 Annex C, Appendix C-3
Test description			
This test checks tha			
Setup			
*Load the exchange set **MissingRevisionInformation*** *This exchange set contains no revision information..*			
Action			
Ensure ECDIS has data installed. Locate and execute the Update Status Report and inspect output.			
Results			
Verify that all cells are marked as "Unknown" in accordance with S-98 Appendix C-3			

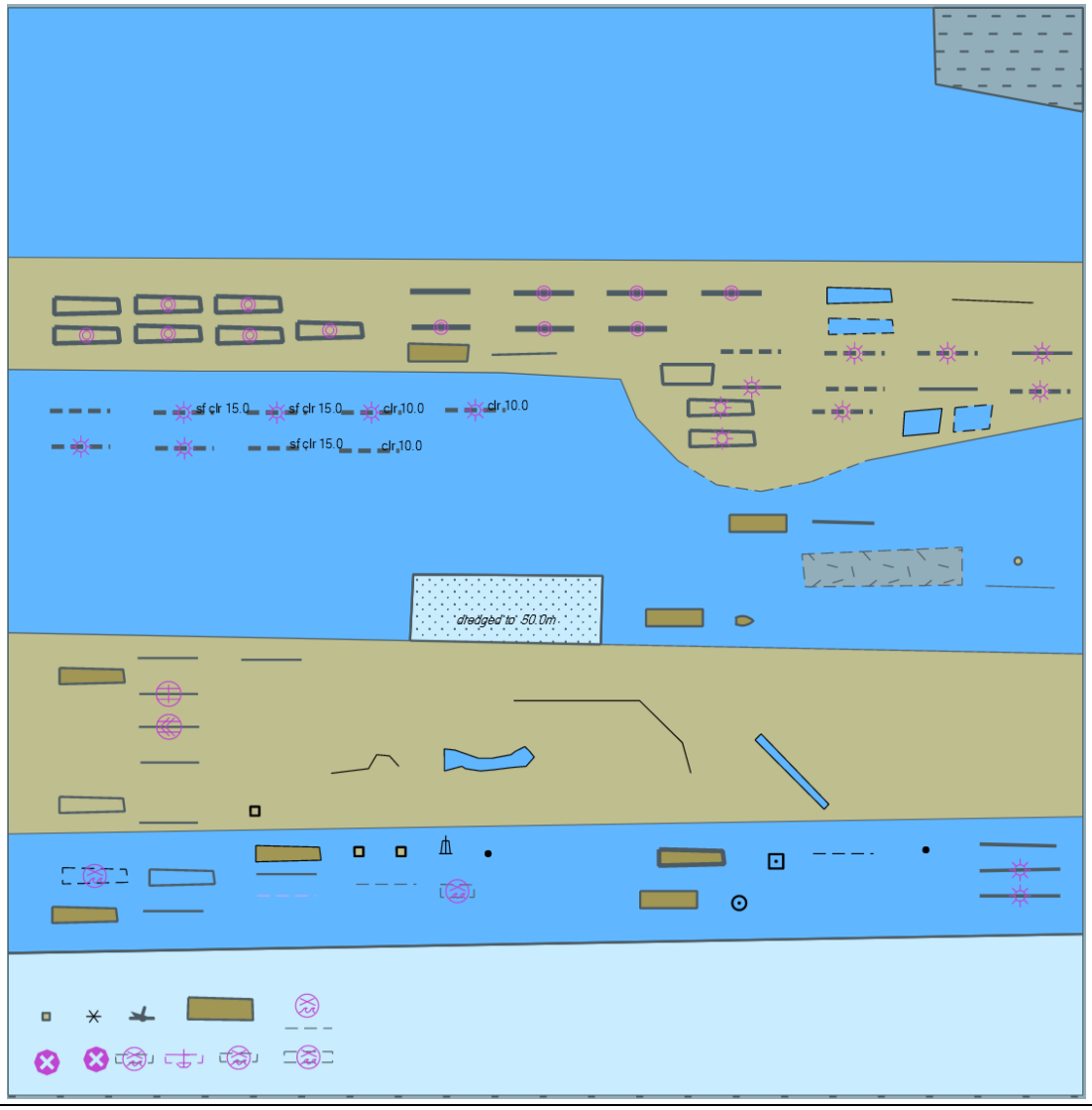
2.10.4 Multiple Revision Information.

Test Reference	MultipleRevisionInformation	**IHO Reference**	S-98 Annex C, Appendix C-3
Test description			
This test checks that the ECDIS is able to merge multiple sources of revision information (encoded in the S-128 datasets) together.			
Setup			
Load the following exchange sets - ***MultipleRevisionInformation1*** - ***MultipleRevisionInformation2*** *These exchange sets contain multiple S-128 revision information. The ECDIS must merge the revision information together to give the user a harmonised view of their data holdings. A single S-124 dataset is common to both services and the revision information shows it has been updated but is not contained in the delivered exchange set.*			
Action			
Ensure ECDIS has data installed. Locate and execute the Update Status Report and inspect output.			
Results			
Verify that all S-101 datasets are marked as "up to date" in the ENC up to date status report. The ENP Up to date Status report should show S-124 dataset 124AA00X01NE.GML marked as "not up to date".			

3 Chart Display

3.1 Display of ENC data

3.1.1 Display Base category

Test Reference	DisplayBase	**IHO Reference**	S-98 C-9.5.2
Test description			
The purpose of the test is to verify by observation that ECDIS correctly displays all S-101 ENC features included in the IMO Display Base category. The test is performed by loading to ECDIS a test S-101 dataset and checking display against graphical plots. The test ENC dataset 101AA00DBASE.000 contains all ENC features belonging to Display Base according to the S-101 Portrayal Catalogue.			
Setup			
Load the *exchange set* ***DIsplayBase*** *(dataset 101AA00DBASE.000)with the following settings:* • *Select Display Category Base* • *Set the Safety Contour value to 10 m* • *Set the Safety Depth value to 10 m* • *Select Symbolized Boundaries*			
Action			
Check the symbols shown in the ECDIS against the graphical plot.			
Results			
The ENC in the ECDIS should be shown like in the picture below (scale 1:60 000). 			

3.1.2 Standard Display category

Test Reference	DisplayStandard	IHO Reference	S-98 C-9.5.3

Test description

The purpose of the test is to verify by observation that ECDIS correctly displays all S-101 ENC features included in the IMO Standard Display category. The test is performed by loading to ECDIS a test S-101 dataset and checking the display against graphical plots.

The test ENC dataset 101AA00STNDR.000 contains depth and land areas from Display Base plus all S-101 ENC features belonging to Standard Display according to the S-101 Portrayal Catalogue. The features belonging to Standard Display are to be shown if Standard Display is selected in ECDIS HMI and should disappear in the Display Base mode.

Setup

*Load the exchange set **DisplayStandard** (101AA00STNDR.000) with the following settings:*

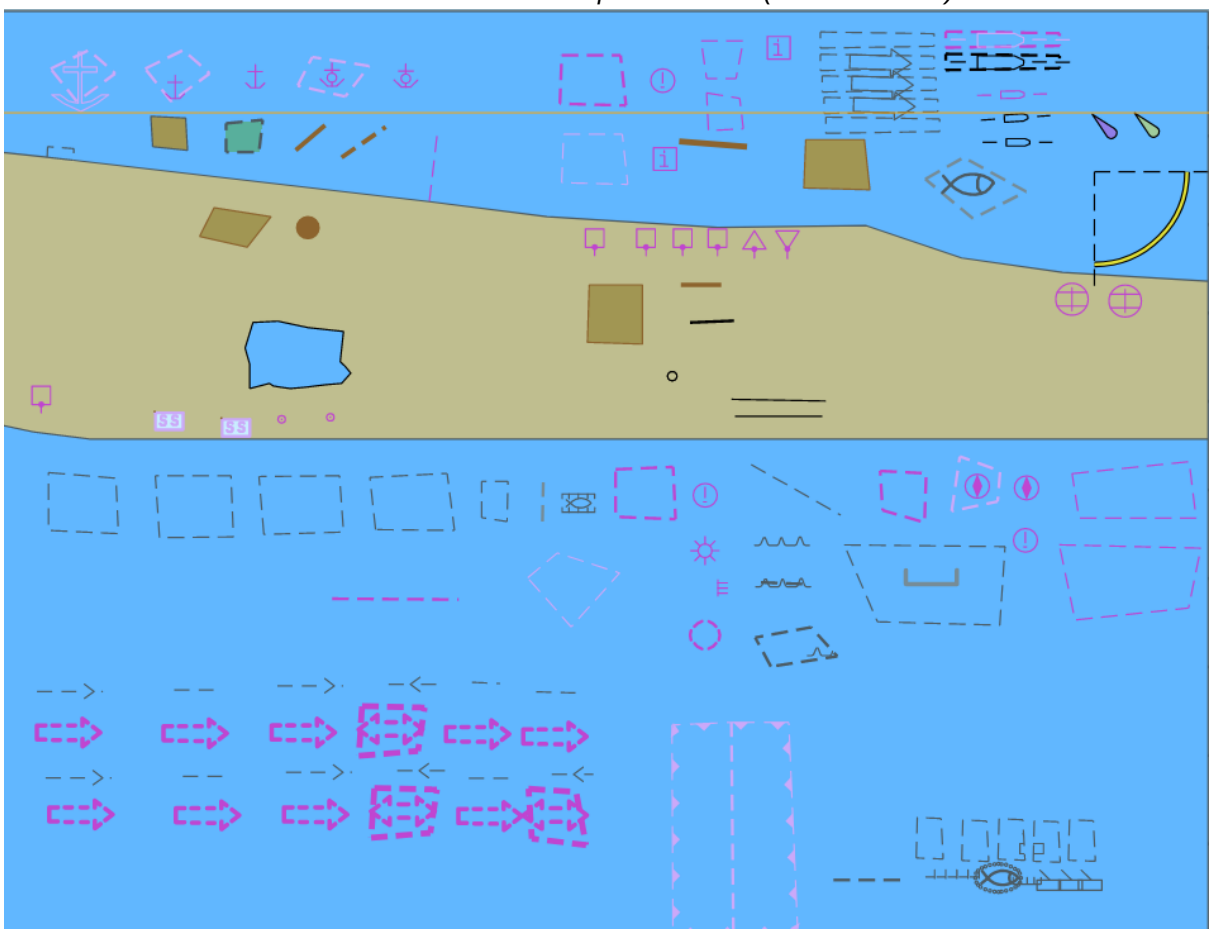
- *Select Display Category Standard Display*
- *Set the Safety Contour value to 10 m*
- *Set the Safety Depth value to 10 m*
- *Select Symbolized Boundaries*
- *Select Simplified Points*

Action

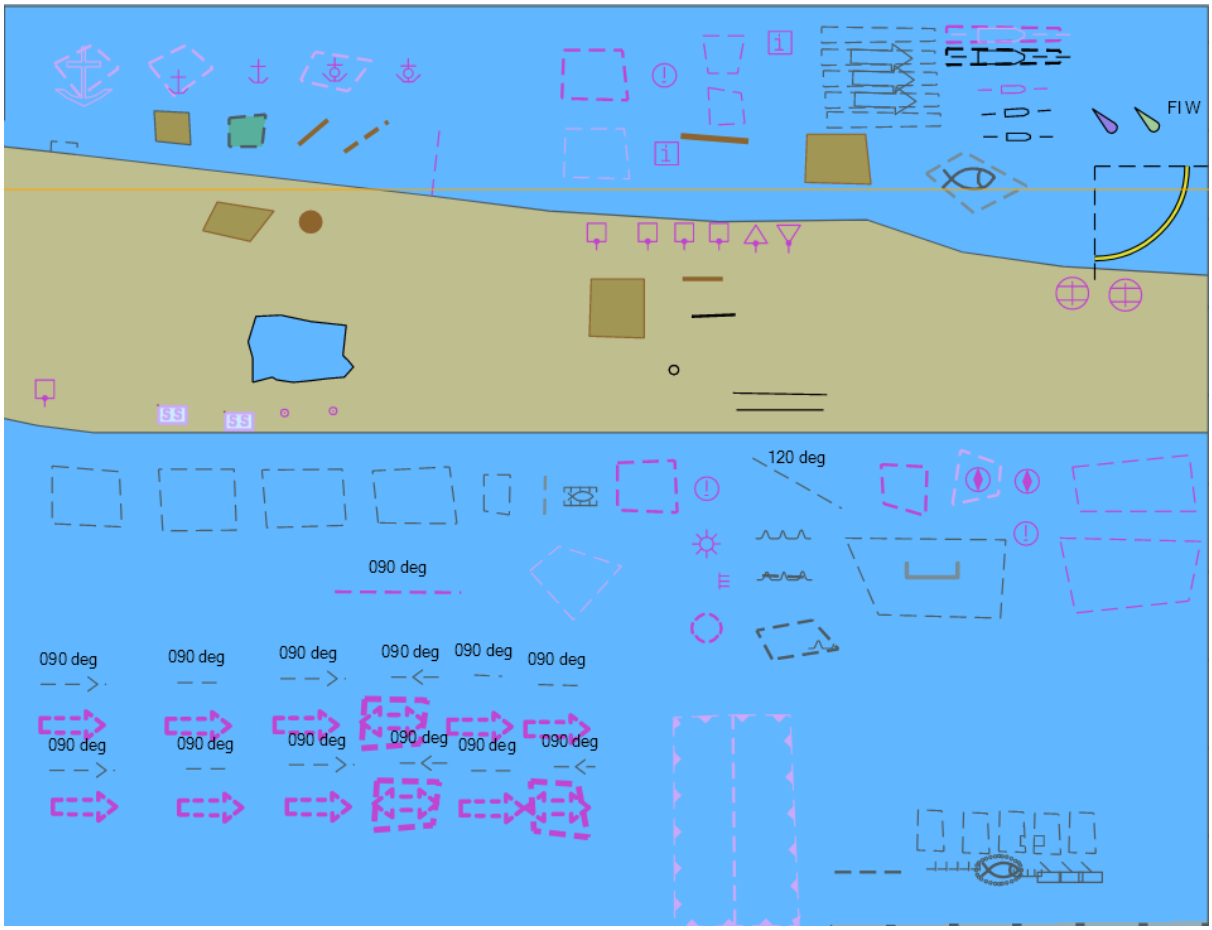
Switch on Standard Display. Check ENC symbols shown in ECDIS against graphical plot.

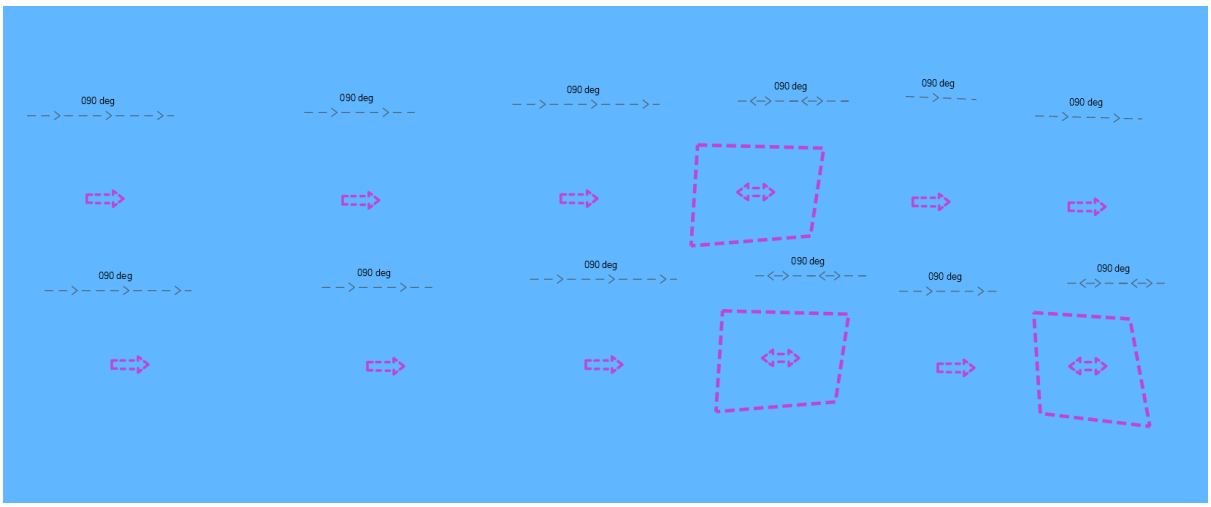
Results

Confirm that depth and land areas from Display Base are shown
The ENC in the ECDIS should be shown as in the picture below (scale 1:70 000).



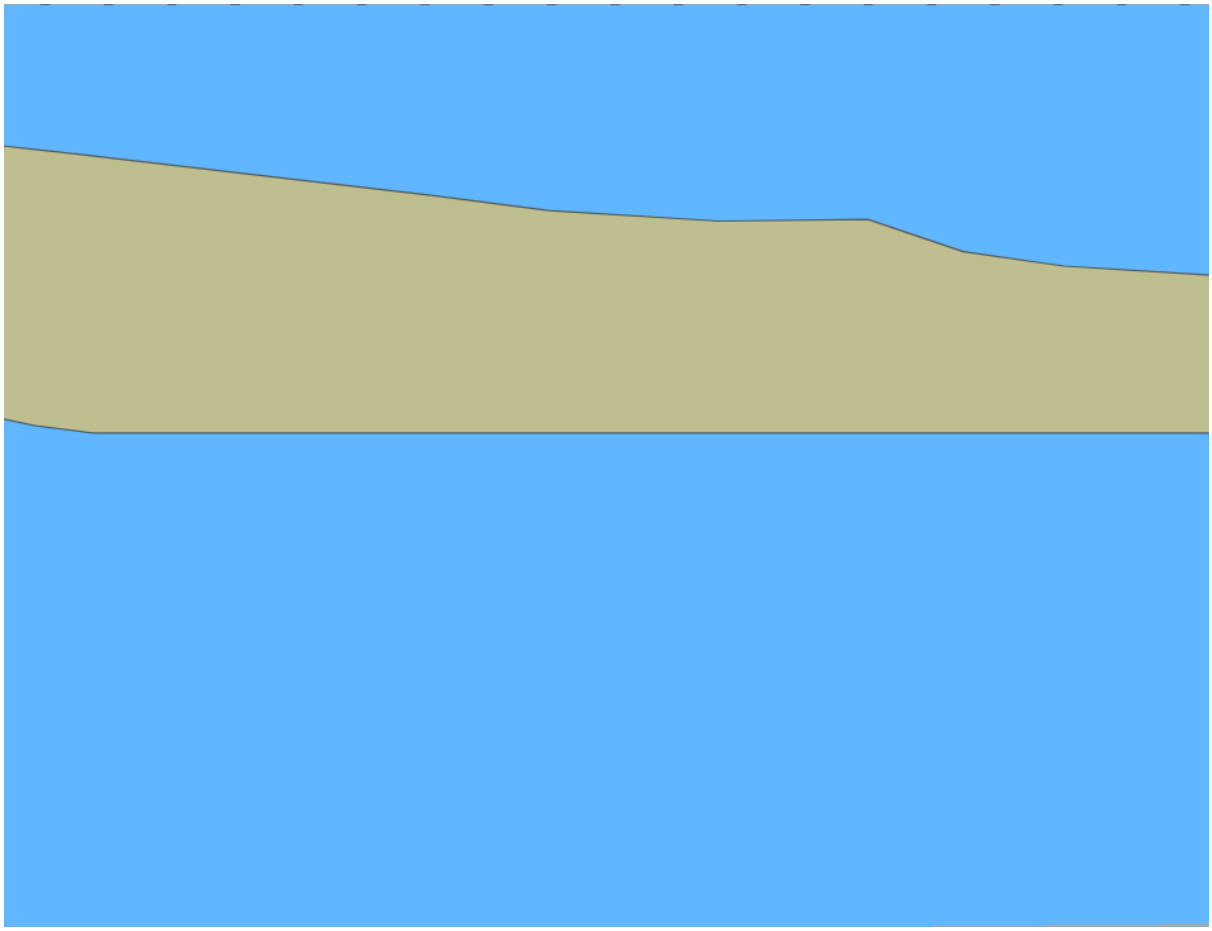
Action
Select all Text groups. Check ENC symbols shown in ECDIS against graphical plot.
Results
The ENC in the ECDIS should be shown as in the picture below.





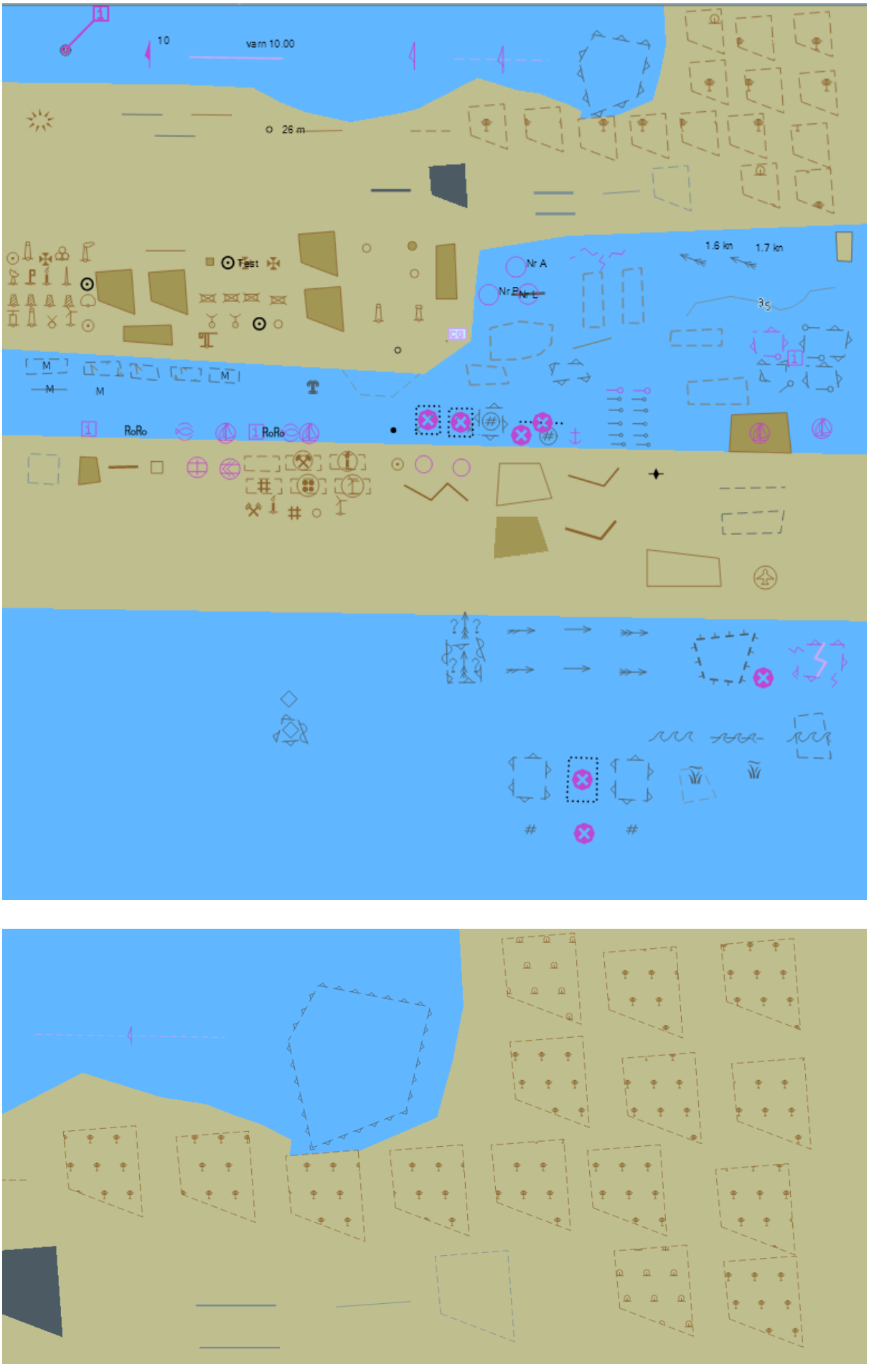
A part of above chart at scale 1:20 000

Action
Switch on Display Base. Check ENC symbols shown in ECDIS against graphical plot.
Results
The ENC in the ECDIS should be shown as in the picture below.

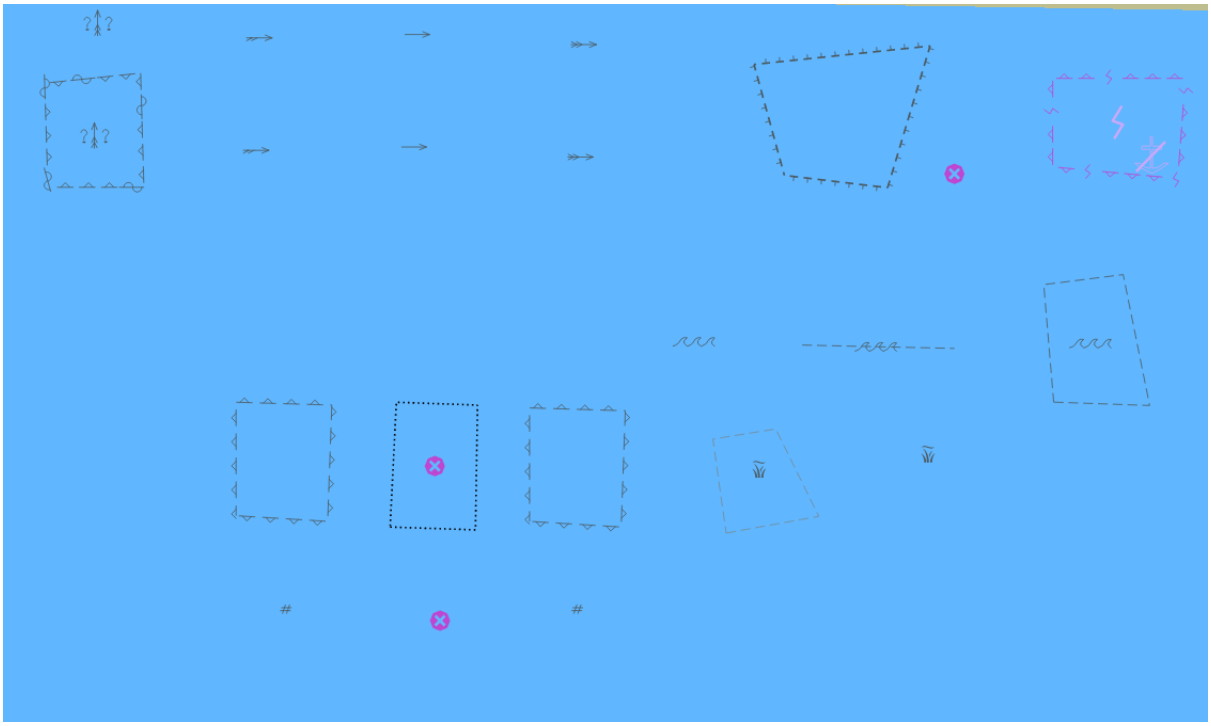


3.1.3 Other Display category

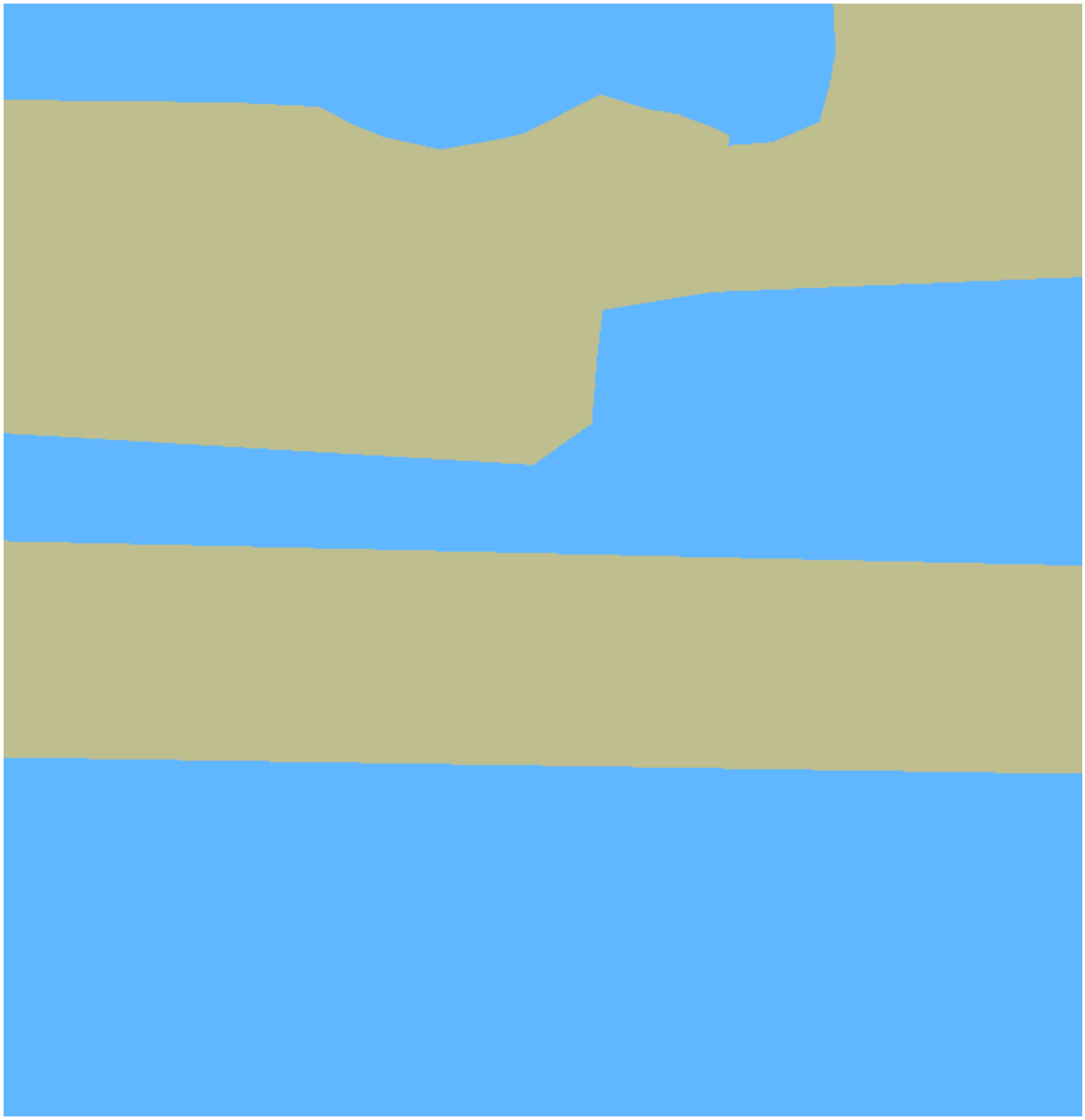
Test Reference	DisplayOther	**IHO Reference**	S-98 C-9.5.4
Test description			
The purpose of the test is to verify by observation that ECDIS correctly displays all ENC features included in the IMO Other Display category. The test is performed by loading to ECDIS a test S-101 dataset and checking display against graphical plots. *The test ENC dataset 101AA00OTHER.000 contains depth and land areas from Display Base plus all ENC features belonging to Other Display according to the S-101 portrayal catalogue..* *The features belonging to Other Display are to be shown if Other (or All) display is selected in ECDIS HMI and should disappear in the Display Base or Standard Display Categories..*			
Setup			
*Load the exchange set **DisplayOther** (dataset 101AA00OTHER.000) with the following settings:* • *Select Display Category Other* • *Set the Safety Contour value to 10 m* • *Set the Safety Depth value to 10 m* • *Select Symbolized Boundaries* • *If provided, select optional Contour label*			
Action			
Switch on Other Display. Check every ENC symbol shown in ECDIS against graphical plot.			
Results			
The features are shown as presented in the screen plot below (scale 1:60 000)			



A part of above chart at scale 1:20 000

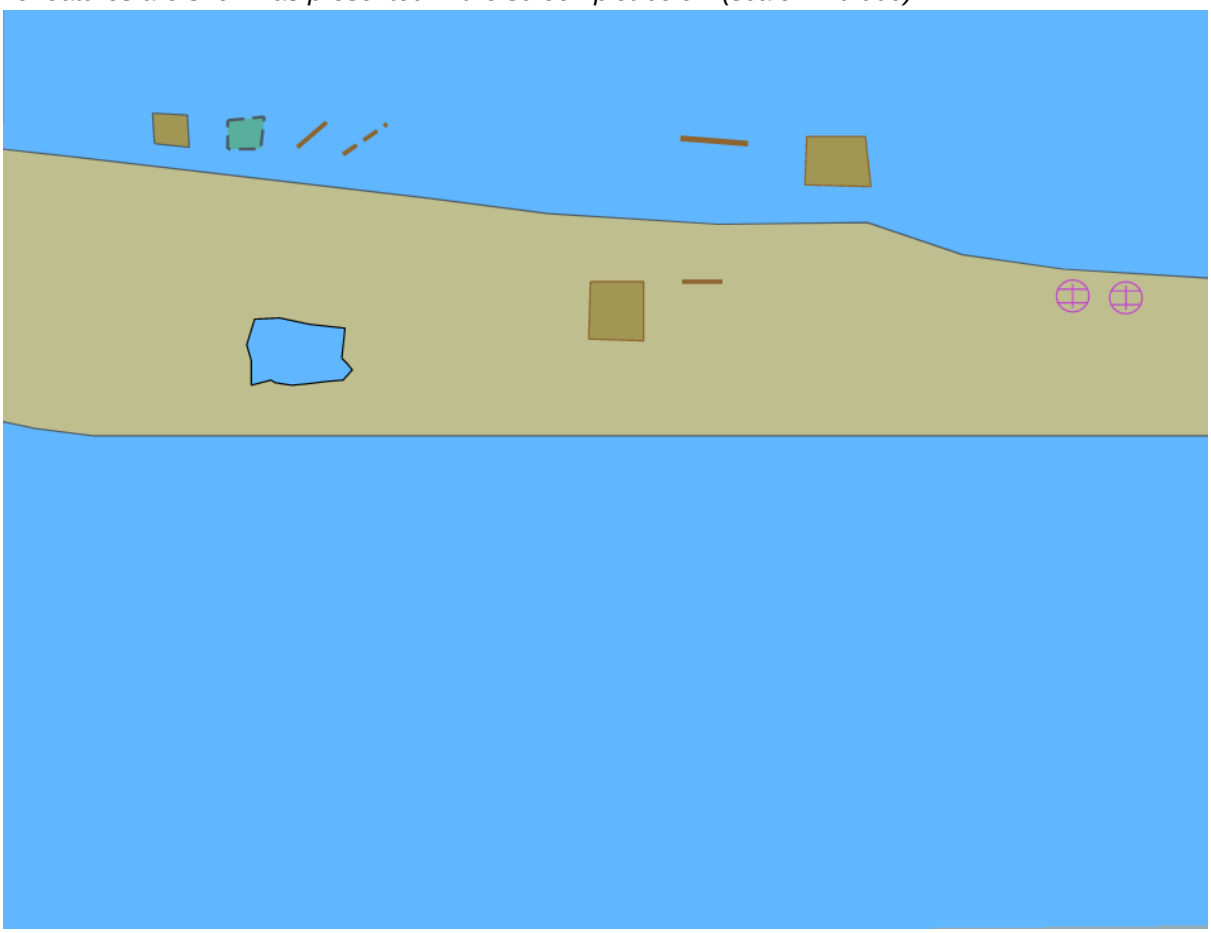


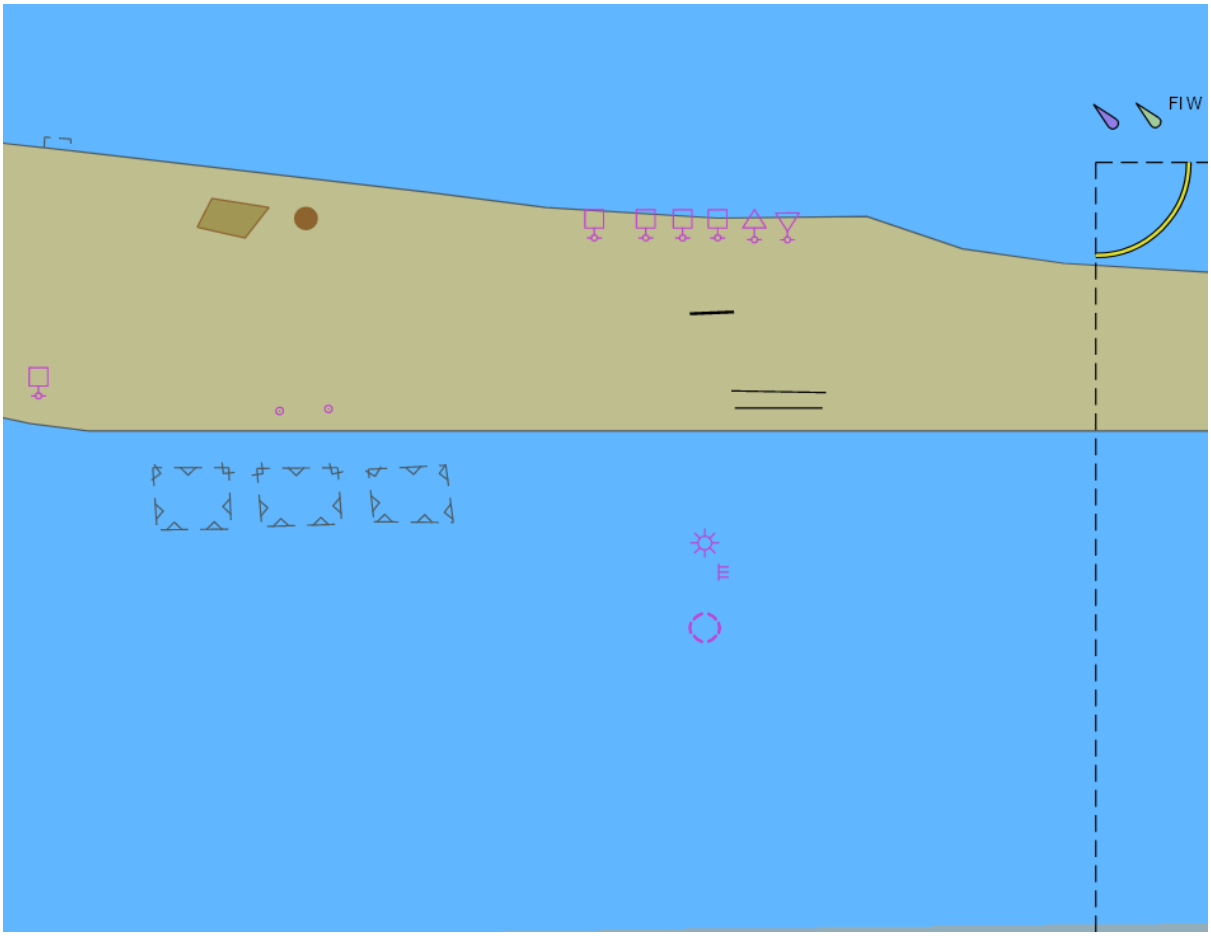
Another part of above chart at scale 1:20 000

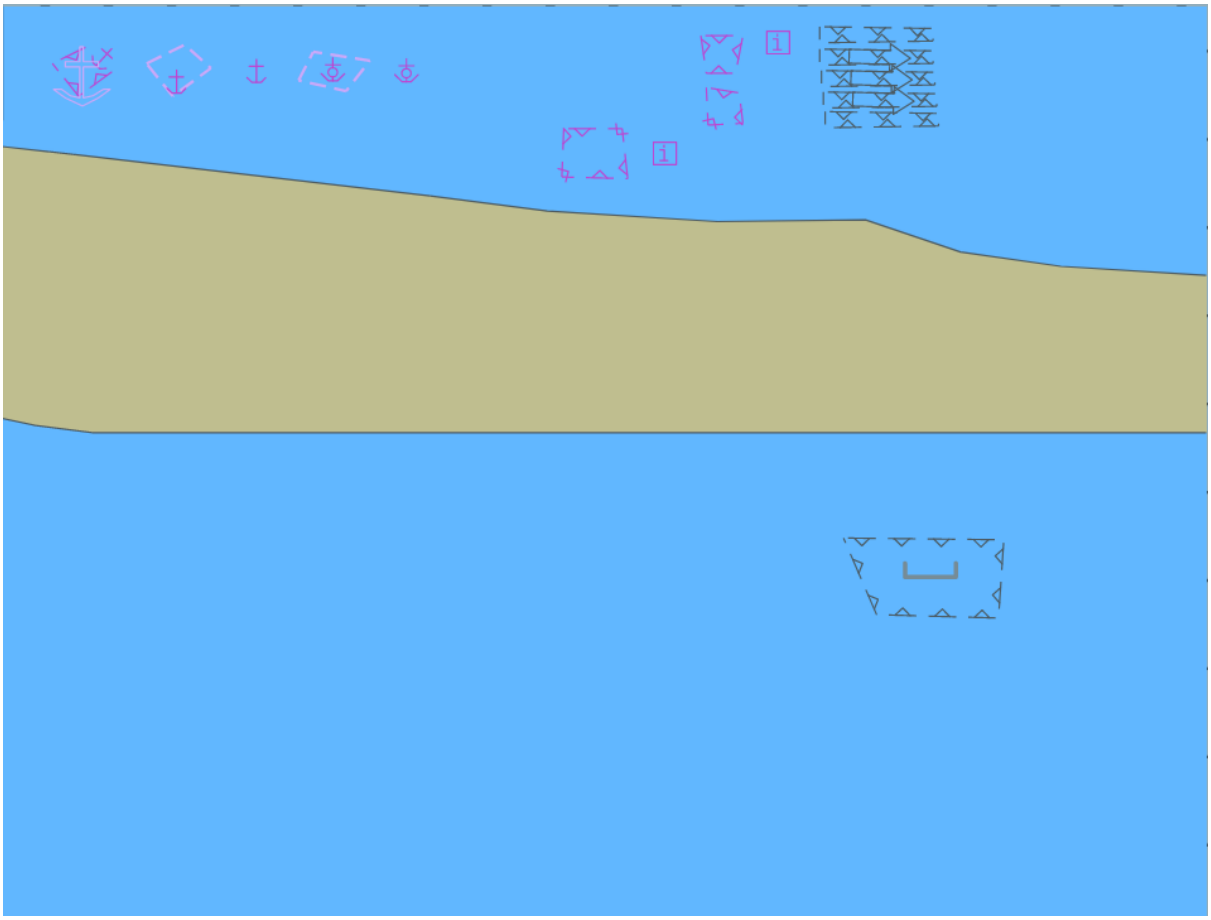
Action
Switch on Display Base. Check ENC display in ECDIS against graphical plot
Results
The ENC in the ECDIS should be shown as in the picture below. 

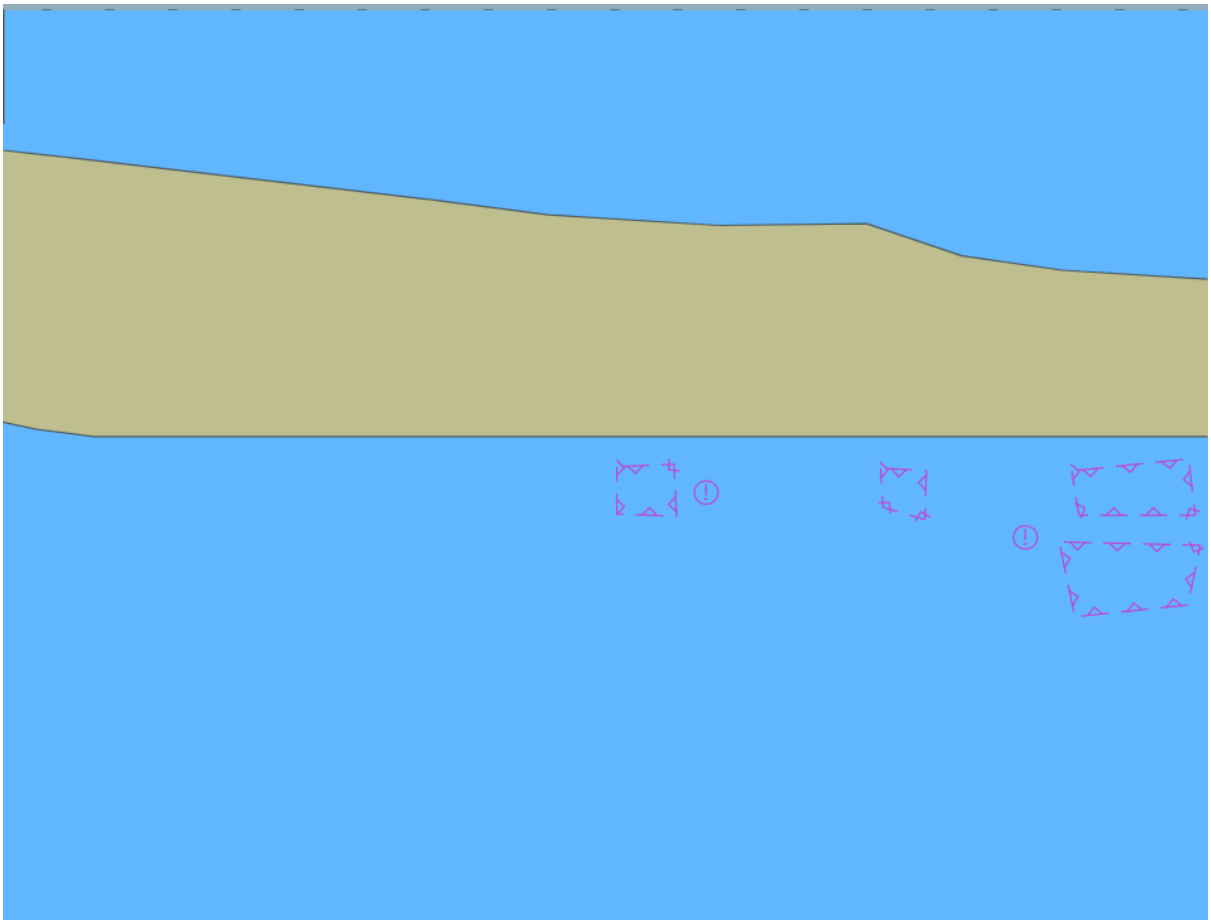
3.1.4 ECDIS Viewing groups names. Standard Display

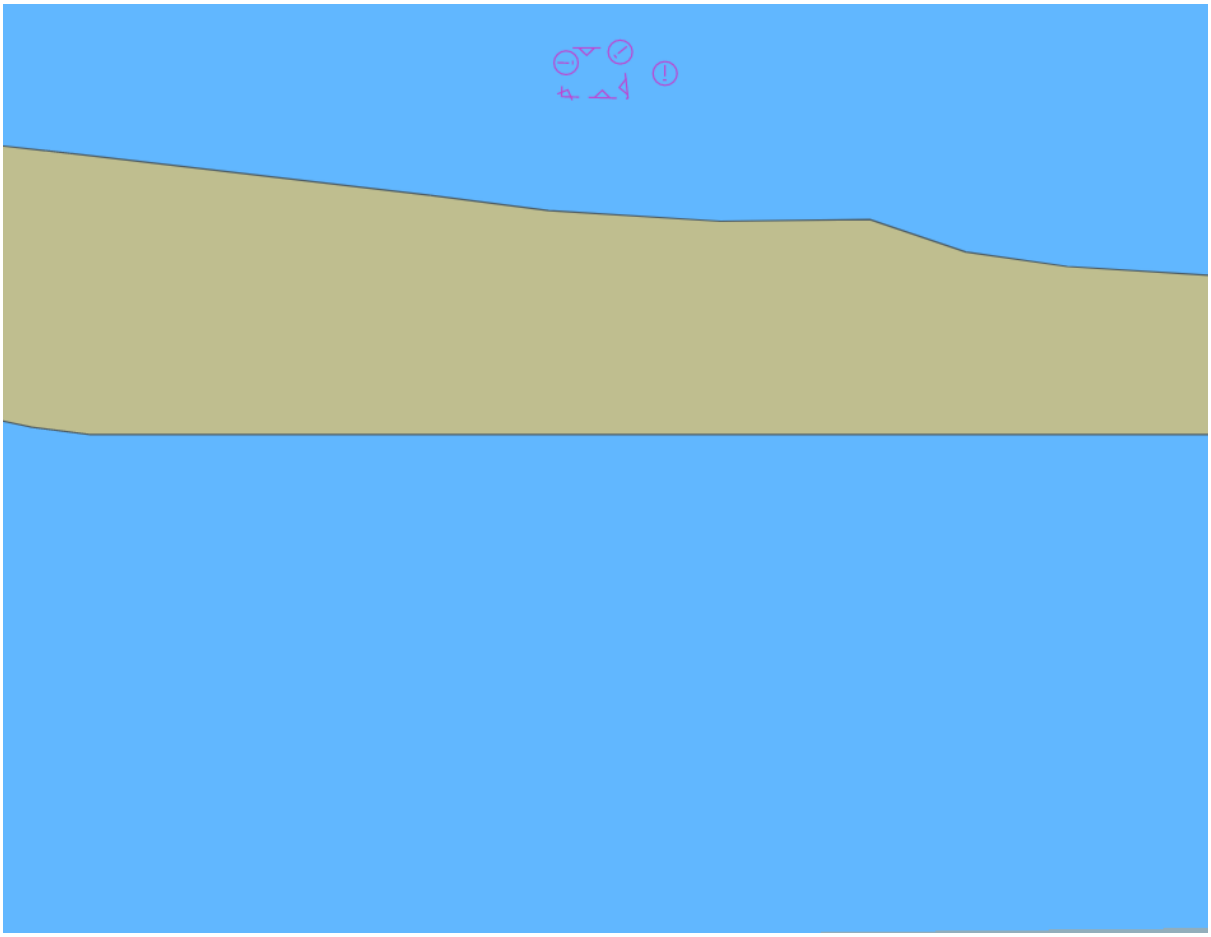
Test Reference	ViewingGroupsStd	**IHO Reference**	S-98 C-9.5.5
Test description			
The purpose of the test is to verify that ECDIS is able to change S-101 display settings using standardized controls. *Names of the controls, located under the Standard Display section of ECDIS should switch on and off certain viewing layers and should comply with the content of the S-101 portrayal catalogue.*			
Setup			
*Load the exchange set **DisplayStandard** with the following settings:* • *Select Display Category Standard* • *Set the Safety Contour value to 10 m* • *Set the Safety Depth value to 10 m* • *Select Symbolized Boundaries* • *Select Simplified Symbols = false;.*			
Action			
Switch on Standard Display. Check that ECDIS HMI contains standardized controls that can switch on and off certain features from the chart			
Results			
Confirm that the following controls are available at ECDIS HMI *Drying line* *Buoys, beacons, aids to navigation* *Buoys, beacons, structures* *Lights* *Boundaries and limits* *Prohibited and restricted areas* *Chart scale boundaries* *Cautionary notes* *Ships' routeing systems and ferry routes* *Archipelagic sea lanes* *Miscellaneous*			

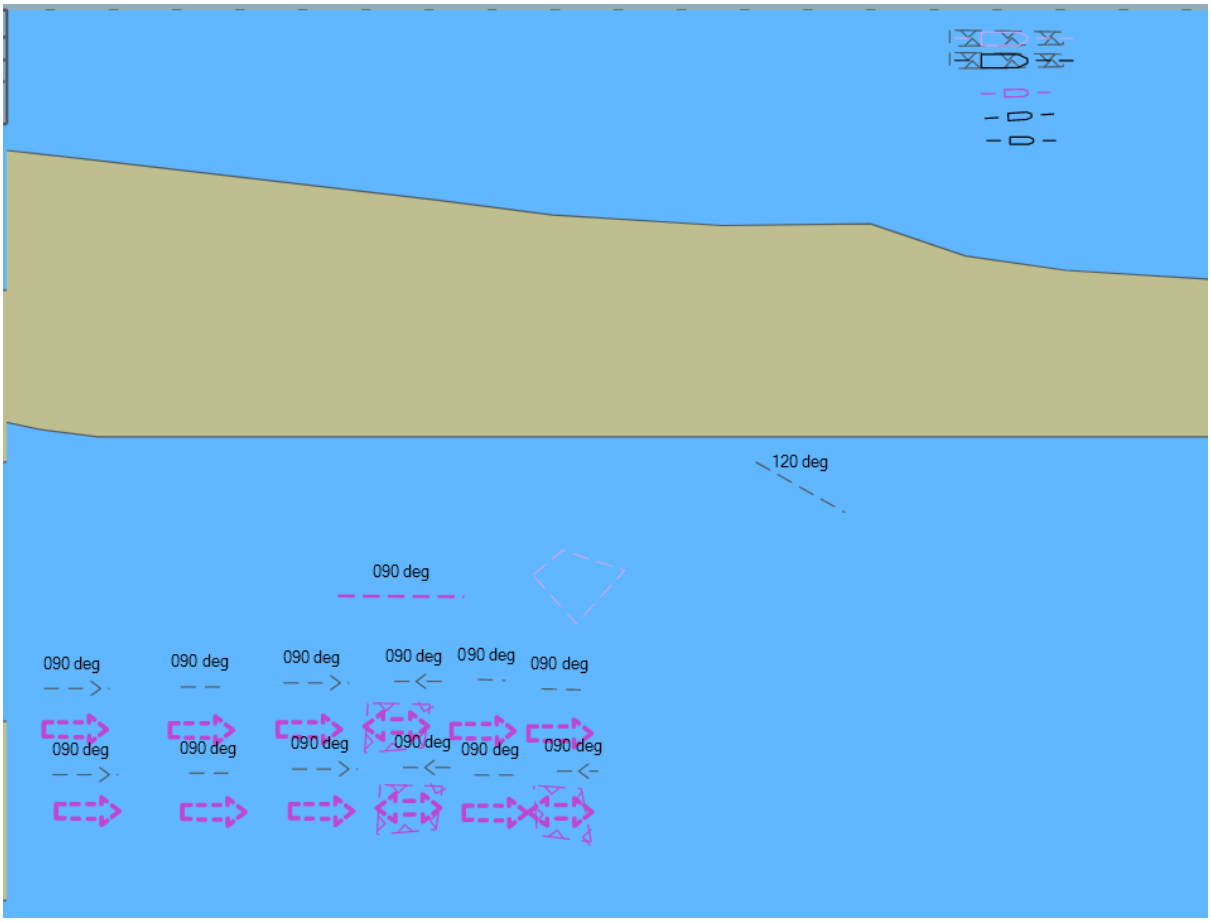
Action
*Switch off all controls and switch on only the "**Drying line**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below (scale 1:70 000) 

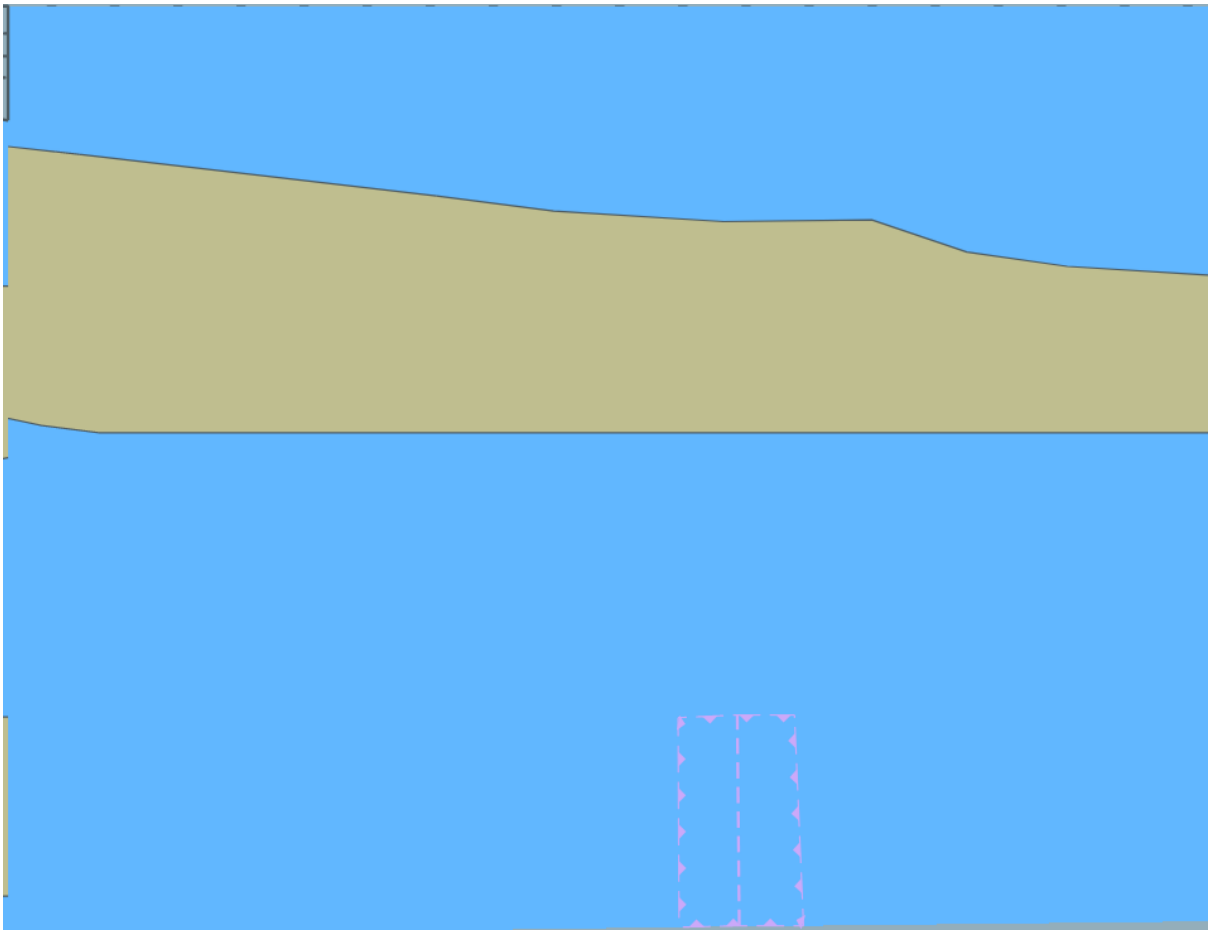
Action
*Switch off all controls and switch on only the "**Buoys, beacons, aids to navigation**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

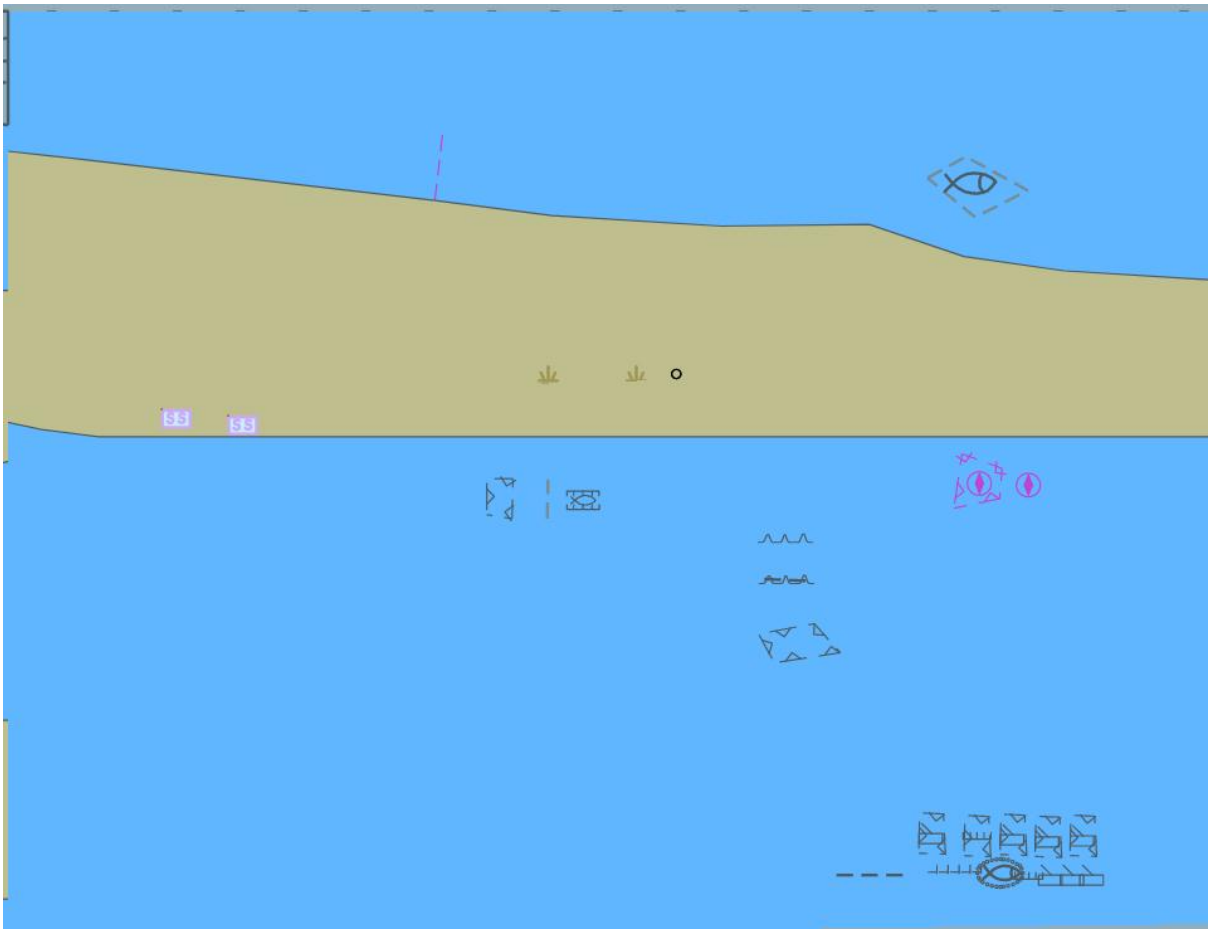
Action
*Switch off all controls and switch on only the "**Boundaries and limits**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

Action
*Switch off all controls and switch on only the "**Prohibited and restricted areas**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

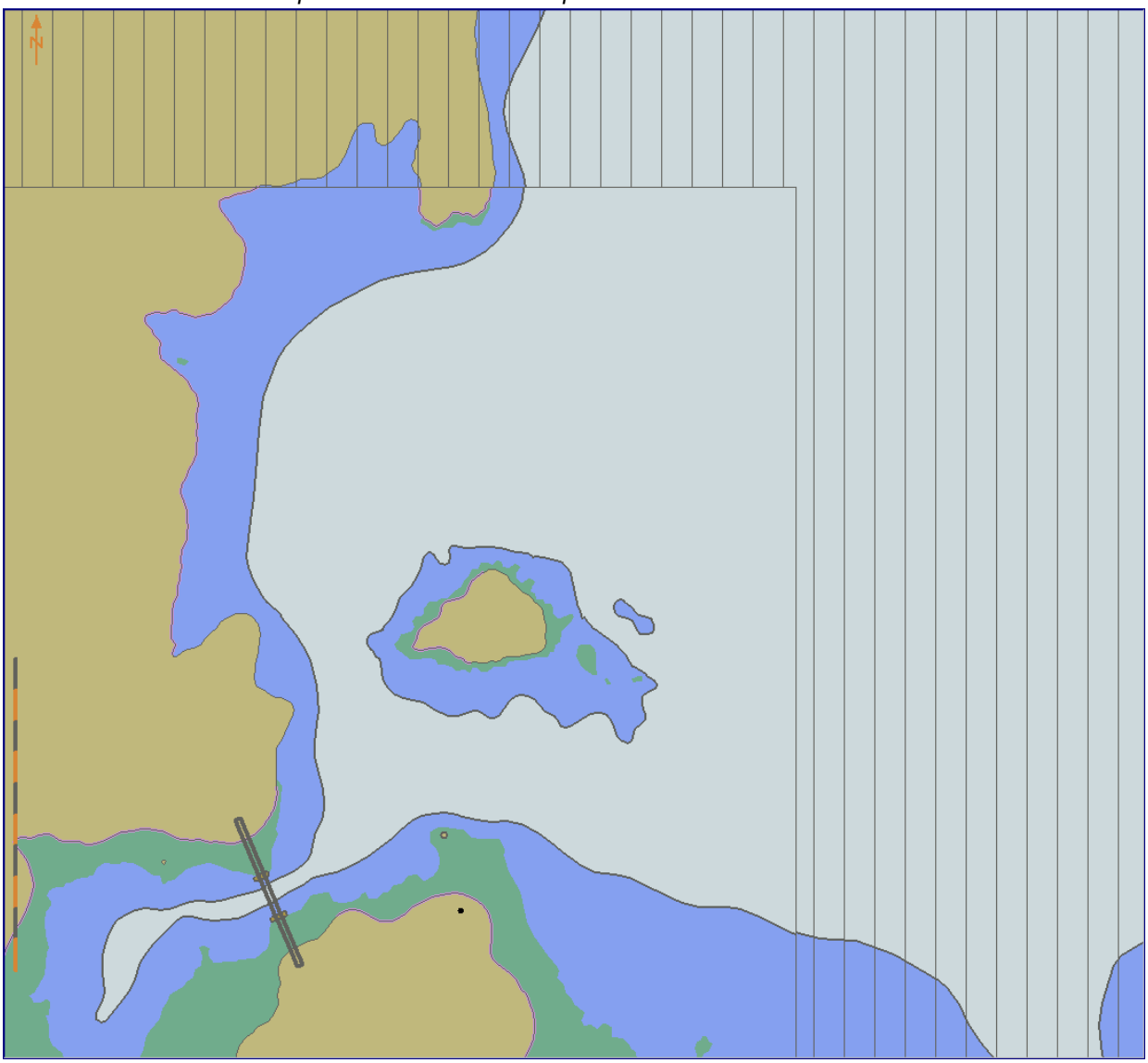
Action
*Switch off all controls and switch on only the "**Cautionary notes**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

Action
*Switch off all controls and switch on only the "**Ships' routeing systems and ferry routes**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

Action
*Switch off all controls and switch on only the "**Archipelagic sea lanes**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below. 

Action
*Switch off all controls and switch on only the "**Miscellaneous**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below. 

Action
*Load all datasets from the exchange set **PowerUp***
Centre the display on position 32°28.500' S 60°59.000' E and then zoom in to a scale of 1:20,000
*Switch off all controls and switch on only the "**Chart scale boundaries**" control.*
Verify that the features are displayed correctly as presented in the plot.
Results
The features are shown as presented in the screen plot below



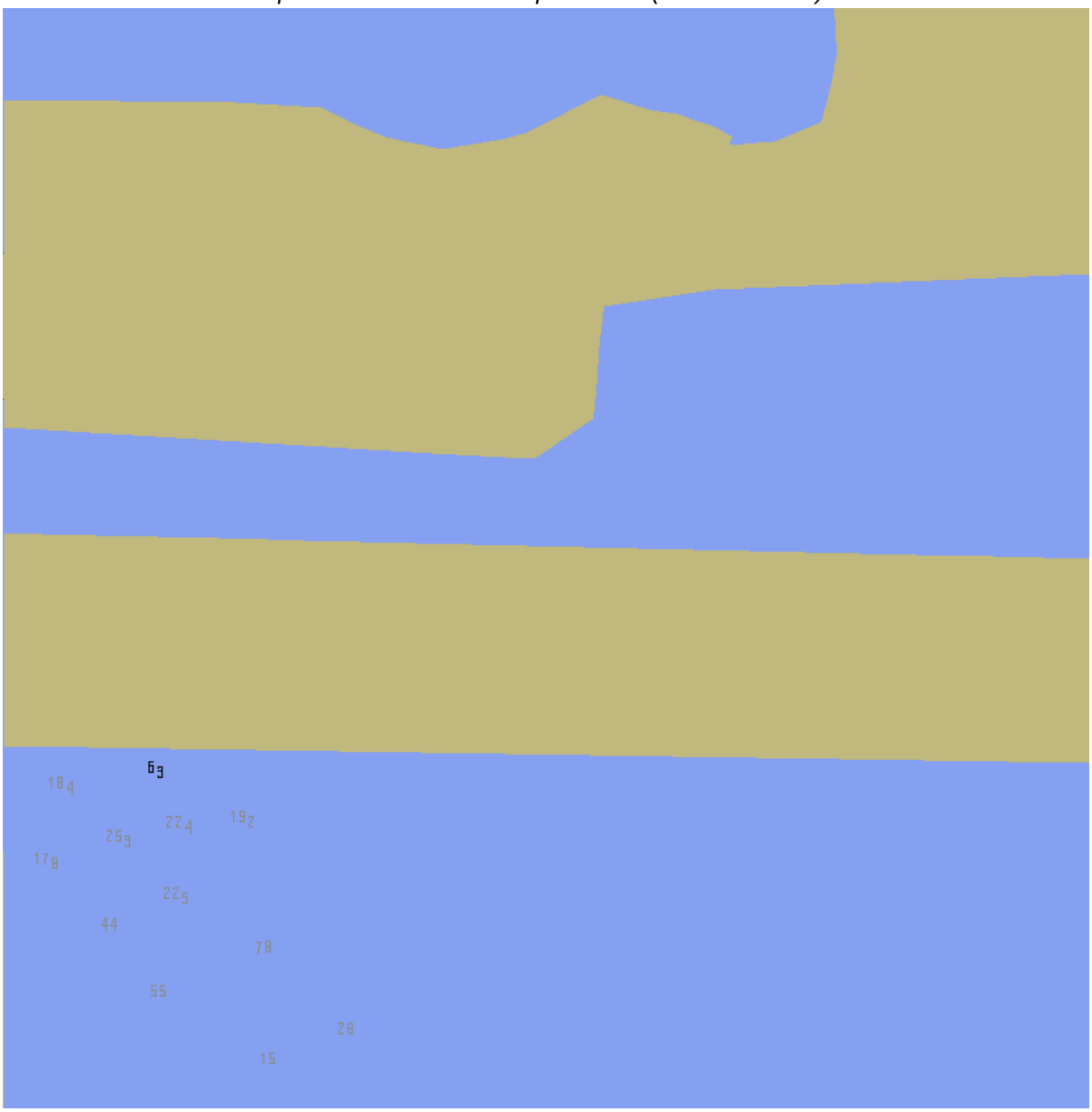
tbd

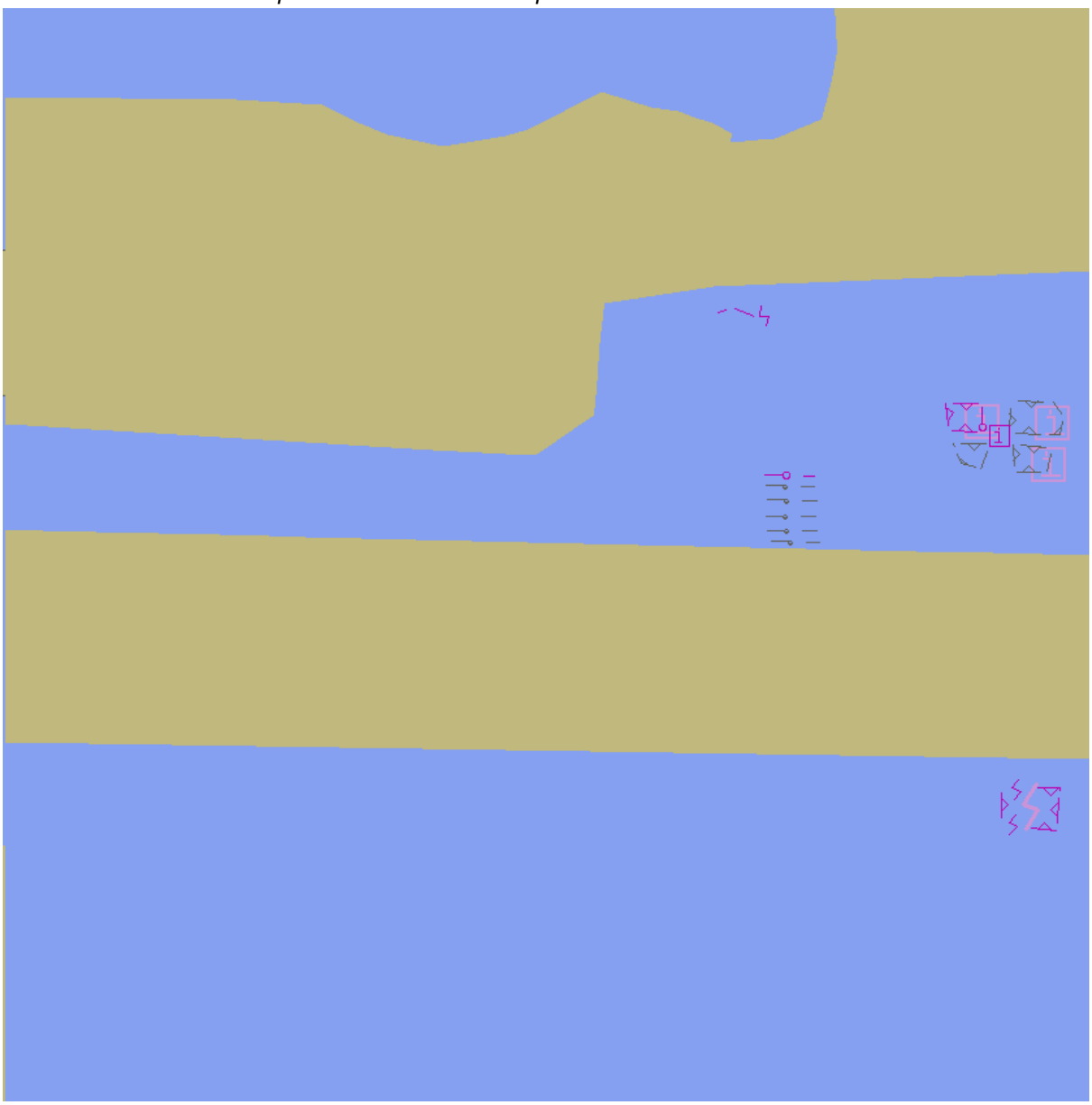
ECDIS Display of features not included in IMO Standard Layers.

Test Reference	UnclassifiedFeatures	**IHO Reference**	(S-100 Part 9/S-98)
Test description			
The purpose of the test is to verify that the ECDIS is able to portray all features which are not assigned into IMO categories of Base, Standard or Other. An exhaustive collection of these features is contained in the dataset 101AA00UNCLASS.000			
Setup			
*Load the exchange set **DisplayUnclassified** (dataset 101AA00UNCLASS.000) with the following settings:* • *Select Display Category Other* • *Set the Safety Contour value to 10 m* • *Set the Safety Depth value to 10 m* • *Select Symbolized Boundaries*			
Action			
Switch on Other Display.			
Results			
The features are shown as presented in the screen plot below: *[**TBD**].*			

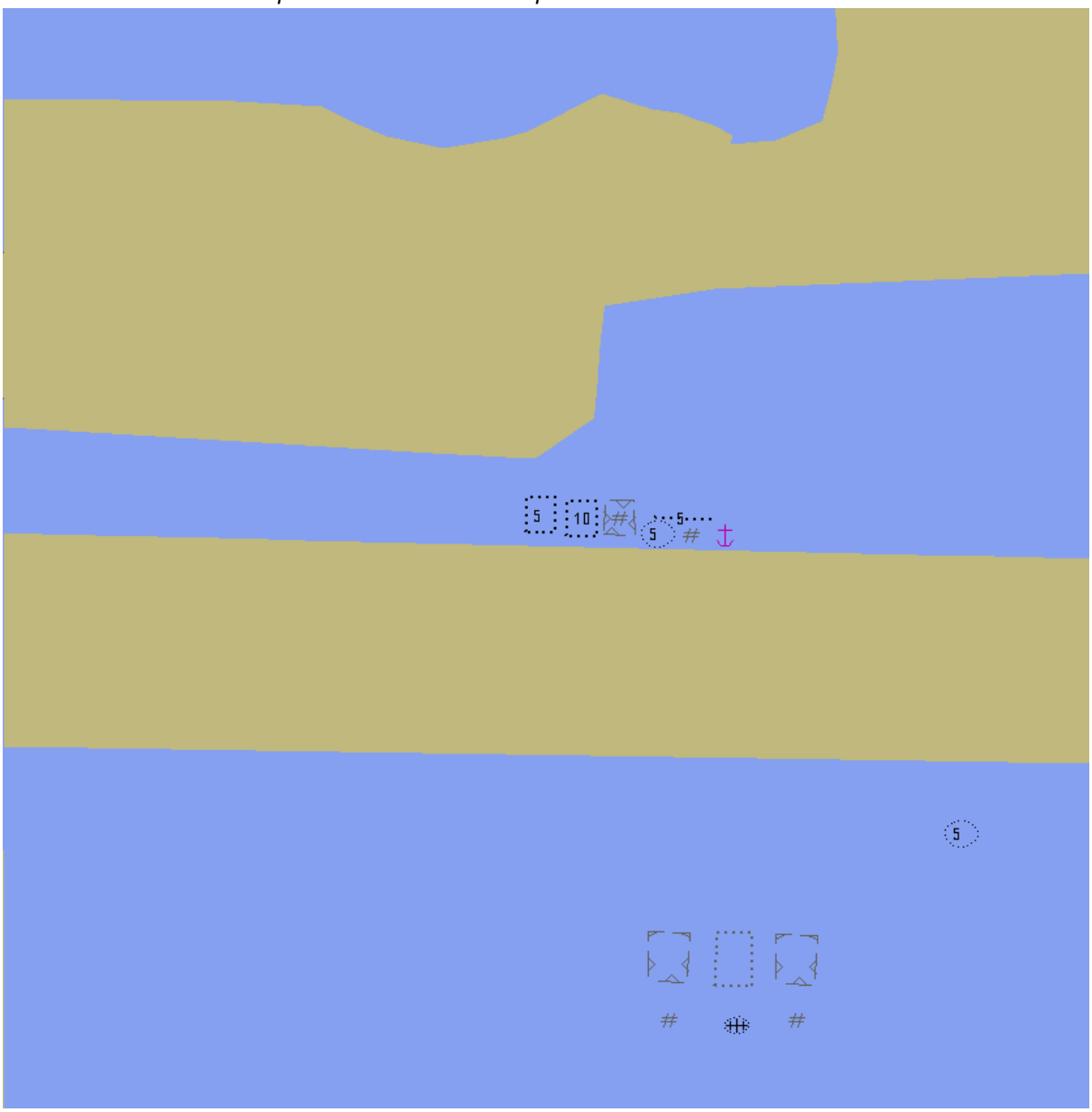
3.1.5 ECDIS Viewing Layers. Other Display

Test Reference	ViewingGroupsOther	**IHO Reference**	S-98 C-7.2.10
Test description			
The purpose of the test is to verify that ECDIS is able to change ENC display settings using standardized controls. Names of the controls, located under the Other Display section of ECDIS should switch on and off certain viewing layers and should comply with the S-101 Portrayal Catalogue.			
Setup			
*Load the exchange set **DisplayOther** (dataset 101AA00OTHER.000)with the following settings:* • *Select Display Category Other* • *Set the Safety Contour value to 10 m* • *Set the Safety Depth value to 10 m* • *Select Symbolized Boundaries* • *Select Simplified Symbols = false*			
Action			
Switch on Other Display Check that ECDIS HMI contains standardized controls that can switch on and off certain features from the chart			
Results			
Confirm that the following controls are available at ECDIS HMI under the Other Display section *Spot soundings* *Submarine cables and pipelines* *All isolated dangers* *Magnetic variation* *Depth contours* *Seabed* *Tidal* *Miscellaneous*			

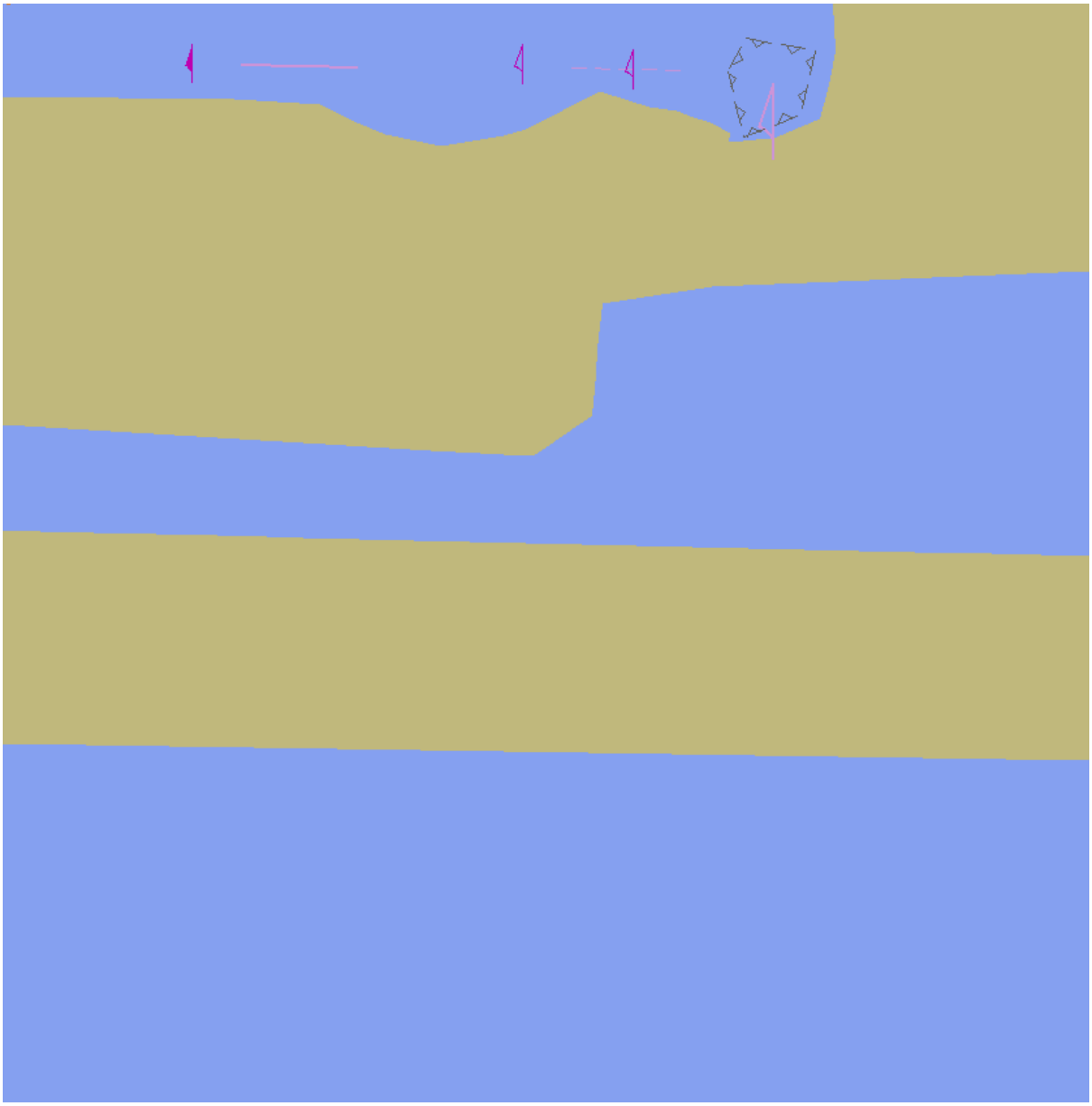
Action
*Switch off all controls and switch on only the "**Spot soundings**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below (scale 1:60 000)  **tbd**

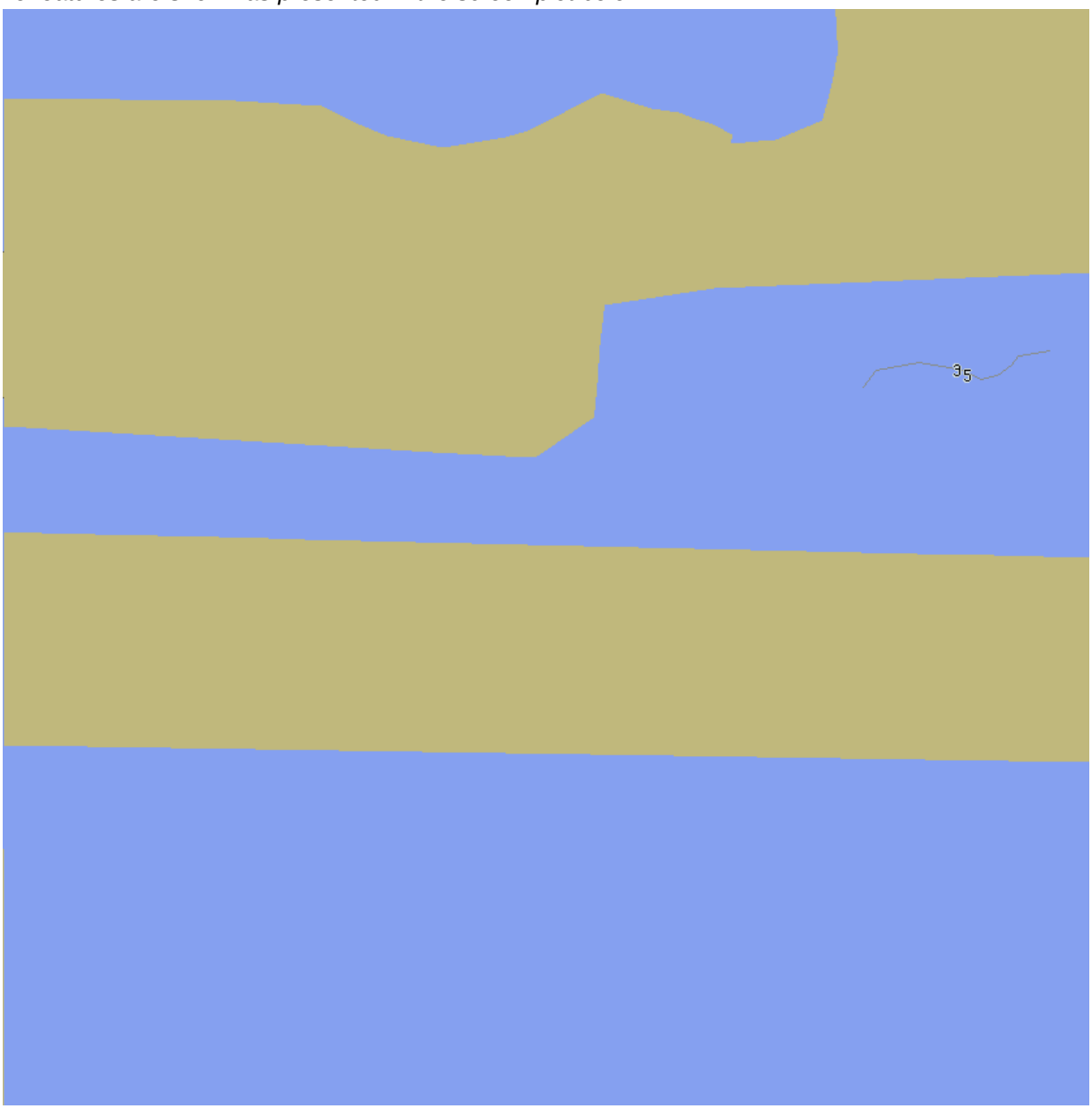
Action
*Switch off all controls and switch on only the "**Submarine cables and pipelines**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below  **tbd**

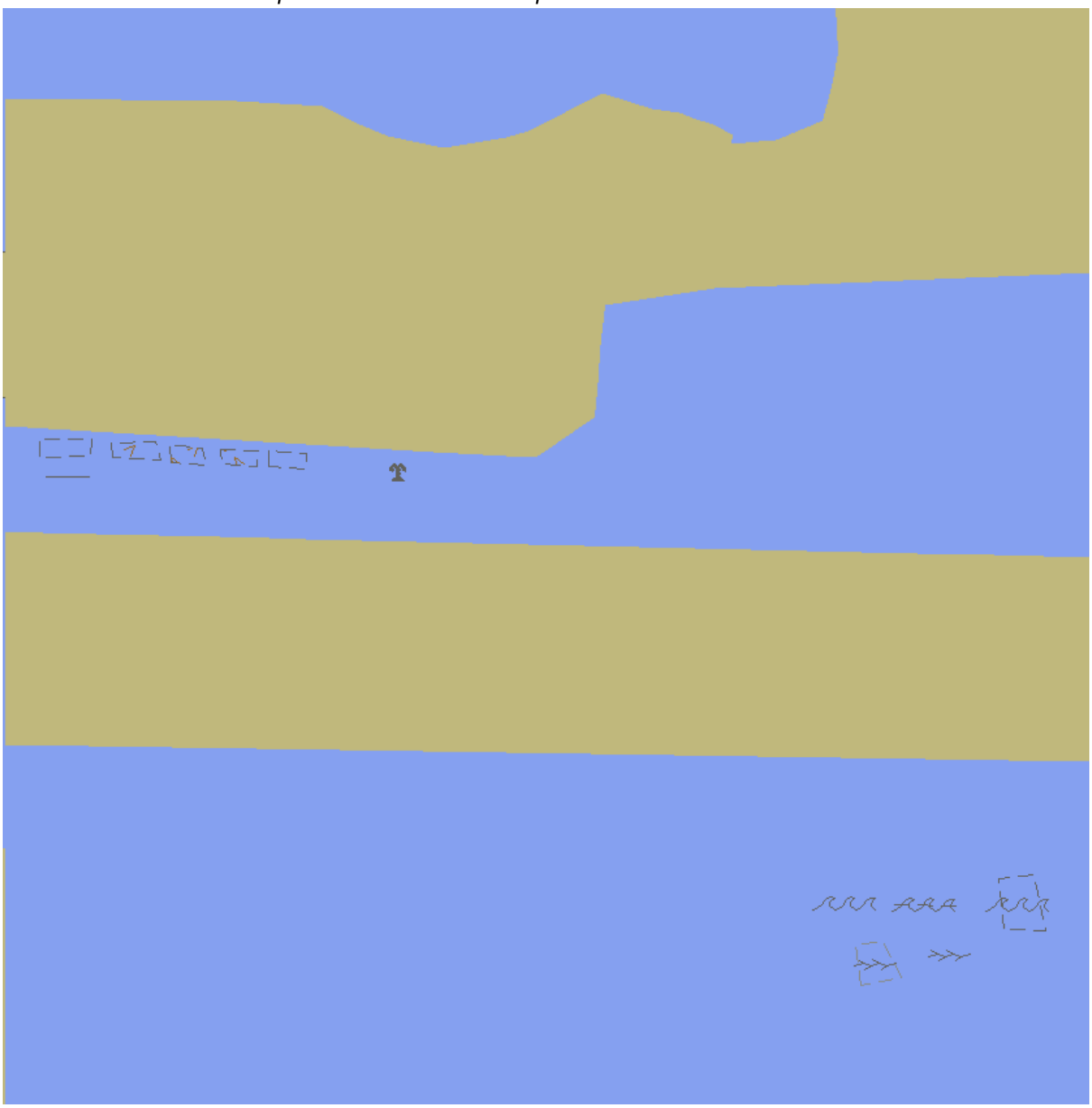
Action
*Switch off all controls and switch on only the "**All isolated danger**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below

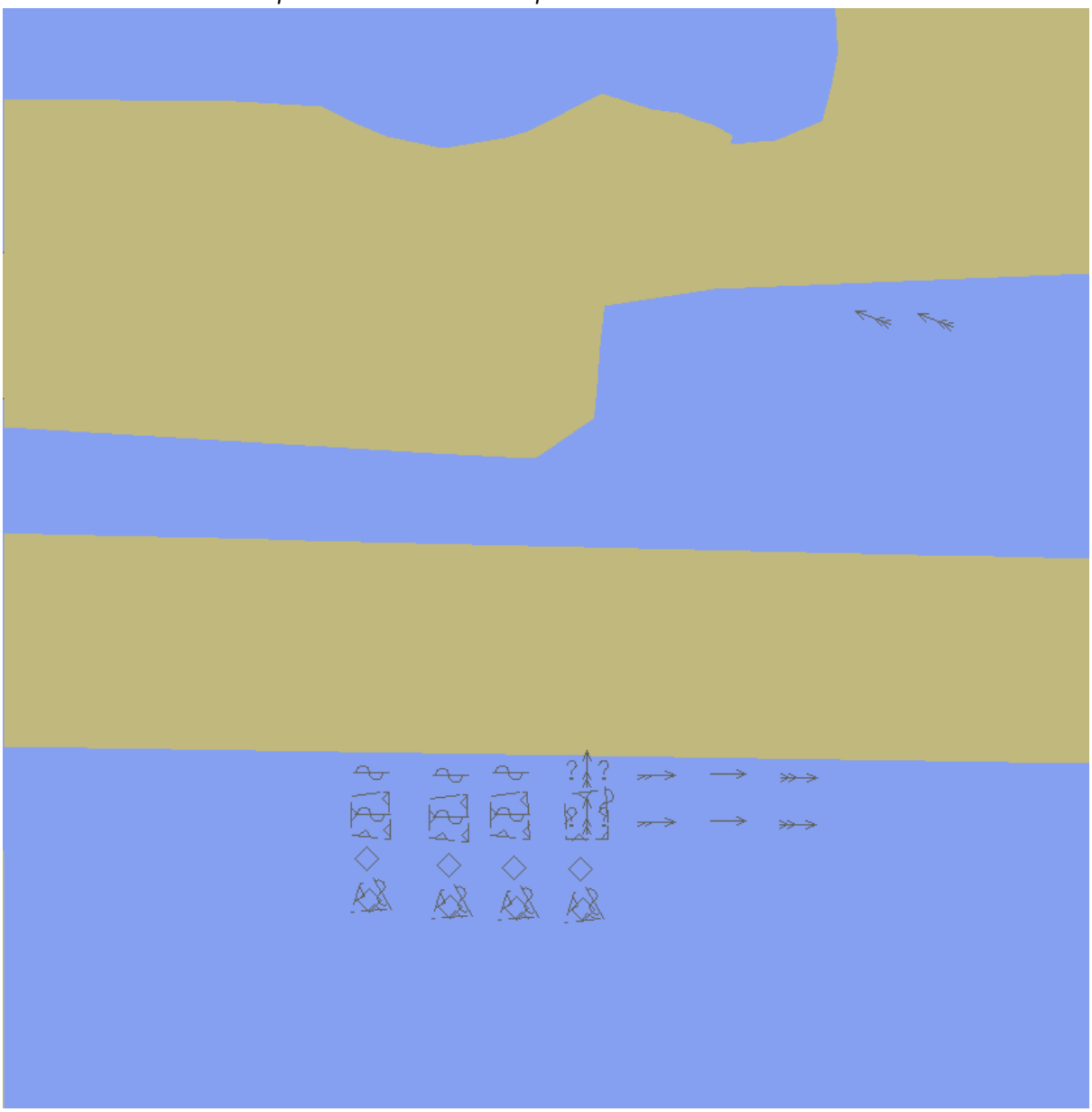


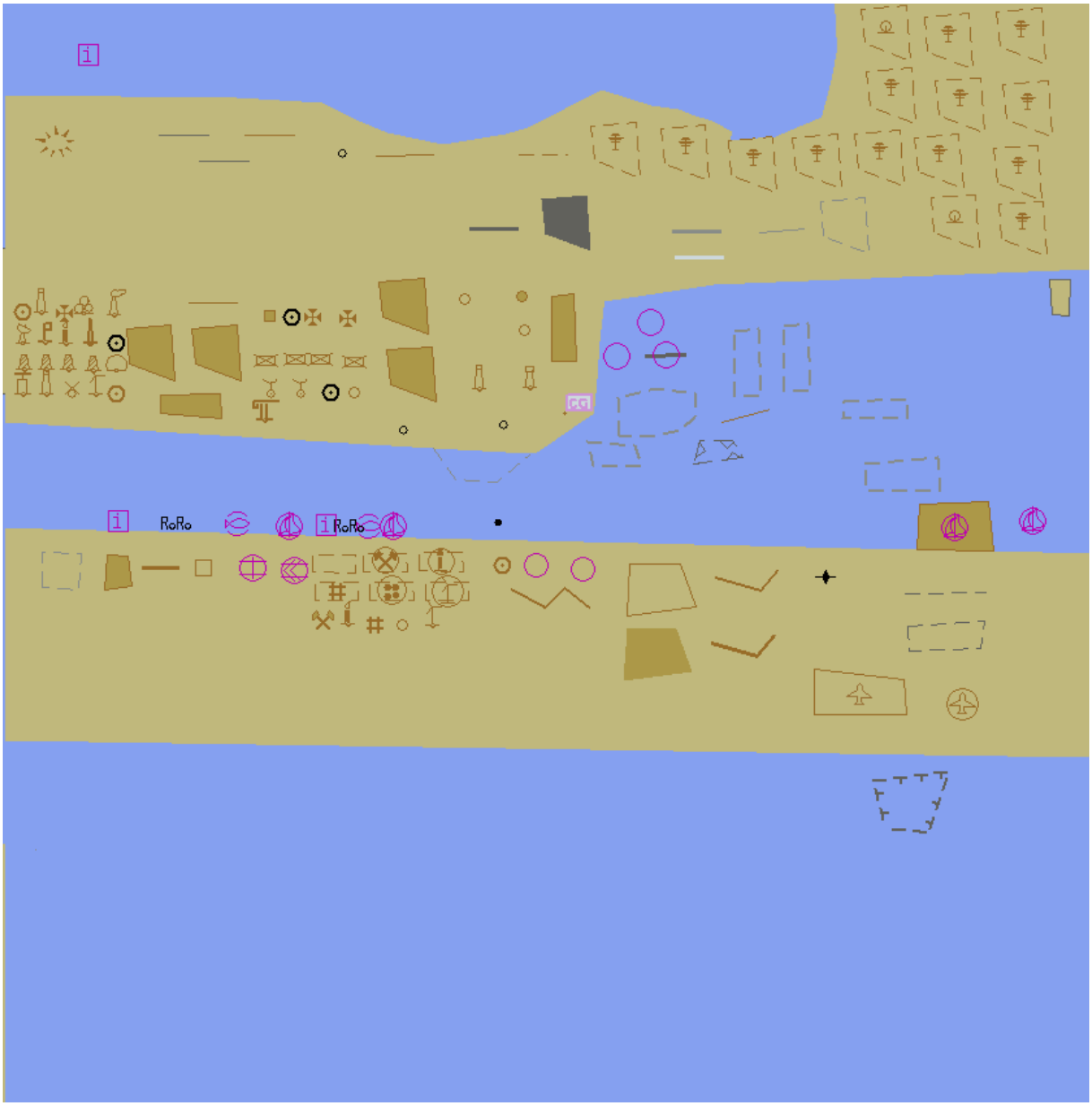
tbd

Action
*Switch off all controls and switch on only the "**Magnetic variation**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below  **tbd**

Action
*Switch off all controls and switch on only the "**Depth Contours**" control.* *If provided, select optional Contour label.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below  **tbd**

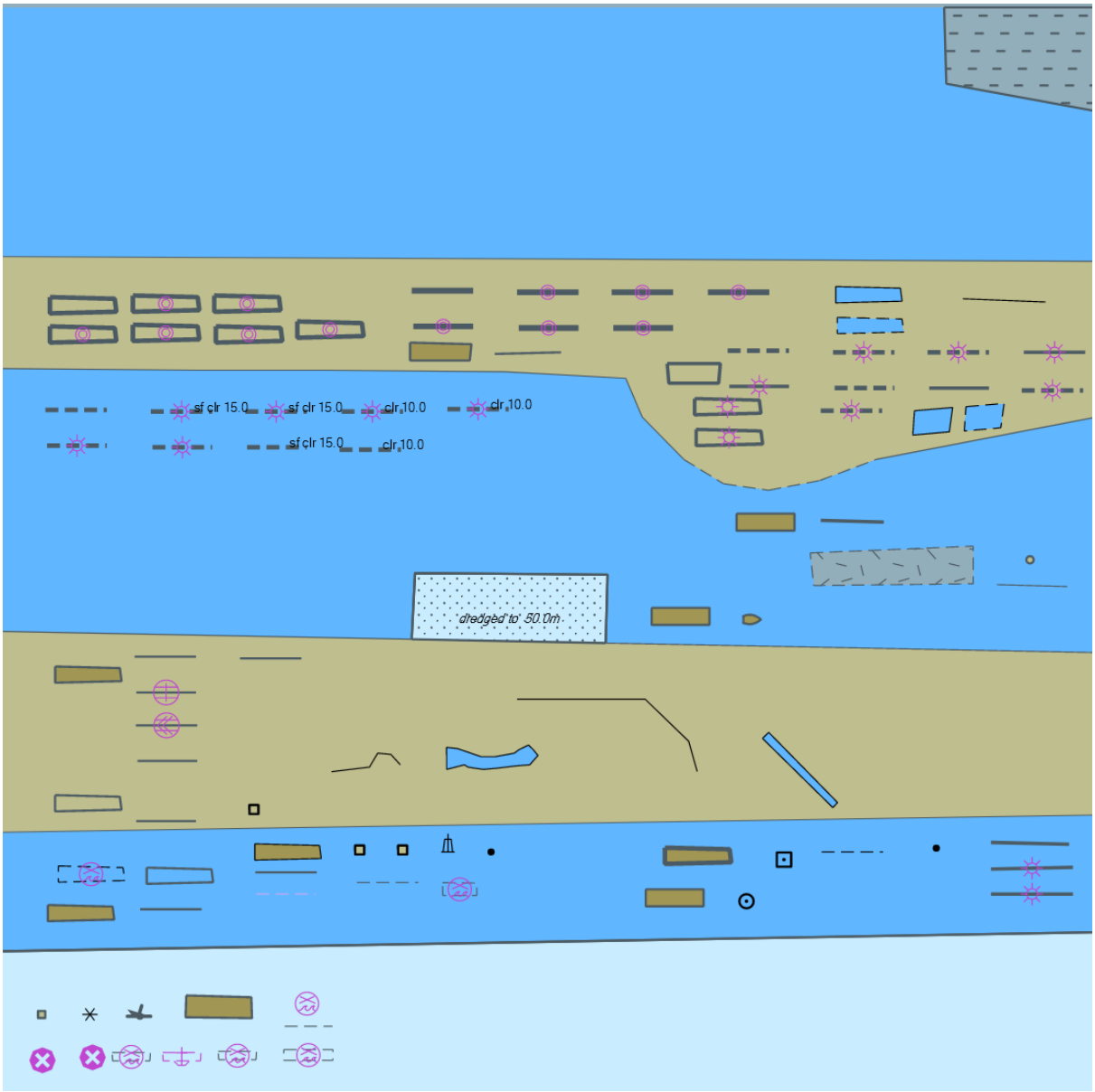
Action
*Switch off all controls and switch on only the "**Seabed**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below  **tbd**

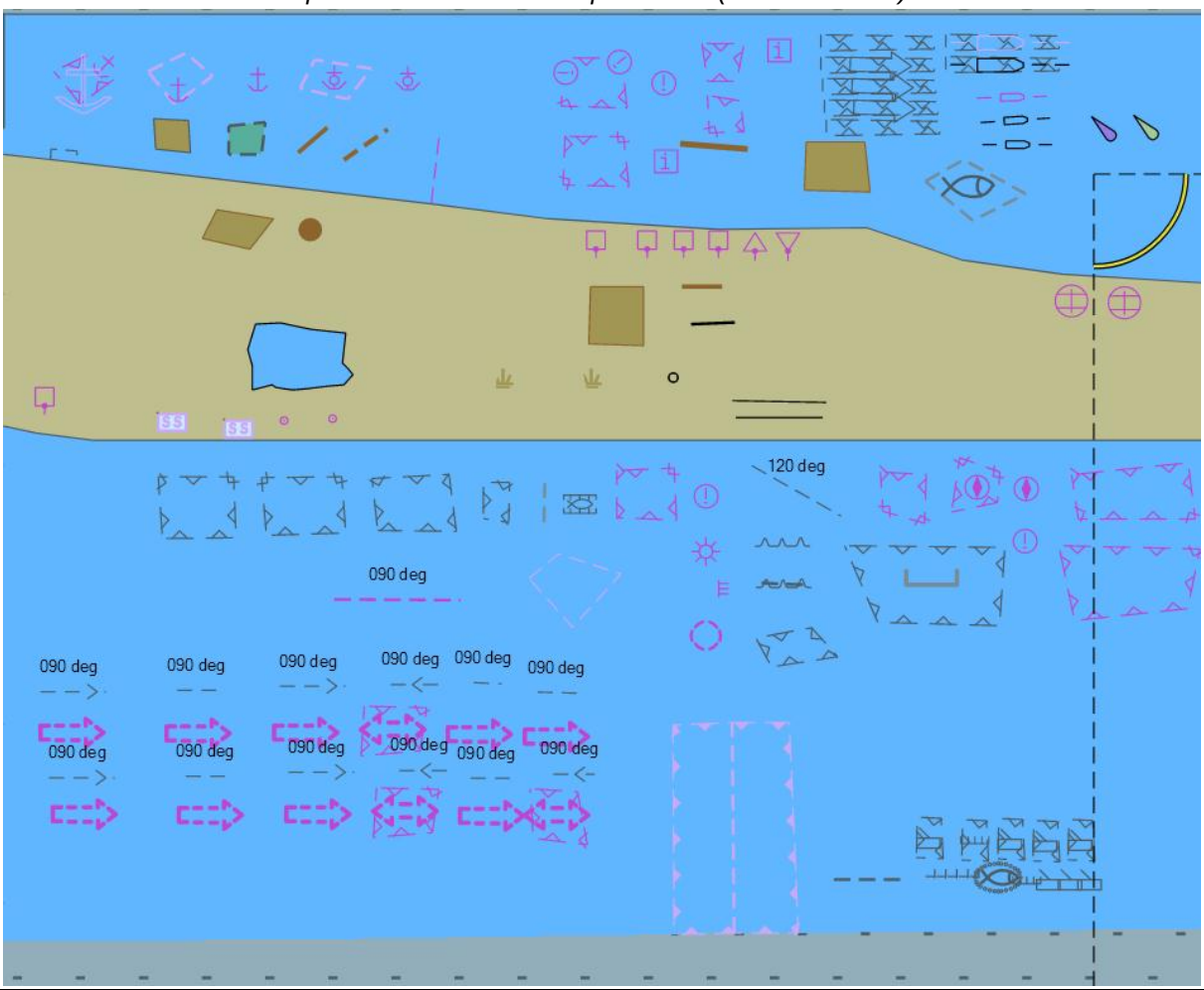
Action
*Switch off all controls and switch on only the "**Tidal**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below  **tbd**

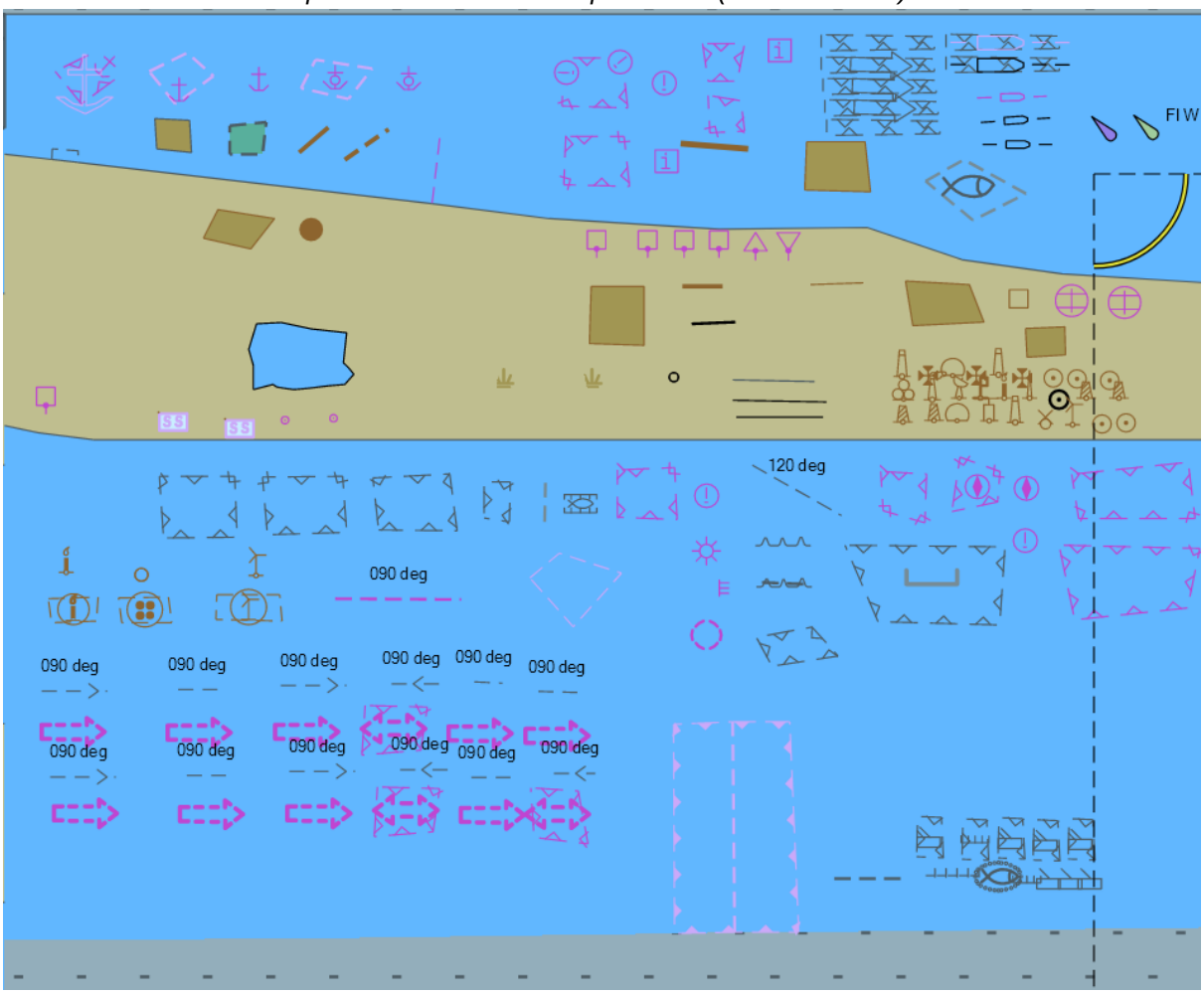
Action
*Switch off all controls and switch on only the "**Miscellaneous**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below  **tbd**

3.1.6 Text Grouping

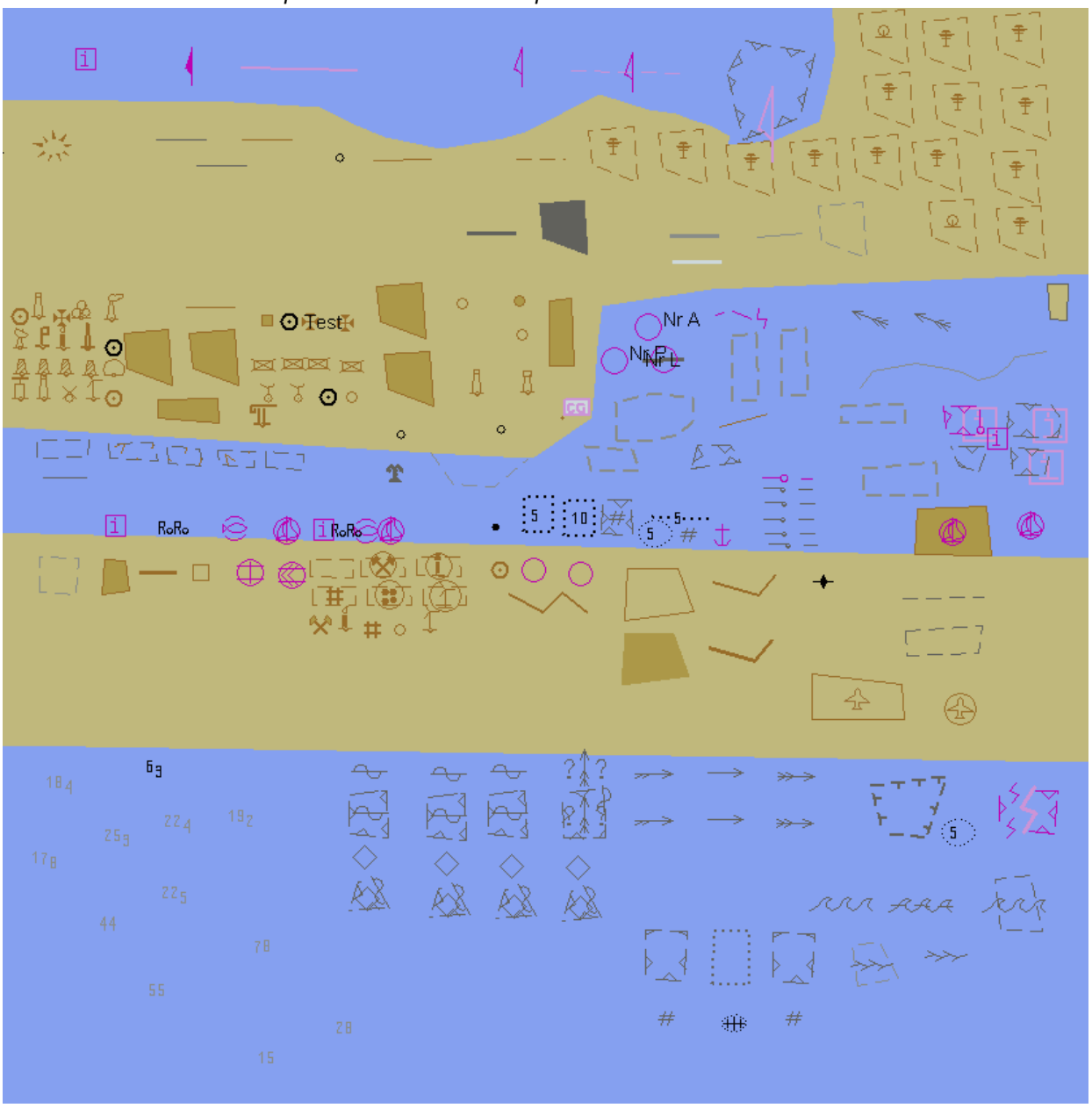
Test Reference	TextGrouping	**IHO Reference**	S-98 C-11.2
Test description			
The purpose of the test is to verify that ECDIS is able to change text display settings and display text in accordance with the S-101 portrayal catalogue. Minimum two text display categories should be available in the ECDIS HMI			
Setup			
Load the exchange sets - ***DisplayBase*** - ***DisplayStandard*** - ***DisplayOther*** *with the following settings:* • *Select Display Category Standard* • *Set the Safety Contour value to 10 m* • *Set the Safety Depth value to 10 m* • *Select Symbolized Boundaries* • *Select Simplified Symbols = false*			
Action			
Switch on Other Display. Check that ECDIS HMI contains standardized controls that can switch on and off certain features from the chart			
Results			
Confirm that the following controls are available at ECDIS HMI under the Other Display section: *Important Text* *Other Text* *More text display controls may be available, however all the additional controls should be subdivision of one of the above controls*			

Action
View dataset 101AA00DBASE.000 *Select Display Category Display Base* *Switch off all text group controls and switch on only the "**Important Text**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below (scale 1:60 000) 

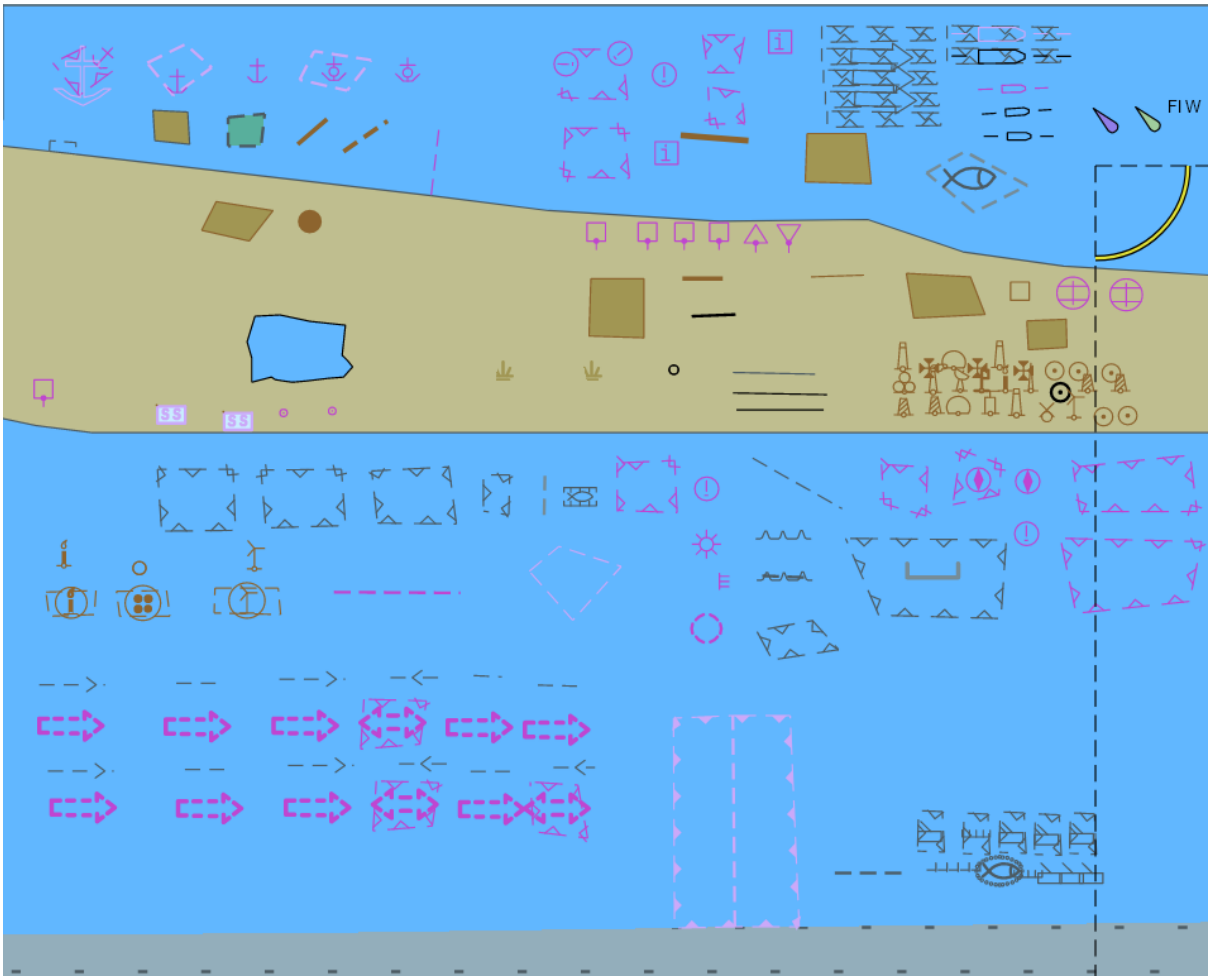
Action
View dataset 101AA00STNDR.000 *Select Display Category Standard* *Switch off all text group controls and switch on only the "**Important Text**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below (scale 1:70 000) 

Action
View dataset 101AA00STNDR.000 *Select Display Category Other* *Switch off all text group controls and switch on only the "**Other Text**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below (scale 1:60 000) 

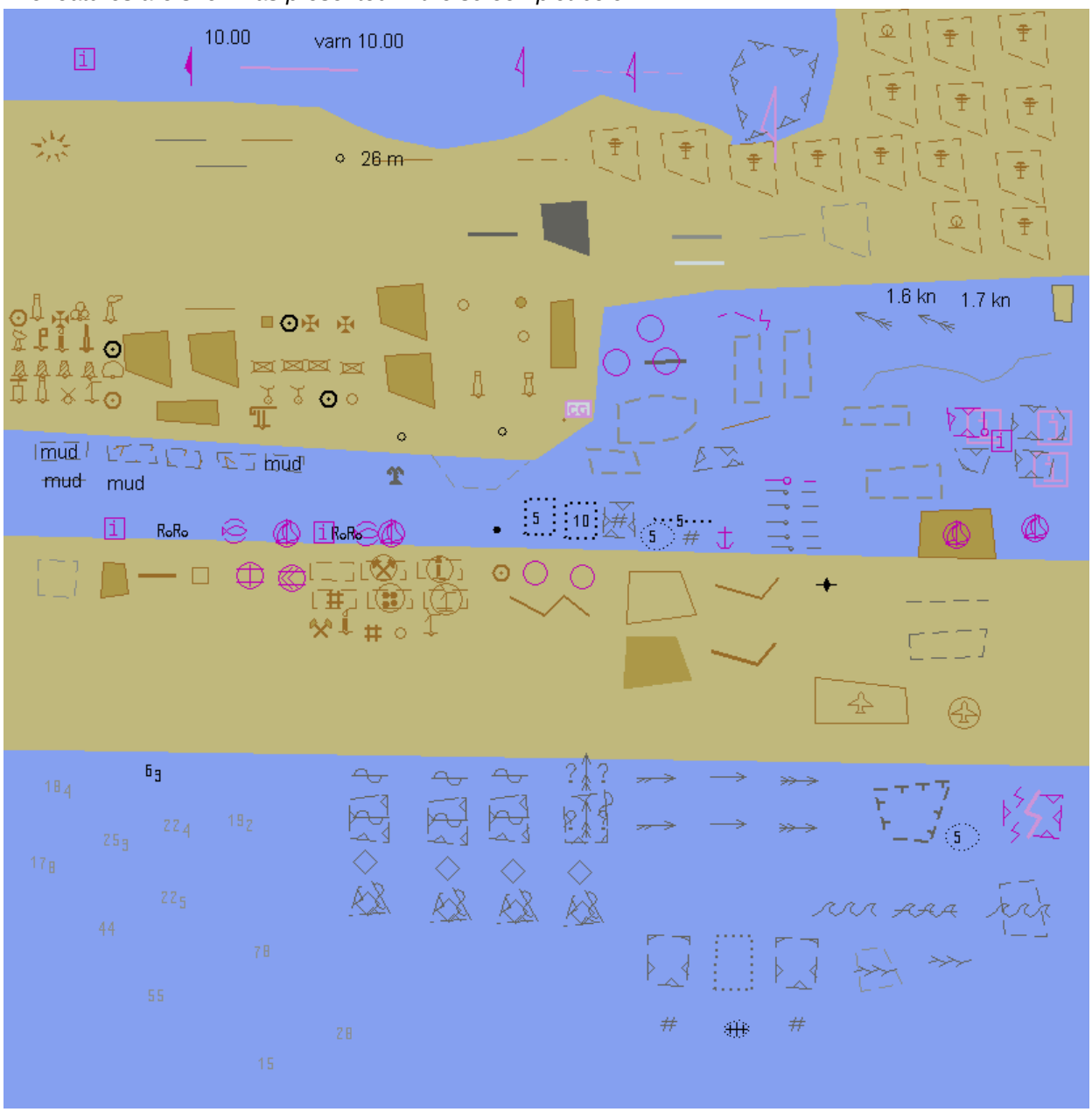
Action
View dataset 101AA00OTHER.000 *Select Display Category Other* *Switch off all text group controls and switch on only the "**Other Text**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below **tbd**

Action
View dataset 101AA00OTHER.000 *Select Display Category Other* *Switch off all text group controls and switch on only the "**Names**" control located under the "**Other Text**" control. Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below    **tbd**

Action
View dataset 101AA00STNDR.000 *Switch off all text group controls and switch on only the "**Light description**" control located under the "**Other Text**" control. Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below



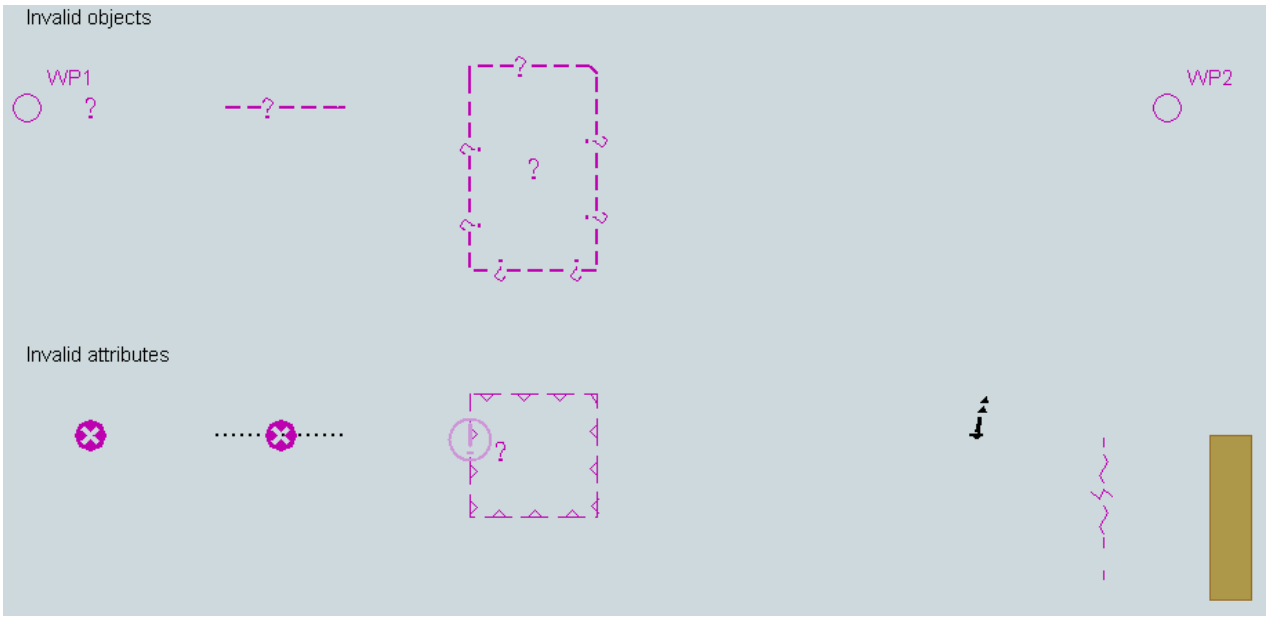
A part of above dataset at scale 1:20 000

Action
View dataset 101AA00OTHER.000 *Switch off all text group controls and switch on only the "**All other**" control located under the "**Other Text**" control. Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below  **tbd**

3.2 Invalid features

3.2.1 Display of Unrecognised features

Test Reference	InvalidFeaturesA	IHO Reference	S-98 C-12.6.2
Test description			
Display of features with unrecognised feature class or display of features for which available or not available attribute(s) causes special presentation.			
Setup			
*Load the the exchange set **InvalidFeatures** (dataset 101AA00INVOB.000)* • *Set the Safety Contour value to 0 m* • *Select Display Category Other* • *Select Colour Palette DAY* • *Select Symbolized Boundaries* • *Select Simplified Symbols = false*			
Action			
View dataset at viewing scale 1:50 000			
Results			
Confirm that the symbol SY(QUESMRK1) is displayed as below for following cases: *a) unknown feature class, point geometry* *b) unknown feature class, line geometry* *c) unknown feature class, area geometry* *d) known feature class for which missing attribute causes presentation of additional symbol SY(QUESMRK1)*			



tbd

Test Reference	InvalidFeaturesB	IHO Reference	S-98 C-12.6.2

Test description

Display of features with unrecognised feature class or display of features for which available or not available attribute(s) causes special presentation.

Setup

Load the following exchange sets

- ***InvalidFeatures*** *(101AA00X01NE.000)*
- ***PowerUp (****101AA00X0000.000)*

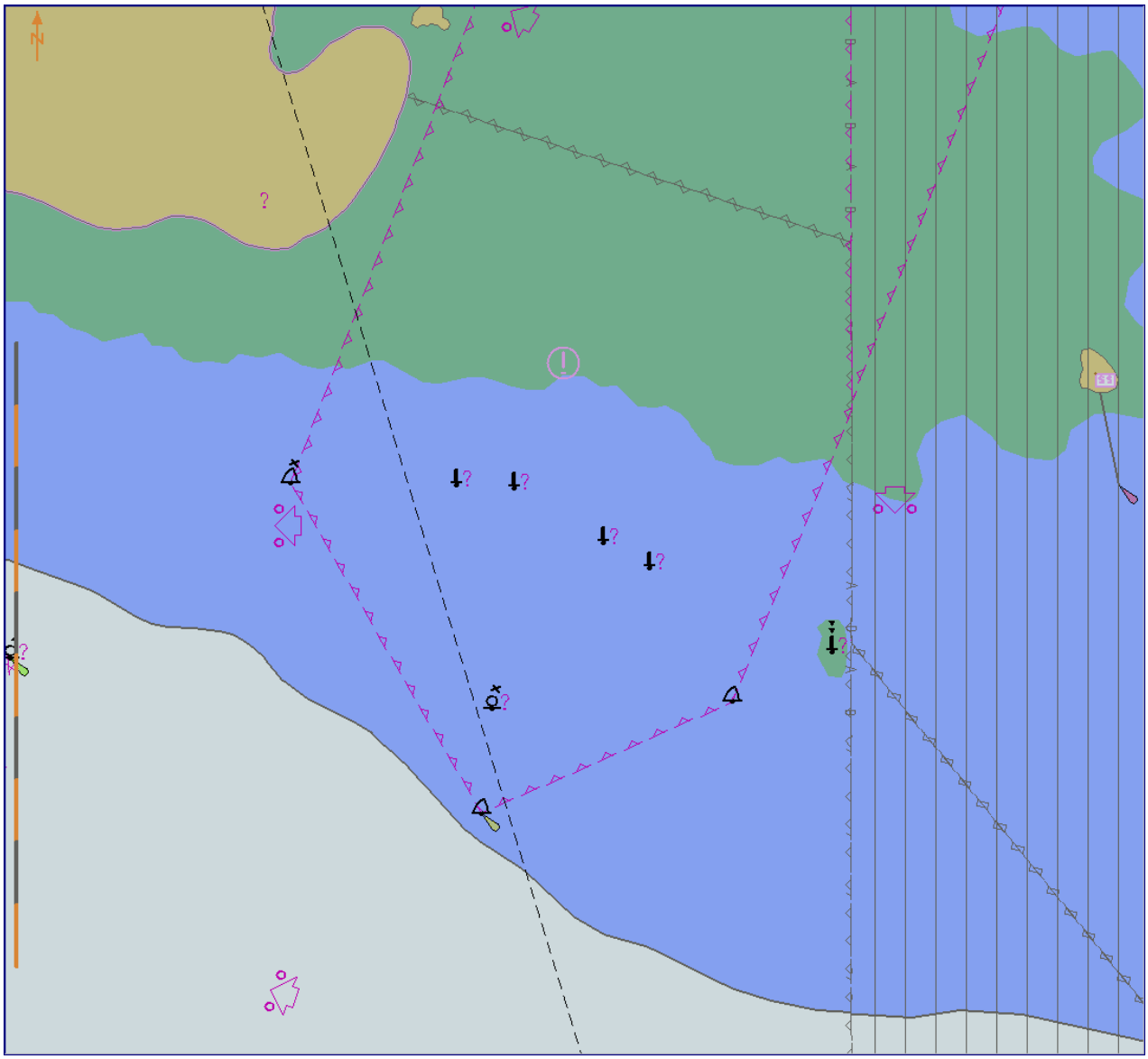
Set the Safety Contour value to 10 m
Select Display Category Standard
Select Colour Palette DAY
Select Symbolized Boundaries
Select Simplified Symbols = false

Action

View dataset at scale 1:10 000

Results

Confirm that all features display as shown in the following screenshot



tbd

3.2.2 Invalid Features Pick Report Display

Test Reference	InvalidFeaturesPickA	**IHO Reference**	S-98 C-12.6.2
Test description			
Display of pick report information for features with unknown feature class.			
Setup			
As for test 3.2.1 a)			
Action			
1. Select the following features: *1) 32°36.900'S 61°20.900'E* *2) 32°36.900'S 61°21.500'E* *3) 32°36.900'S 61°22.000'E* *2. Remove pick report information from display.*			
Results			
1a. Pick report associated with chart feature is displayed only when feature is selected. *1b. First example has 2 attributes (Orientation is 45.0 deg; Information is Wreck).* *1c. Second example has 1 attribute (Information is danger line).* *1d. Third example has 1 attribute (Information is See regulation "Jussland fishing act" paragraph 42).* *2. Pick report associated with chart feature is removed from the display.*			

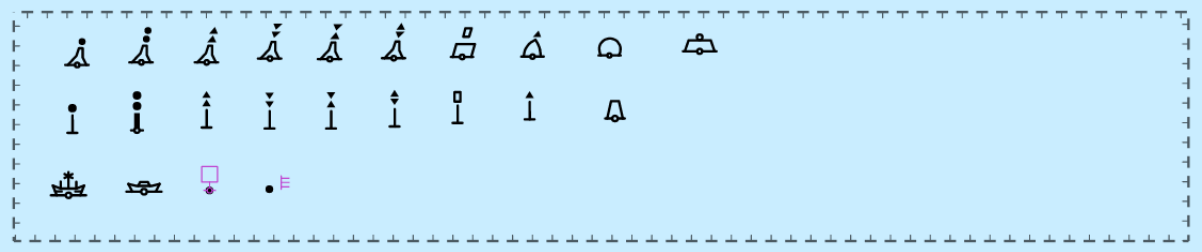
Test Reference	InvalidFeaturesPickB	**IHO Reference**	
Test description			
Display of pick report information for features with unknown feature class.			
Setup			
As for test 3.2.1 b)			
Action			
1. Select the following feature 32°30.924'S, 60°58.719'E *2. Remove pick report information from display.*			
Results			
1a. Pick report associated with chart feature is displayed only when feature is selected. *1b. This example has no attributes. Only unknown feature and its position is available in the pick report.* *2. Pick report associated with chart feature is removed from the display.*			

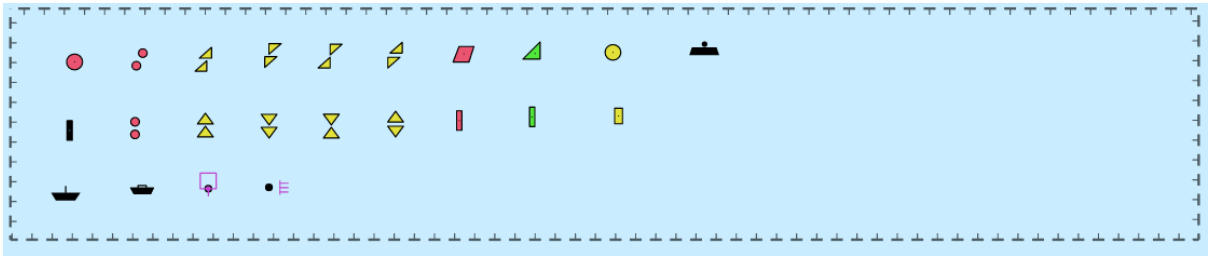
Test Reference	InvalidFeaturesPickC	**IHO Reference**	S-98 C-12.6.2
Test description			
Display of pick report information for known features which have unknown attribute(s).			
Setup			
As for test 3.2.1 a)			
Action			
1. Select the following features: *- 39°29.000'N, 104°44.000'W* *- 39°29.000'N, 104°43.000'W* *- 39°28.000'N, 104°41.000'W* *2. Remove pick report information from display.*			
Results			
1a. Pick report associated with chart feature is displayed only when feature is selected. *1b. First example is a wreck and it has 1 unknown attribute and 1 known attributes (Water level effect is Covers and uncovers).* *1c. Second example is an obstruction and it has 1 unknown attribute and 1 known attribute (Value of sounding has no value).* *1d. Third example is a restricted area and it has 1 unknown attribute* *2. Pick report associated with chart feature is removed from the display.*			

Test Reference	InvalidFeaturesPickD 3.2.2 d)	**IHO Reference**	S-98 C-12.6.2
Test description			
Display of pick report information for known features for which available or not available attribute(s) cause special presentation.			
Setup			
As for test 3.2.1 b)			
Action			
1. Select the following features: *- 32°31.737'S, 60°59.153'E* *- 32°31.379'S, 60°59.084'E* *- 32°31.383'S, 60°59.193'E* *- 32°31.472'S, 60°59.364'E* *- 32°31.511'S, 60°59.452'E* *- 32°31.646'S, 60°59.800'E* *2. Remove pick report information from display.*			
Results			
1a. Pick report associated with chart feature is displayed only when feature is selected. *1b. First example is a buoy and it has 2 known attributes (Category of special purpose mark is target mark; Colour is yellow)* *1c. Second example is a beacon and attribute Beacon shape has no value* *1d. Third example is a beacon and attribute Beacon shape has no value* *1e. Fourth example is a beacon and attribute Beacon shape has no value* *1f. Fifth example is a beacon and attribute Beacon shape has no value* *1g. Sixth example is a beacon and attribute Beacon shape has no value* *2. Pick report associated with chart feature is removed from the display.*			

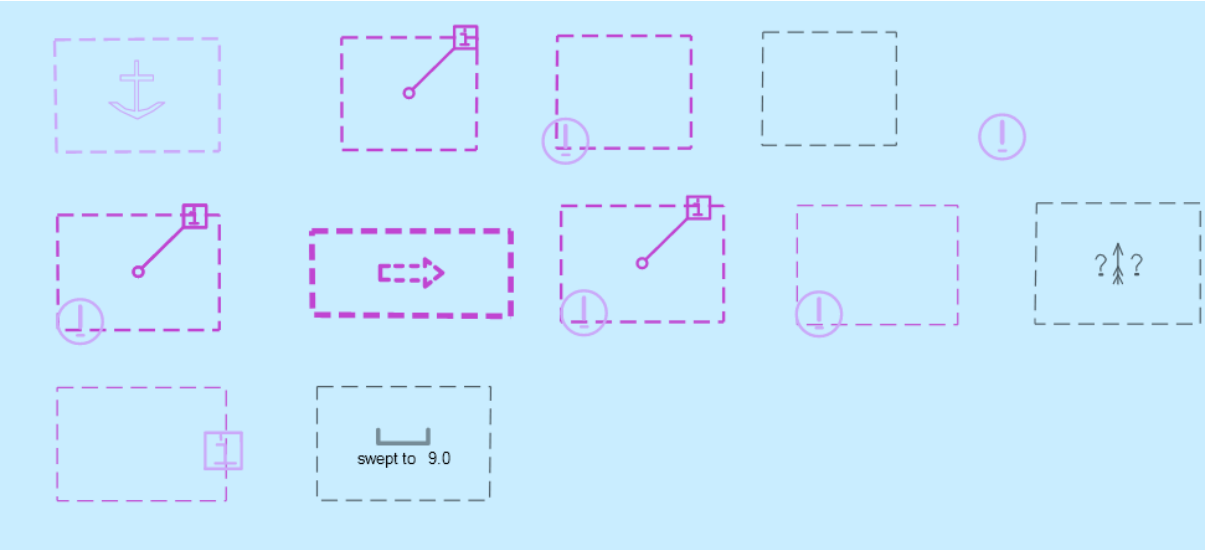
3.3 Independent Mariner Selections

3.3.1 Portrayal of simplified point symbols

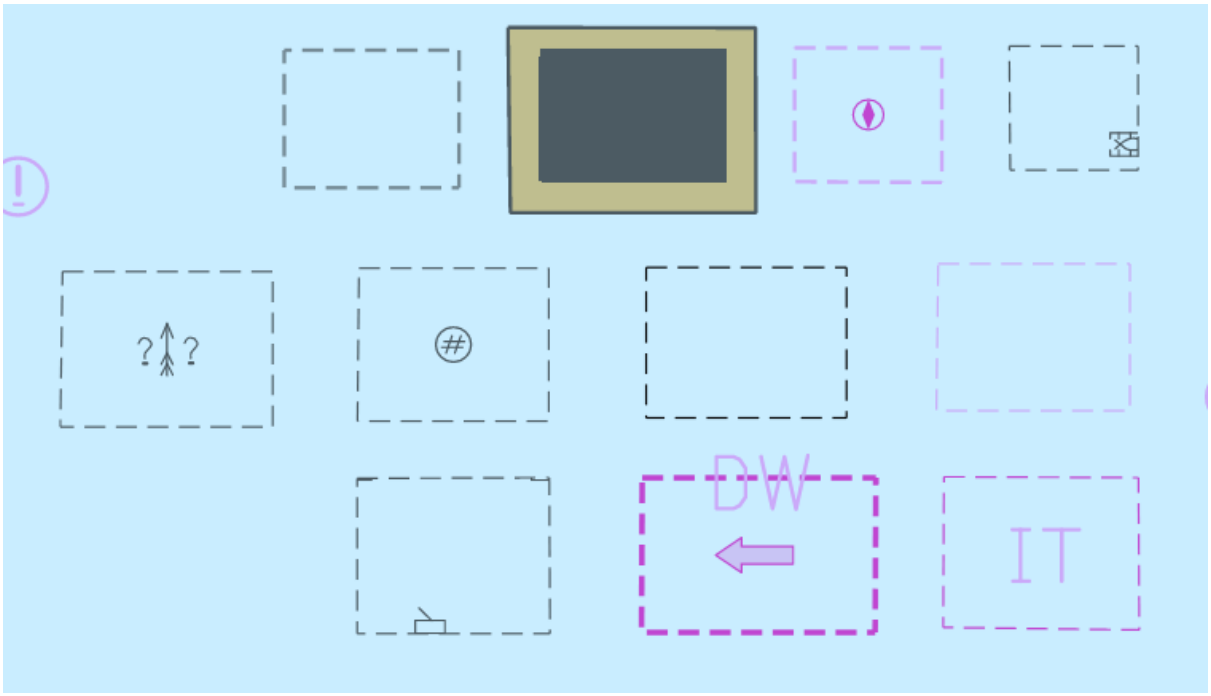
Test Reference	SimplifiedSymbolsFalse	**IHO Reference**	S-98 C-7.2.3
Test description			
Display of features with simplified symbols turned off.			
Setup			
*Load the exchange set **Settings (**101AA00X0001.000) with the following settings :* - *Select Display Category Other* - *Set the Safety Contour to 10 m* - *Set the Safety Depth to 10 m* - *Select Symbolized Boundaries* - *Select Simplified Points = false*			
Action			
View the features at position 32° 37.280' S 61° 21 .000' E and then zoom in to a scale of 1:10,000.			
Results			
Confirm that the features display as follows: 			

Test Reference	SimplifiedSymbolsTrue	**IHO Reference**	S-98 C-7.2.3
Test description			
Display of features with simplified symbols			
Setup			
As for test 3.3.1 a) *Select Simplified Symbols = true*			
Action			
View the features at position 32° 37.280' S 61° 21 .000' E and then zoom in to a scale of 1:10,000.			
Results			
Confirm that the features display as follows: 			

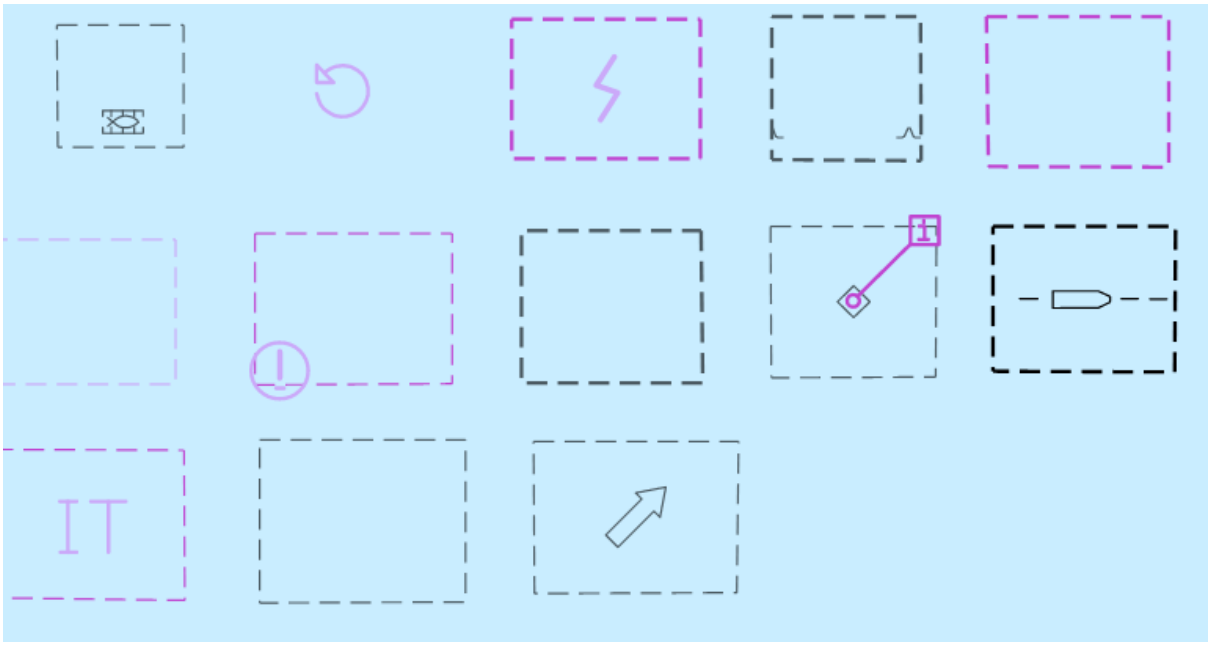
3.3.2 Symbolized and plain boundaries

Test Reference	PlainBoundaries	IHO Reference	S-98 C-7.2.5
Test description			
Display of features with plain boundaries.			
Setup			
*Load the dataset 101AA00X0001.000 from the exchange set **Settings** with the following settings.* *Select Display Category Other* *Set the Safety Contour to 10 m* *Set the Safety Depth to 10 m* *Select Plain Boundaries* *Select Simplified Points = false* *Select all Text groups*			
Action			
Zoom into 1:5 000 and View the features at position *1) 32°36.900'S 61°20.840'E* *2) 32°36.900'S 61°21.400'E* *3) 32°36.900'S 61°21.950'E*			
Results			
Confirm that the features display as follows: *1) at position 32°36.900'S 61°20.840'E:* 			

2) at position 32°36.900'S 61°21.400'E:



3) at position 32°36.900'S 61°21.950'E:



Test Reference	Symbolisedboundaries	IHO Reference	S-98 C-7.2.5

Test description

Display of features with symbolized boundaries.

Setup

As for test 3.3.2 a) and Select Symbolized Boundaries

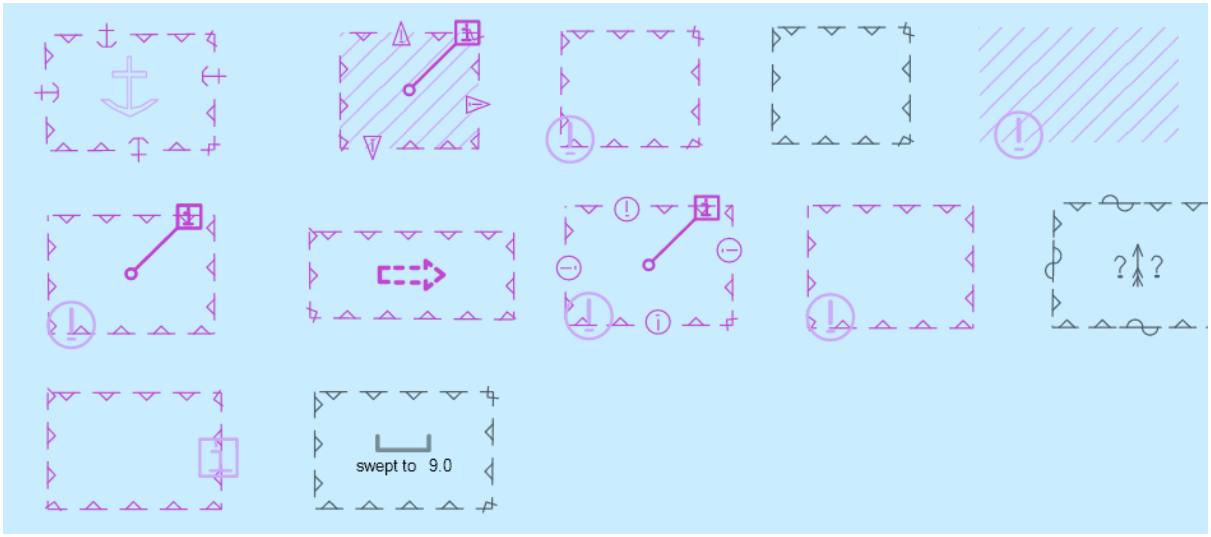
Action

Zoom into 1:5 000 and View the features at position
1) 32°36.900'S 61°20.840'E
2) 32°36.900'S 61°21.400'E
3) 32°36.900'S 61°21.950'E

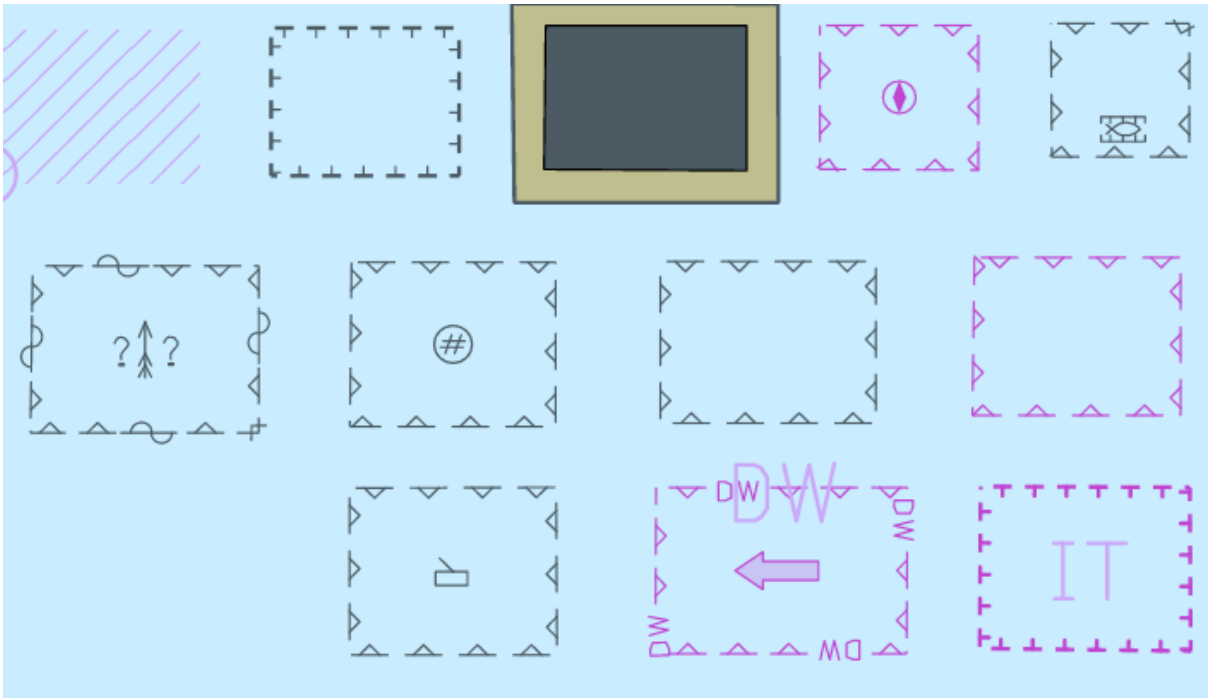
Results

Confirm that the features display as follows:

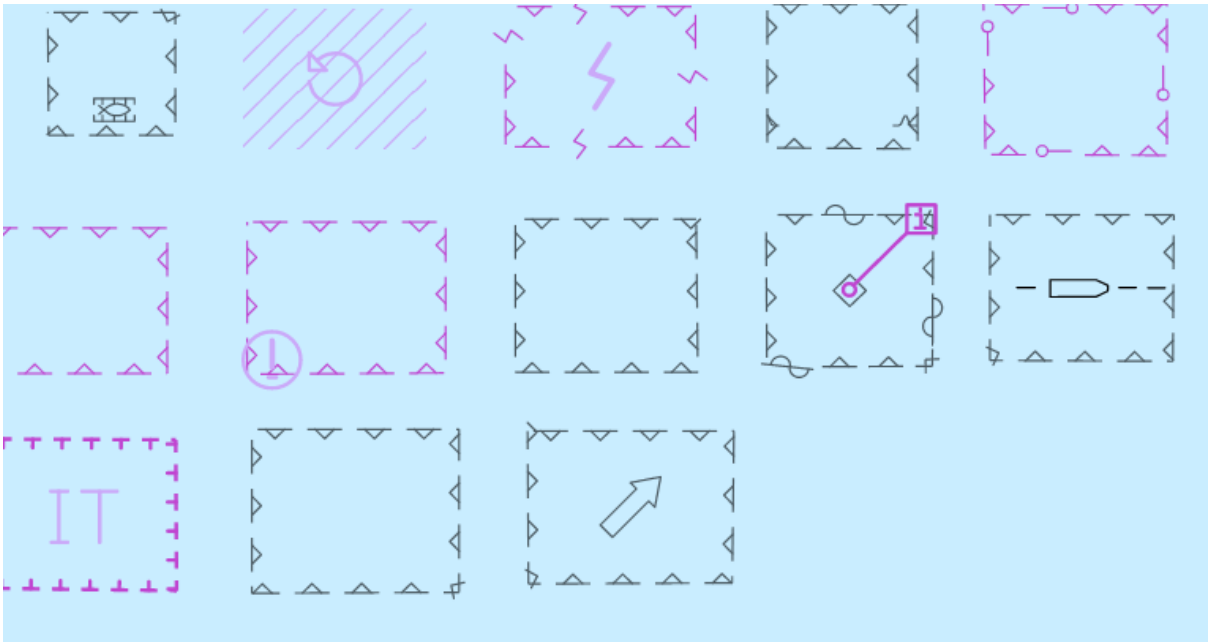
1) at position 32°36.900'S 61°20.840'E:



2) at position 32°36.900'S 61°21.400'E:

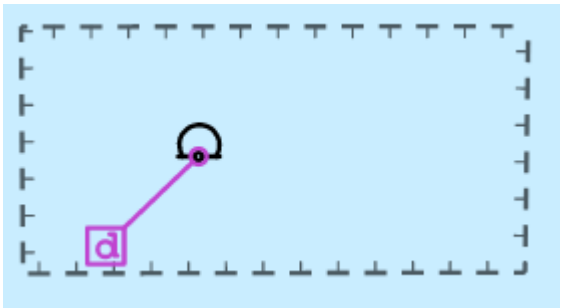


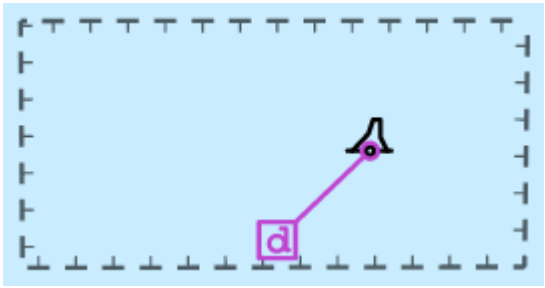
3) at position 32°36.900'S 61°21.950'E:

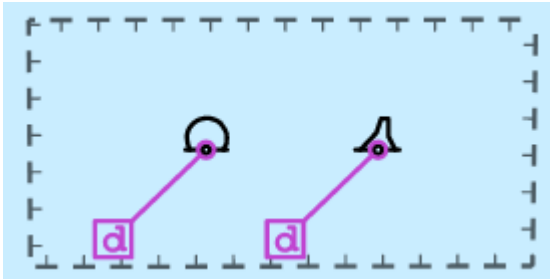


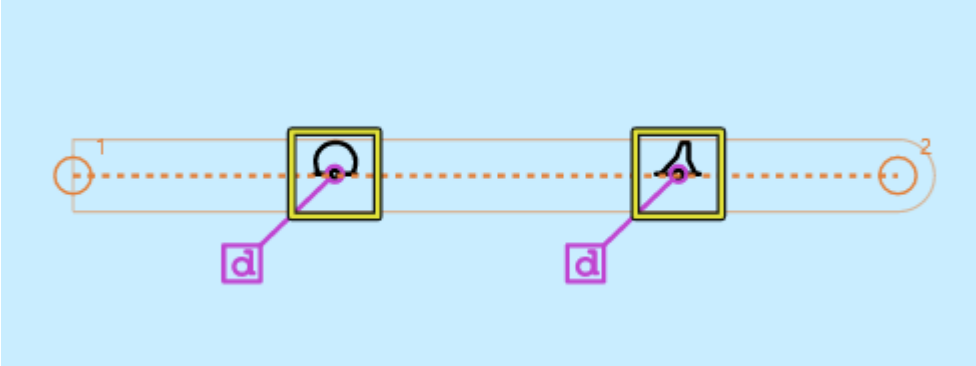
3.3.3 Date Dependent Display and Functionality

3.3.3.1 DateStart/DateEnd on buoys

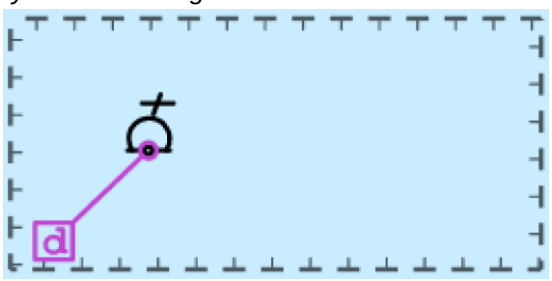
Test Reference	DateDependentFeatures1	**IHO Reference**	S-98 C-7.2.16
Test description			
Display of date dependent features, current date. (DateStart and DateEnd)			
Setup			
*Load the exchange set **Settings** with the following settings:* *Select Display Category Other* *Select Symbolized Boundaries* *Select Simplified Point Symbols = false* *Safety Contour value to 10 m* *Safety Depth value to 10 m* *Select Highlight date dependent* *Ensure that the viewing date is set to the current date and time (any date after 20231201).*			
Action			
Centre the display on position 32°36.450'S 61°20.900'E and then zoom in to a scale of 1:20,000.			
Results			
Confirm that the feature displays as in the image below: 			

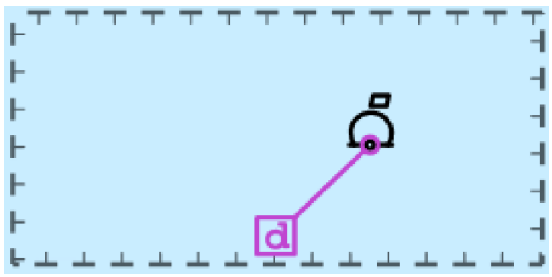
Test Reference	DateDependentFeatures2	**IHO Reference**	S-98 C-7.2.16
Test description			
Display of date dependent features, set date. (DateStart and DateEnd)			
Setup			
As for test DateDependentFeatures1 *Select Highlight date dependent* *Ensure that the viewing date is set to* ***18.02.2022***			
Action			
As for test DateDependentFeatures1			
Results			
Confirm that the feature displays as in the image below and that a permanent indication is shown as specified in ***S-98 XXX-XXX****:*  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-98* ***XXX-XXX****.*			

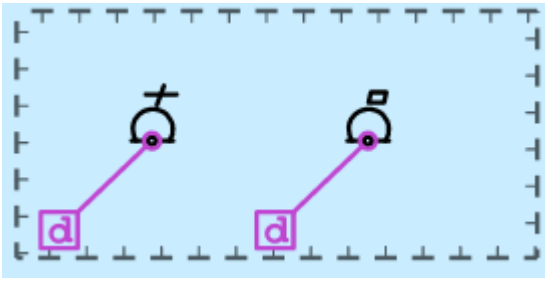
Test Reference	DateDependentFeatures3 3.3.3.1 c)	**IHO Reference**	S-98 C-7.2.16
Test description			
Display of date dependent features, date range. (DateStart and DateEnd)			
Setup			
As for test DateDependentFeatures2 *Set the viewing date range as follows:* *Start viewing date= 01.02.2022* *End viewing date= 01.12.2022*			
Action			
As for test DateDependentFeatures1			
Results			
Confirm that the feature displays as in the image below and that a permanent indication is shown as specified in S-98 XXX-XXX:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-98 XXX-XXX.*			

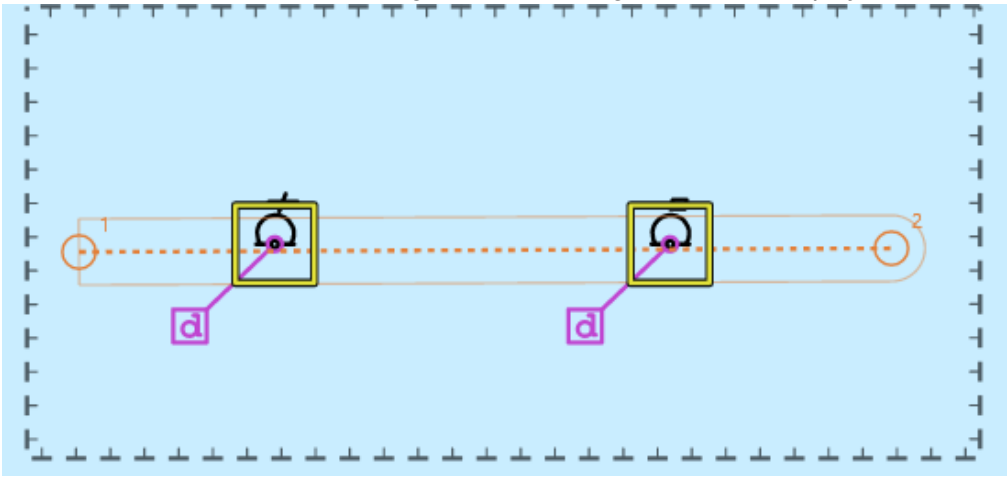
Test Reference	DateDependentFeatures4	**IHO Reference**	S-98 C-7.2.16
Test description			
Route checking of date dependent features, date range. (DateStart and DateEnd)			
Setup			
As for test DateDependentFeatures3 *Select scale 1:10 000*			
Action			
As for test 3.3.3.1 a) *Create a route from 32°36.425'S 61°20.335'E to 32°36.425'S 61°21.400'E with a cross track distance of 0.10NM set for Starboard and for Port.*			
Results			
Check the route and confirm that the following indications are given and the display is as shown:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-98 XXX-XXX.*			

3.3.3.2 Periodic Date Range on buoys

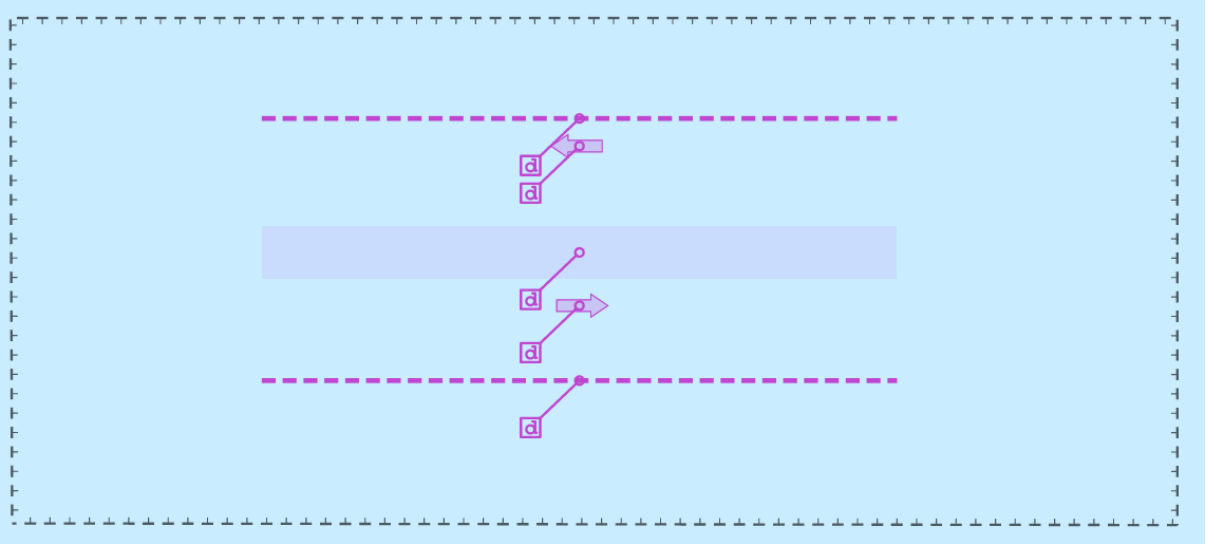
Test Reference	PeriodicDateRange1	**IHO Reference**	S-98 C-7.2.16
Test description			
Display of date dependent features, current date. (Periodic Date Range)			
Setup			
*Load the exchange set **Settings** with the following settings:* *Select Display Category Other* *Select Symbolized Boundaries* *Select Simplified Point Symbols = false* *Safety Contour value to 10 m* *Safety Depth value to 10 m* *Select Highlight date dependent* *Ensure that the viewing date is set to the 01.11.2023*			
Action			
Centre the display on position 32°36.450'S 61°21.900'E and then zoom in to a scale of 1:20,000.			
Results			
Confirm that the feature displays as in the diagram below:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-98 XXX-XXXX.*			

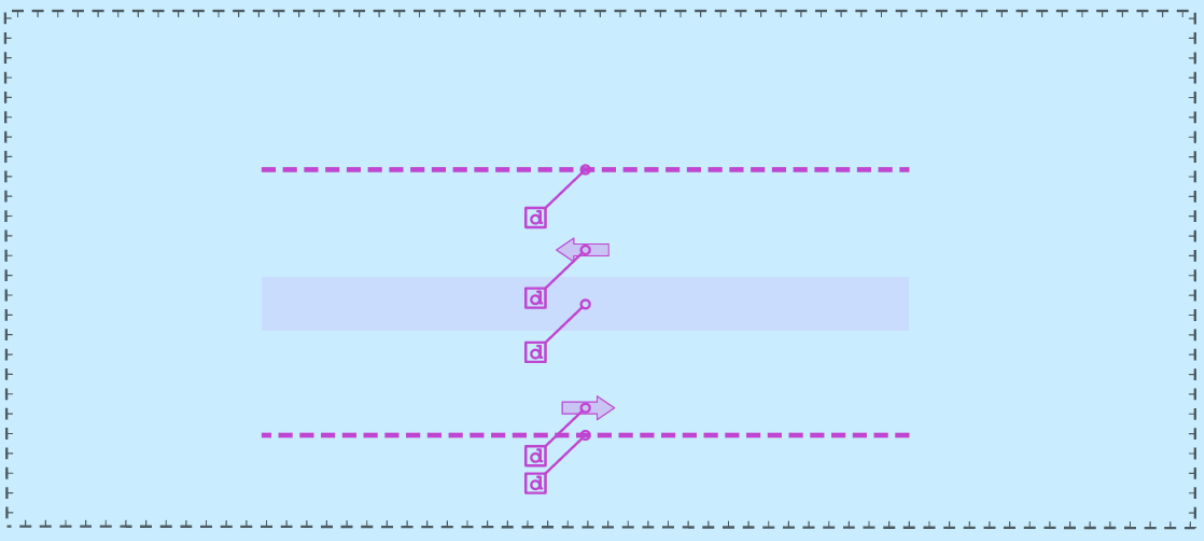
Test Reference	PeriodicDateRange2	**IHO Reference**	S-98 C-7.2.16
Test description			
Display of date dependent features, set date. (Periodic Date Range)			
Setup			
As for test PeriodicDateRange1 *Select Highlight date dependent* *Ensure that viewing date is set to 18.03.2013*			
Action			
As for test PeriodicDateRange1			
Results			
Confirm that the feature displays as in the image below and that a permanent indication is shown as specified in S-98 XXX-XXX:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-98 XXX-XXX.*			

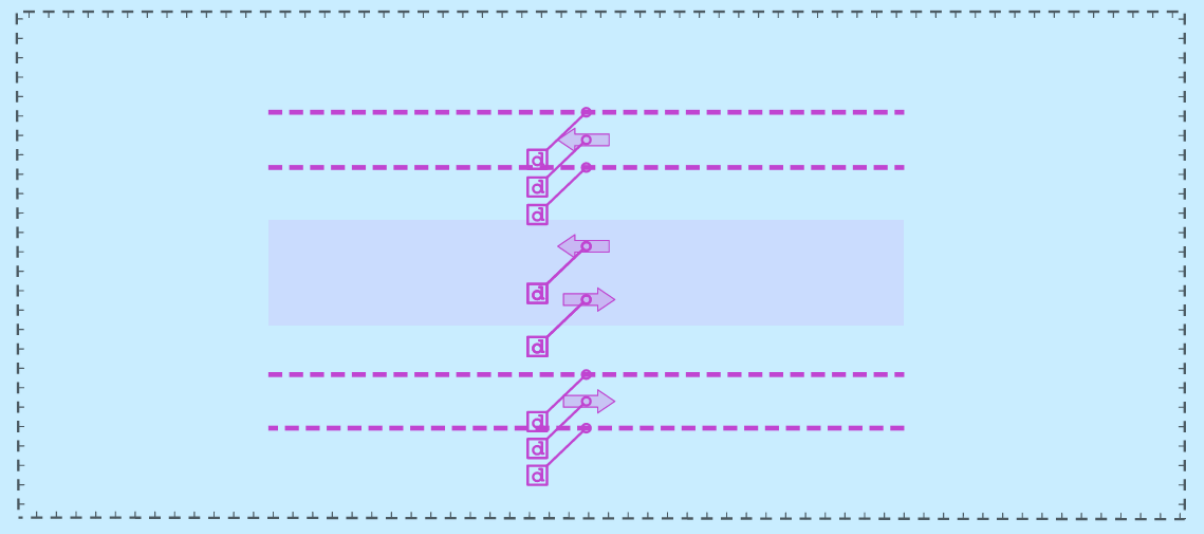
Test Reference	PeriodicDateRange3	IHO Reference	S-98 C-7.2.16
Test description			
Display of date dependent features, date range. (Periodic Date Range)			
Setup			
As for test PeriodicDateRange2 *Set the viewing date range as follows:* *Start viewing date = 01.02.2022* *End viewing date = 14.11.2022*			
Action			
As for test PeriodicDateRange1			
Results			
Confirm that the feature displays as in the image below and that a permanent indication is shown as specified in S-98 XXX-XXX:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-98 XXX-XXX.*			

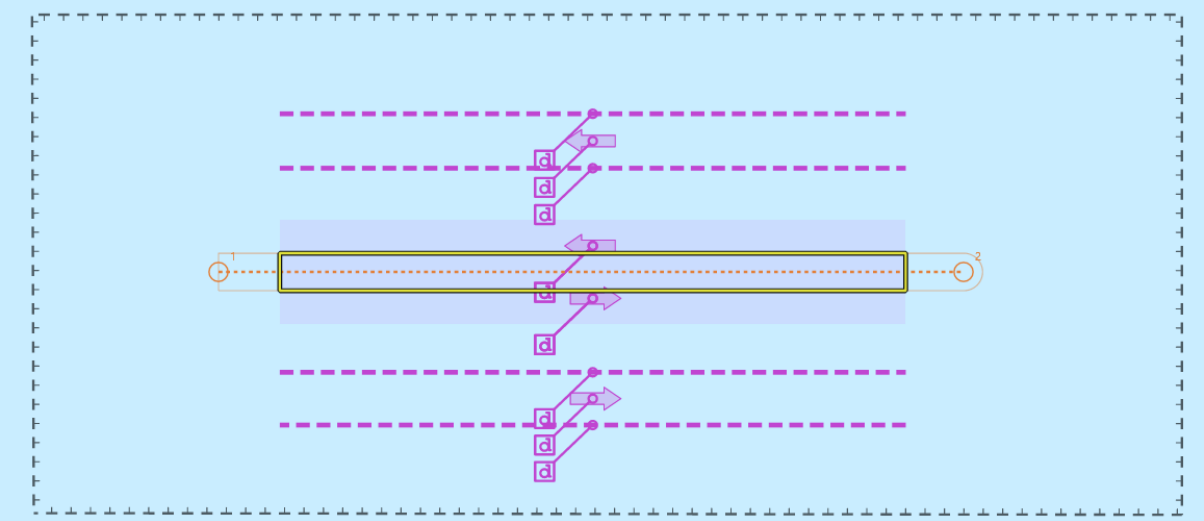
Test Reference	PeriodicDateRange4	IHO Reference	S-98 C-7.2.16
Test description			
Route checking of date dependent features, date range. (Periodic Date Range)			
Setup			
As for PeriodicDateRange3 *Select scale 1:10 000*			
Action			
As for test PeriodicDateRange1 *Create a route from 32°36.425'S 61°21.400'E to 32°36.425'S 61°22.500'E with a cross track distance of 0.10NM set for Starboard and for Port.*			
Results			
Check the route and confirm that the following indications are given and the display is as shown:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-98 XXX-XXX.*			

3.3.3.3 Fixed Date Range on Traffic Separation Schemes (TSS)

Test Reference	FixedDateRange1	IHO Reference	S-98 C-7.2.16
Test description			
Display of date dependent features, current date. Fixed Date Range			
Setup			
*Load the exchange set **Settings** with the following settings.* *Select Display Category Other* *Select Symbolized Boundaries* *Select Simplified Point Symbols = false* *Safety Contour value to 10 m* *Safety Depth value to 10 m* *Select Highlight date dependent* *Ensure that the viewing date is set to the current date and time (any date after 20231201).*			
Action			
Centre the display on position 32°35.300'S 61°21.380'E and then zoom in to a scale of 1:20,000.			
Results			
Confirm that the feature displays as in the image below: 			

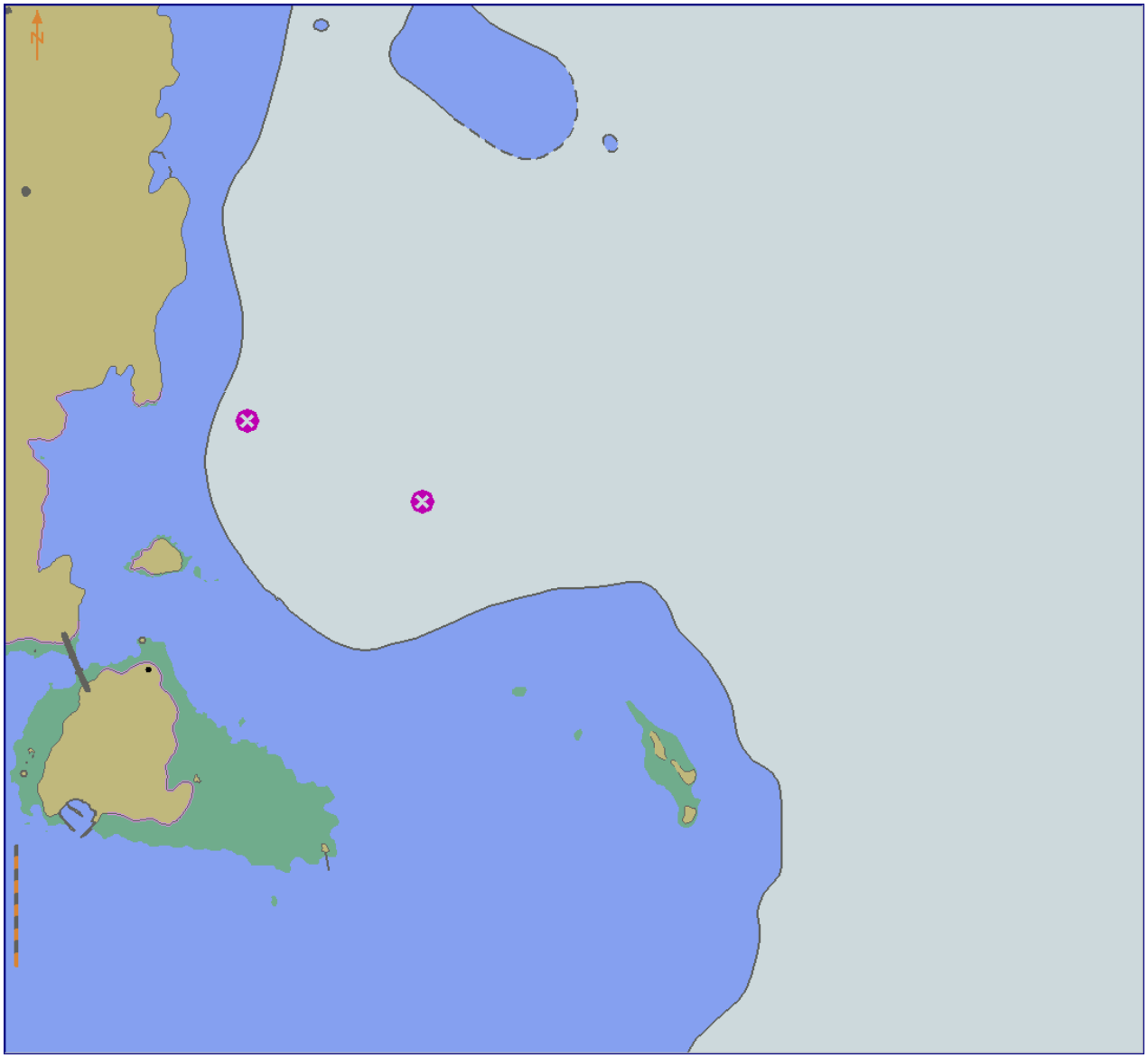
Test Reference	FixedDateRange2	IHO Reference	S-98 C-7.2.16
Test description			
Display of date dependent features, set date. (Fixed Date Range)			
Setup			
As for test FixedDateRange1 *Select Highlight date dependent* *Ensure that viewing date is set to 30.11.2023*			
Action			
As for test 3.3.3.3 a)			
Results			
Confirm that the feature displays as in the image below and that a permanent indication is shown as specified in S-98 XXX-XXX:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-98 XXX-XXX.*			

Test Reference	FixedDateRange3	IHO Reference	S-98 C-7.2.16
Test description			
Display of date dependent features, date range. (Fixed Date Range)			
Setup			
As for test FixedDateRange2 *Set the viewing date range as follows:* *Start viewing date = 01.11.2023* *End viewing date = 01.12.2023*			
Action			
As for test FixedDateRange1			
Results			
Confirm that the feature displays as in the image below and that a permanent indication is shown as specified in S-98 XXX-XXX:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-98 XXX-XXX.*			

Test Reference	FixedDateRange4	IHO Reference	S-98 C-7.2.16
Test description			
Route checking of date dependent features, date range. (Periodic Date Range)			
Setup			
As for test FixedDateRange3			
Action			
As for test FixedDateRange1 *Create a route from 32°35.325'S 61°20.800'E to 32°35.325'S 61°21.960'E with a cross track distance of 0.20NM set for Starboard and for Port.*			
Results			
Check the route and confirm that the following indications are given and the display is as shown:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-98 XXX-XXX.*			

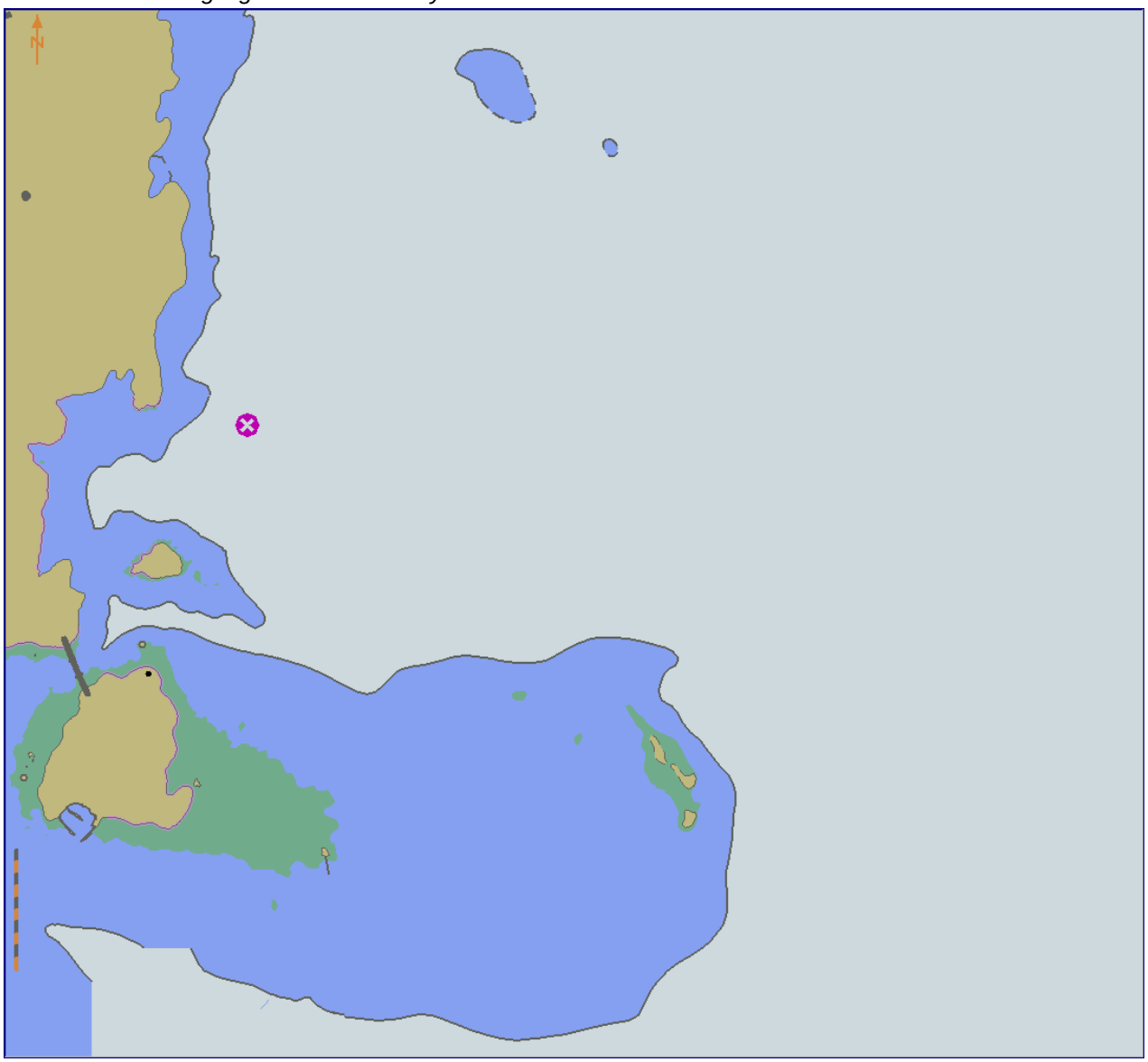
3.3.4 Safety contour

Test Reference	SafetyContourDisplay1	IHO Reference	S-98 C-7.2.5
Test description			
Display of default safety contour			
Setup			
Switch on EUT without setting Safety Contour value (factory default setting). *Load all datasets from the exchange set **PowerUp***			
Action			
Display dataset 101AA00X0000.000 at compilation scale (1:52 000), select Display Base.			
Results			
The Safety Contour value must be set to 30 m and the 30 m contour in chart 101AA00X0000.000 must be displayed as Safety Contour (thick grey line as per portrayal catalogue).			

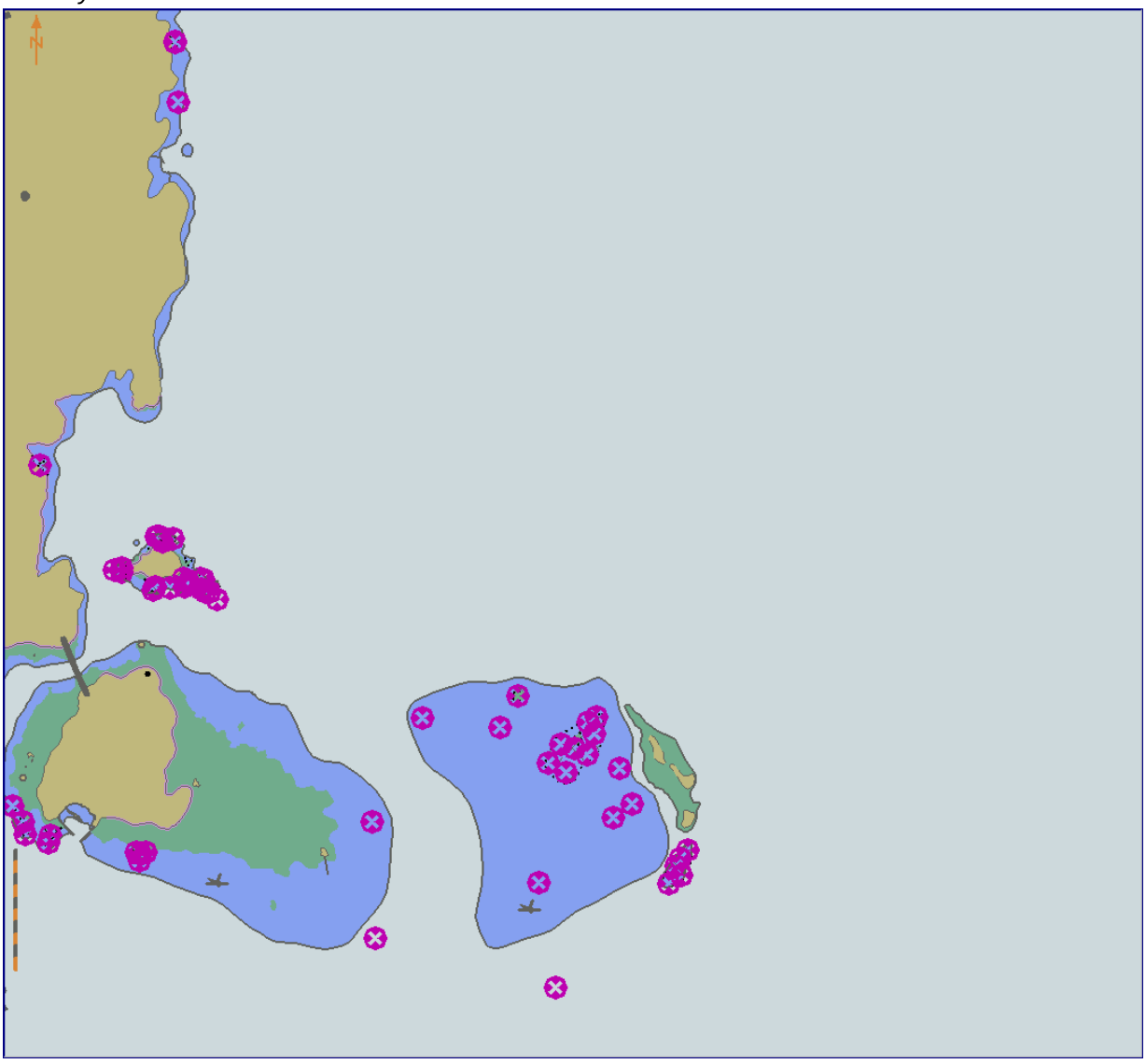


tbd

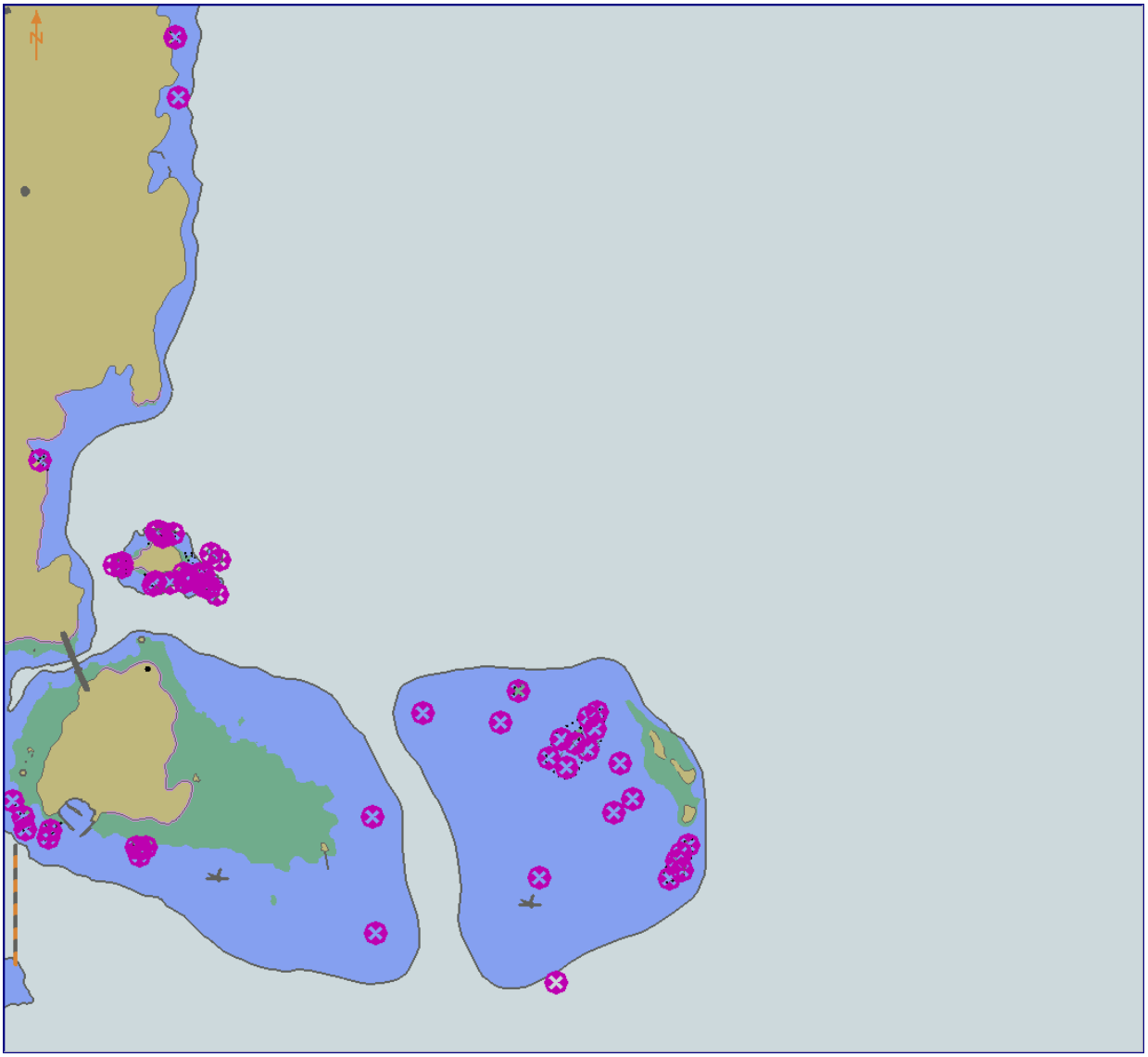
Test Reference	SafetyContourDisplay2	IHO Reference	S-98 C-7.2.5
Test description			
Display of safety contour			
Setup			
As for test SafetyContourDisplay1			
Action			
1. Select a Safety Contour value of 15 m. None of the ENCs (with the exception of 101AA00X01SE.000) have a 15 m contour. *2. Other values should also be investigated. The large scale charts (i.e. 101AA00*****.000) contain 0, 2, 5, 10, 20m contours, and the contour intervals on the smaller scale chart (i.e. 101AA00X0000.000 are 0, 2, 5, 10, 20, 30, 50, 100, 200, 300, and 400m.*			
Results			
1. In dataset 101AA00X01SE.000 the 15 m contour and in the other datasets the 20m contour must be highlighted as the safety contour. *2. If the selected value of Safety Contour is not available as a depth contour in the chart, the next deeper contour must be highlighted as the safety contour.*			



tbd

Test Reference	SafetyContourDisplay3	IHO Reference	S-98 C-7.2.5
Test description			
Display of Safety Contour and isolated dangers within the safe water enclosed by the ship's safety contour.			
Setup			
As for test SafetyContourDisplay1			
Action			
Select Shallow water dangers for display *1. Set the Safety Contour value to 5 m* *2. Set the Safety Contour value to 10 m.*			
Results			
The Safety Contour must be emphasised and the isolated dangers within the unsafe water enclosed by the ship's Safety Contour must be displayed as shown in the image below *1. Safety Contour set as 5 m*  ***tbd***			

2. Safety Contour set as 10 m



tbd

Test Reference	SafetyContourDisplay4	IHO Reference	S-98 C-7.2.5

Test description

If the equipment under test supports four colour depth shades the following test shall also be performed.

Display of Safety Contour and isolated dangers within the safe water enclosed by the ship's Safety Contour using four shades for depth areas.

Setup

As for test SafetyContourDisplay1

Action

Select Shallow water dangers for display

Select Four shades

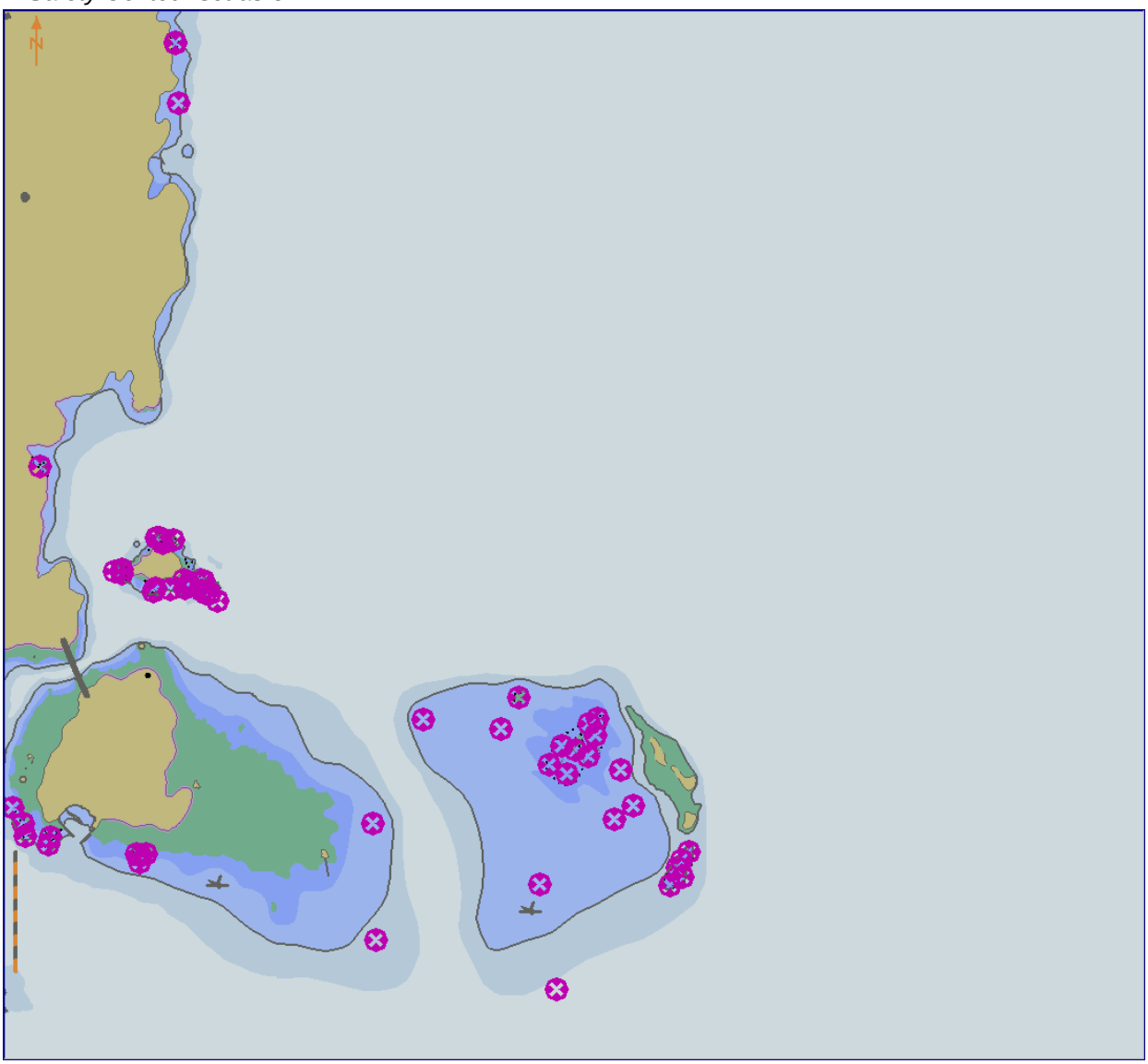
1. Set the Safety Contour value to 5 m (shallow contour 2 m, deep contour 10 m).

2. Set the Safety Contour value to 10 m (shallow contour 5 m, deep contour 20 m).

Results

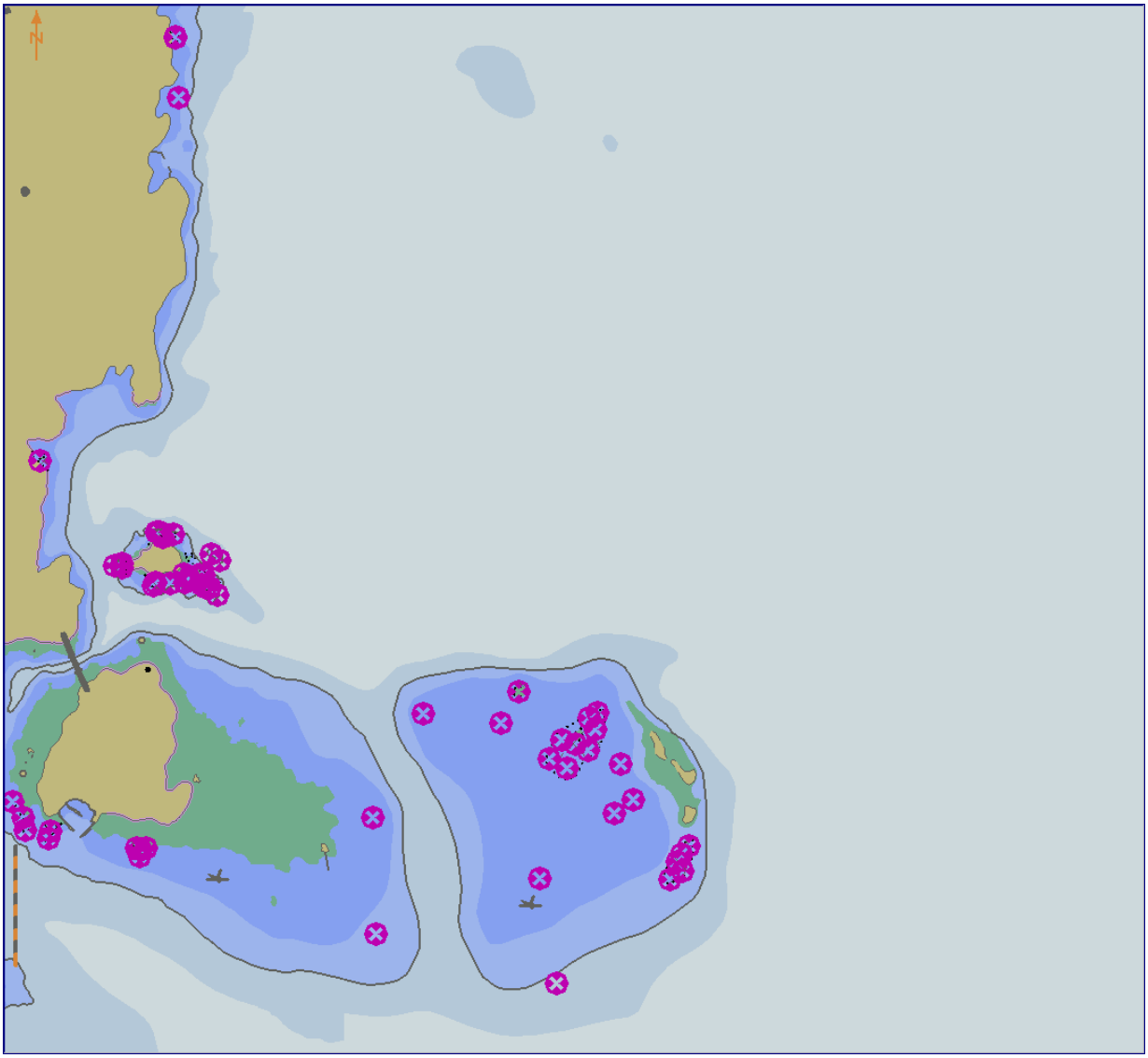
The Safety Contour must be emphasised and the isolated dangers within the unsafe water enclosed by the ship's Safety Contour must be displayed as shown in the image below

1. Safety Contour set as 5 m



tbd

2. Safety Contour set as 10 m



tbd

3.4 Display of User Selected Safety Contour.

3.4.1 Setting User Selected Safety Contour.

Test Reference	UserSelectedSafetyContour	**IHO Reference**	(S-100 Part 9/S-98)

Test description

This test ensures the user is able to set a user selected safety contour in areas of S-102 and S-104 coverage..

Setup

*Load the exchange set **PowerUp** with the following settings:*

- *Set User selected safety contour = 11.4m*
- *Set Water Level Adjustment = false*
- *Turn Interoperability to Level 2*

Action

1. Set ship's position to XX YY, Viewing Scale NN,000

Results

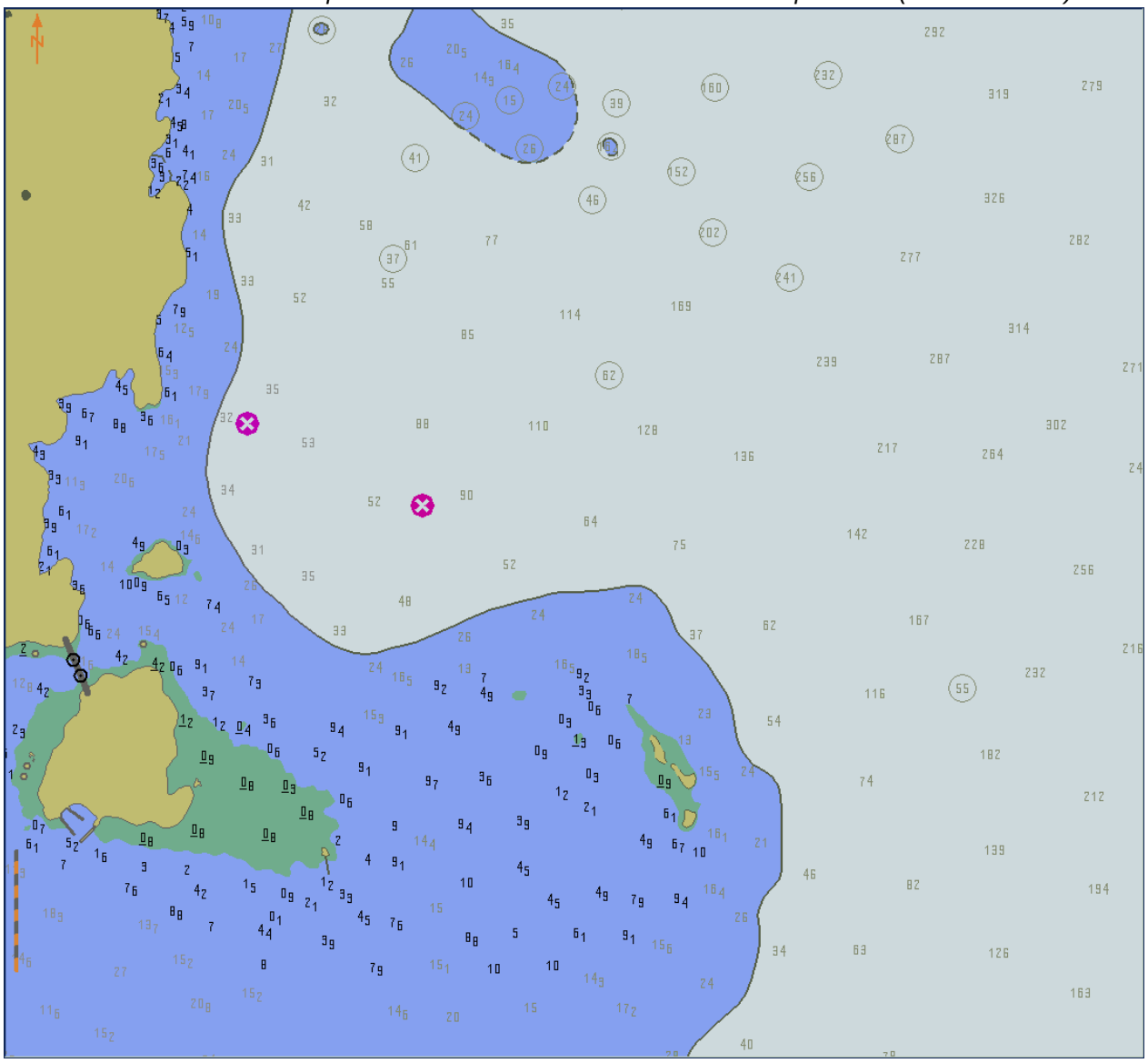
The ENC depth area is substituted for the S-102 values and a safety contour drawn delimiting the area deeper than 11.3m

Verify

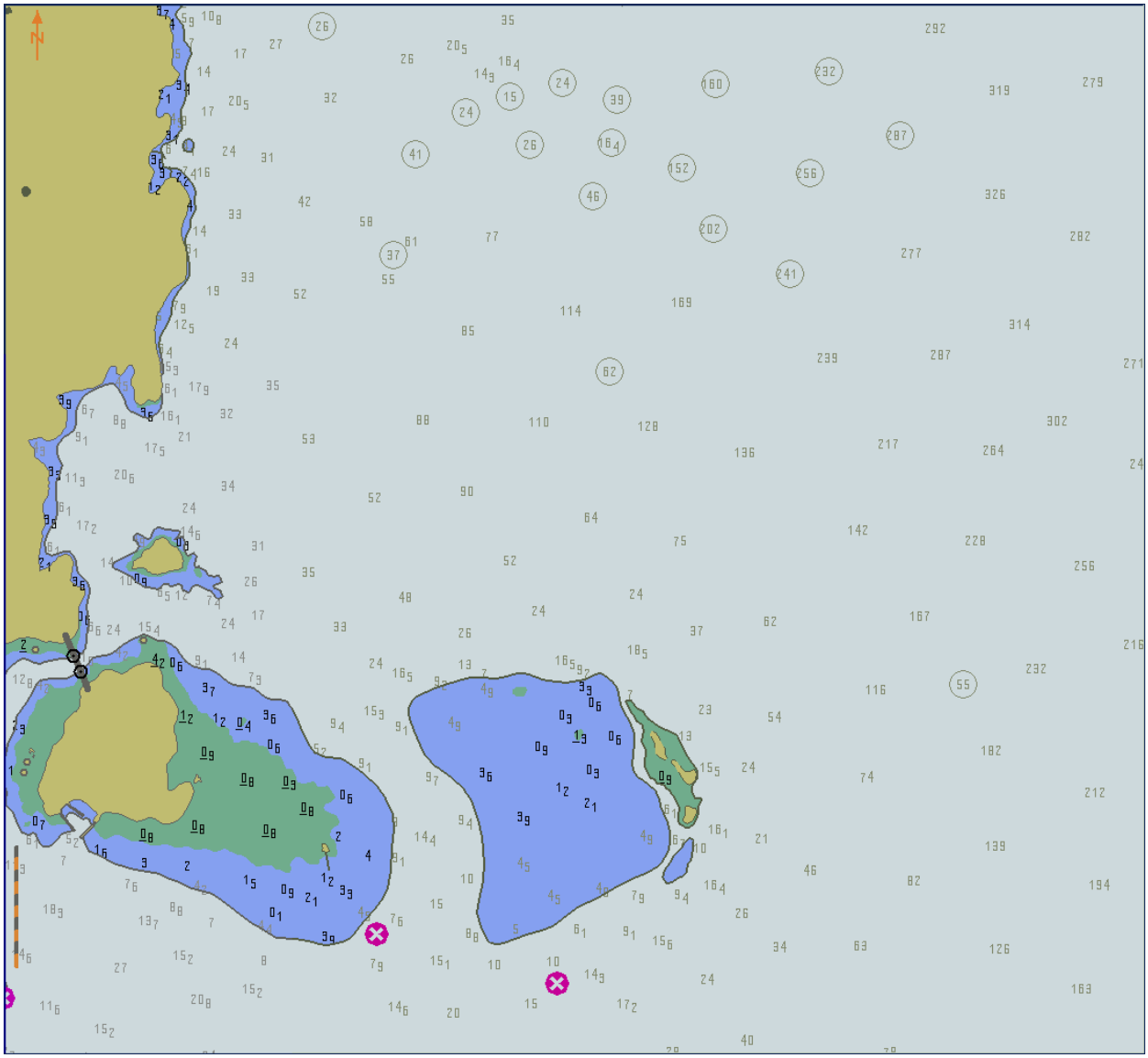
1. User is able to set a user defined safety contour
2. Verify portrayal of DepthArea, DredgedArea and DepthContours in area of S-102 coverage.

tbd

3.4.2 Safety depth

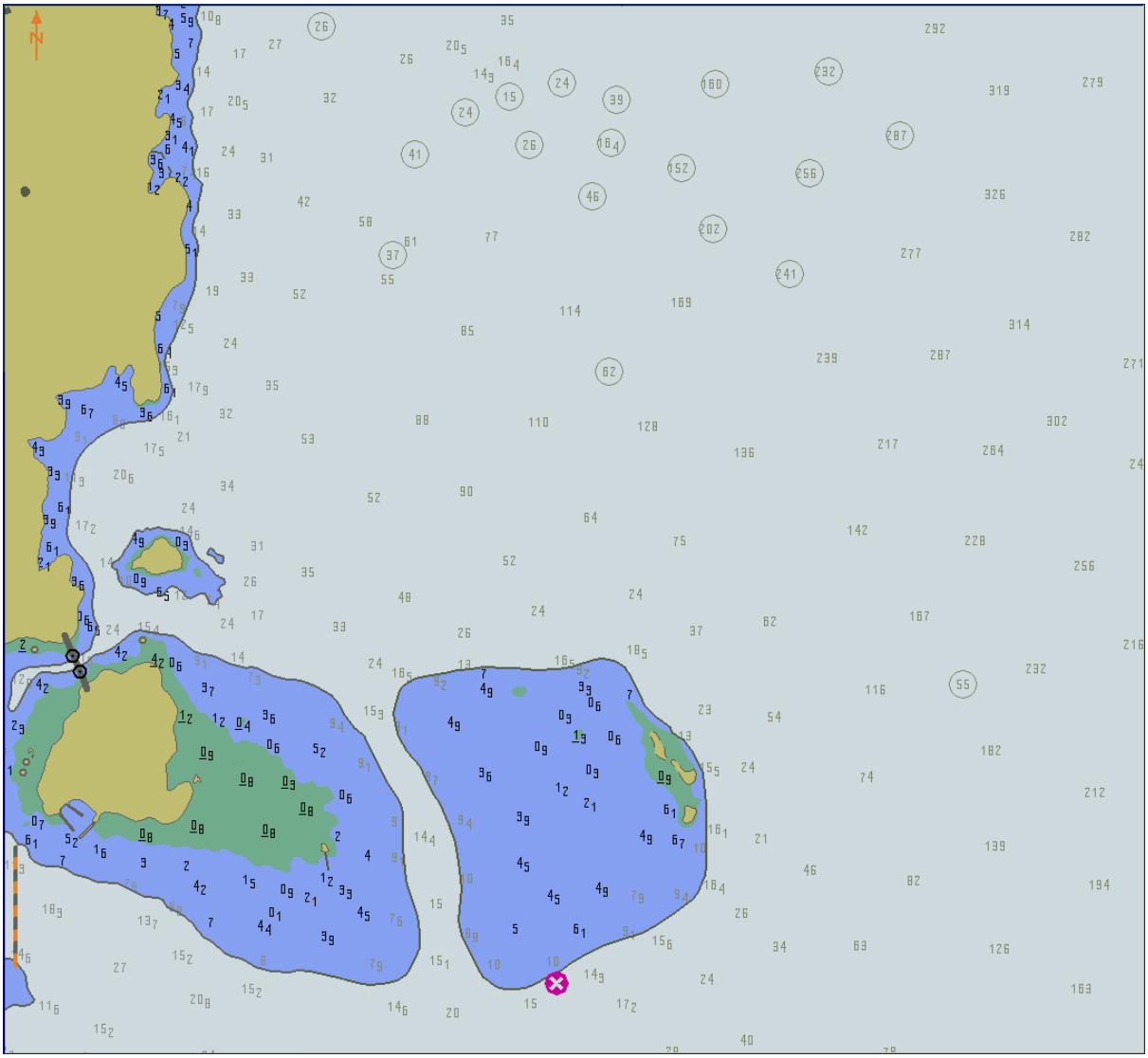
Test Reference	SafetyDepth	**IHO Reference**	
Test description			
Display of features with respect to value of safety depth			
Setup			
*Load the exchange set **PowerUp** with the following settings:* *Display of spot soundings shall be switched on.*			
Action			
1. Set the Safety Depth value to 10 m (Safety Contour 30 m). *2. Set the Safety Depth value to 4 m (Safety Contour 5 m).* *3. Set the Safety Depth value to 7 m (Safety Contour 10 m).* *4. Set the Safety Depth value to 12 m (Safety Contour 10 m).*			
Results			
1. The features shown with depth values shallower than 10 m must be emphasised (scale 1:52 000).  ***tbd***			

2. The features shown with depth values shallower than 4 m must be emphasised.



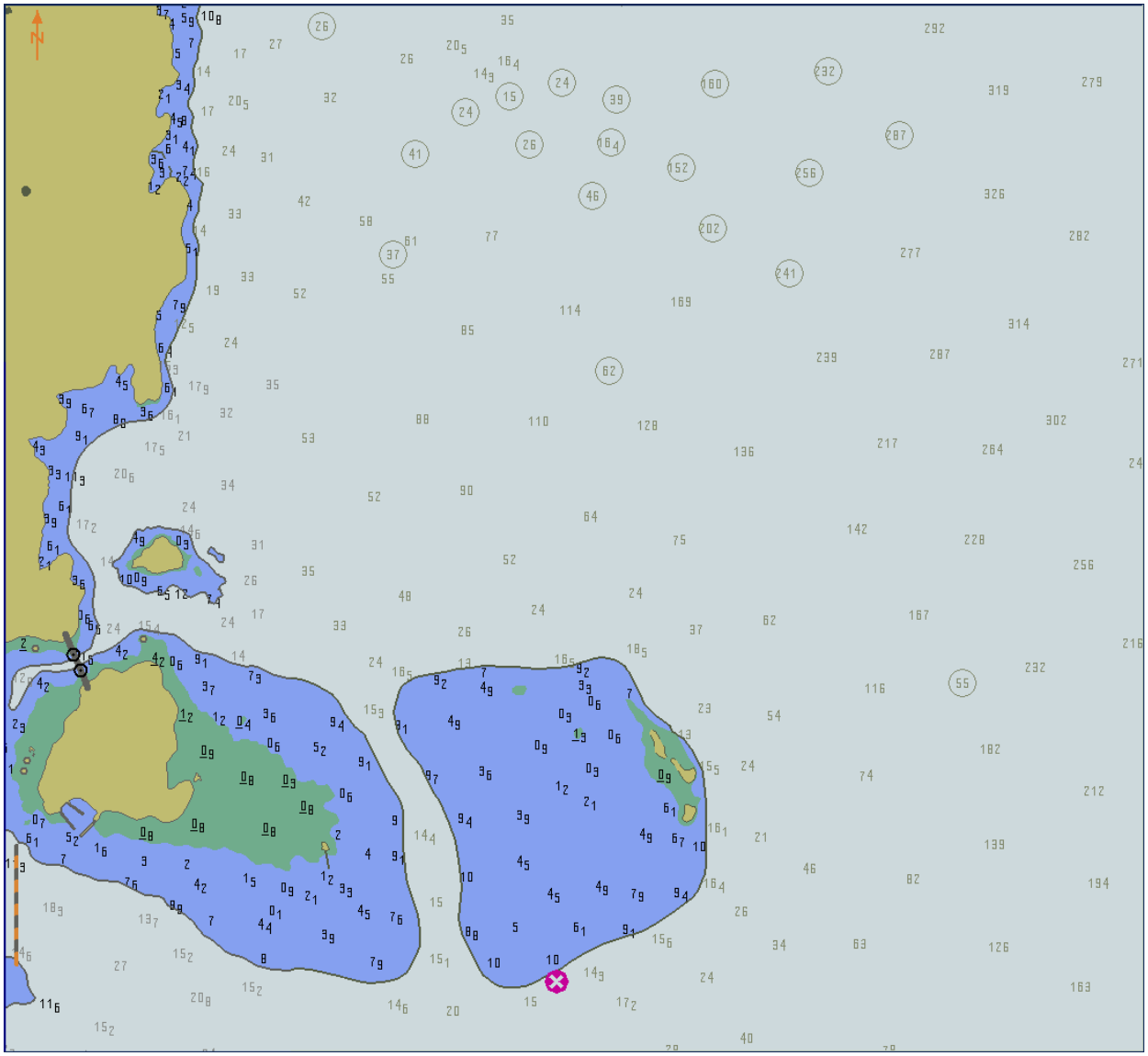
tbd

3. The features shown with depth values shallower than 7 m must be emphasised.



tbd

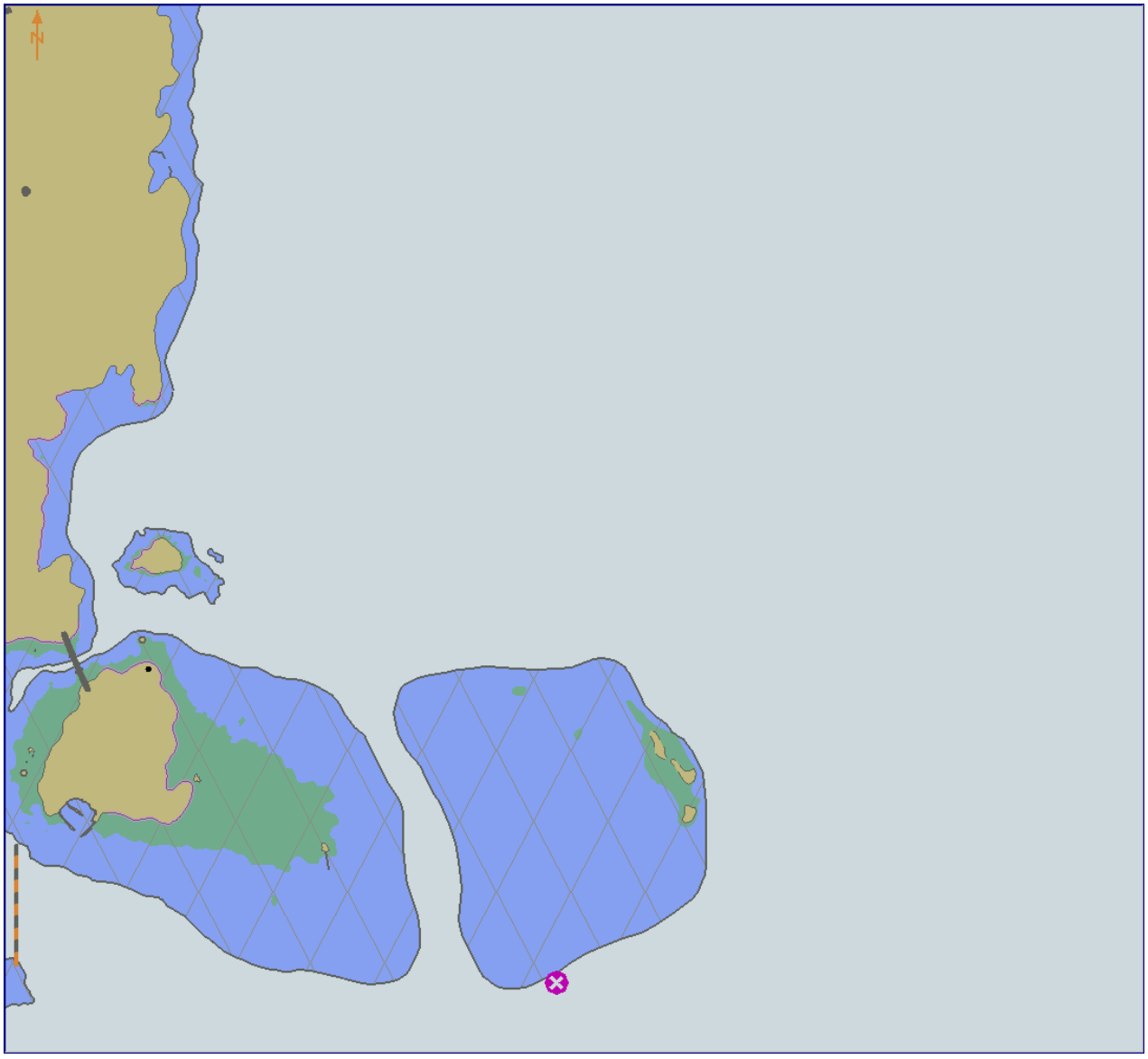
4. The spot soundings shallower than 12 m must be emphasised.



tbd

3.4.3 Shallow pattern

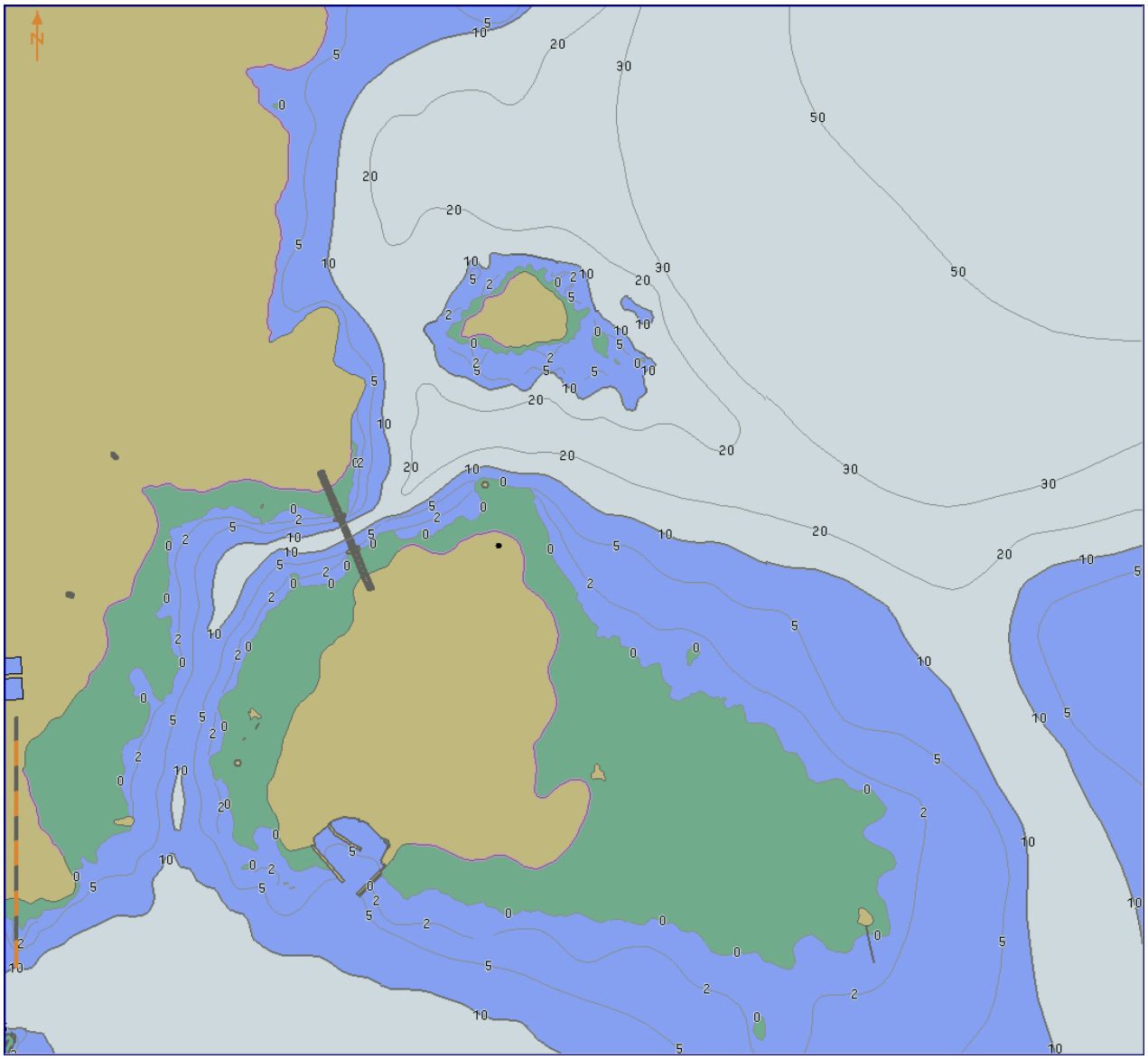
Test Reference	ShallowPattern	IHO Reference	S-98 C-12.9.5
Test description			
Display of shallow pattern.			
Setup			
*Load the exchange set **PowerUp** with the following settings:* *Set the Safety Contour value to 10 m* *Select Shallow Pattern*			
Action			
Display dataset 101AA00X0000.000 at maximum display scale (1:52 000), select Display Category Display Base			
Results			
Confirm that the diamond shallow pattern is displayed as follows:			



tbd

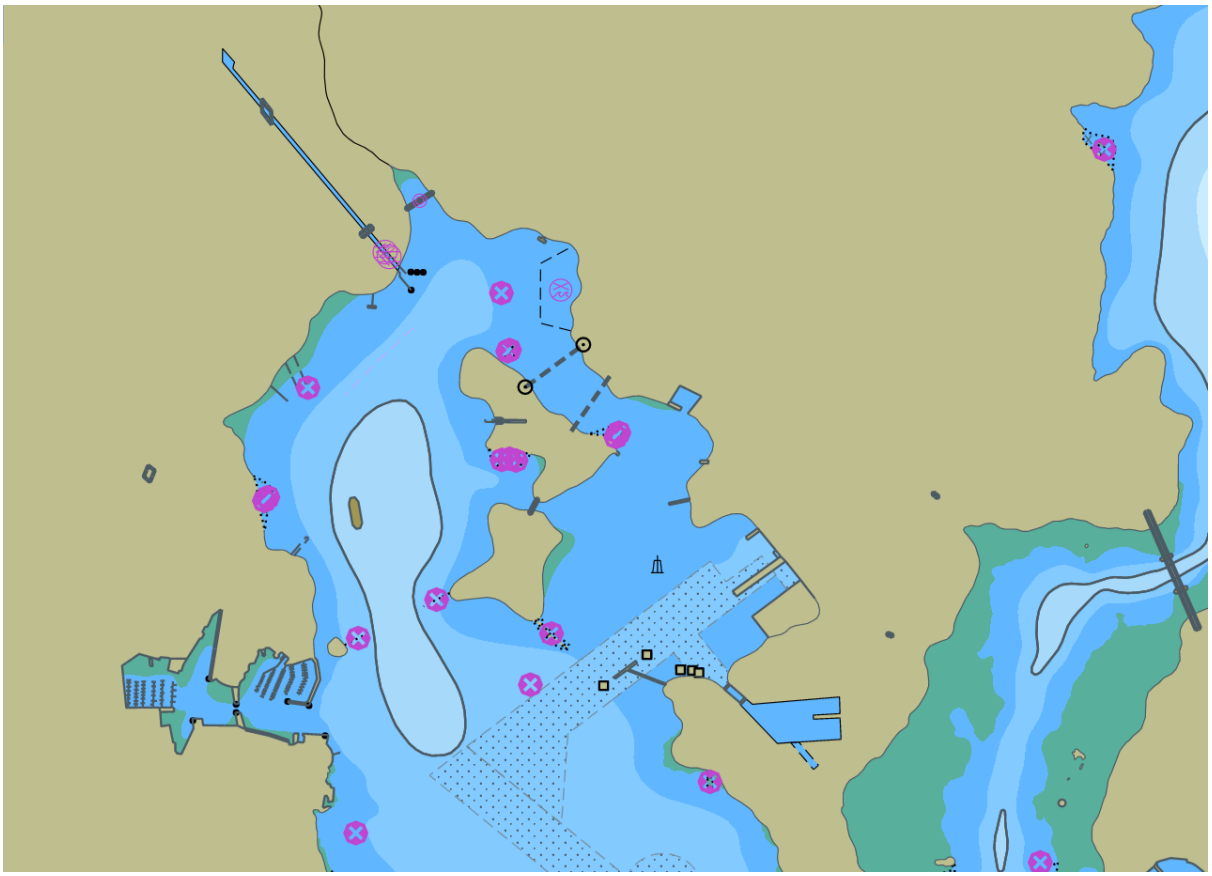
3.4.4 Contour labels

Test Reference	ContourLabels	IHO Reference	S-98 C-9.5.4
Test description			
Contour labels are an optional Mariners' selection. This test shall be performed, if the contour label option is provided.			
Setup			
*Load all datasets the exchange set **PowerUp** with the following settings:* *Set the Safety Contour to 10 m* *Select Display Category Display Base* *Select Colour Palette as "DAY"* *Select Symbolized Boundaries* *Select Simplified Point Symbols = false* *Select Other Depth contours* *Select Contour labels*			
Action			
Display dataset 101AA00X01NE.000 at maximum display scale (1:25 000)			
Results			
Confirm that the features display as follows			

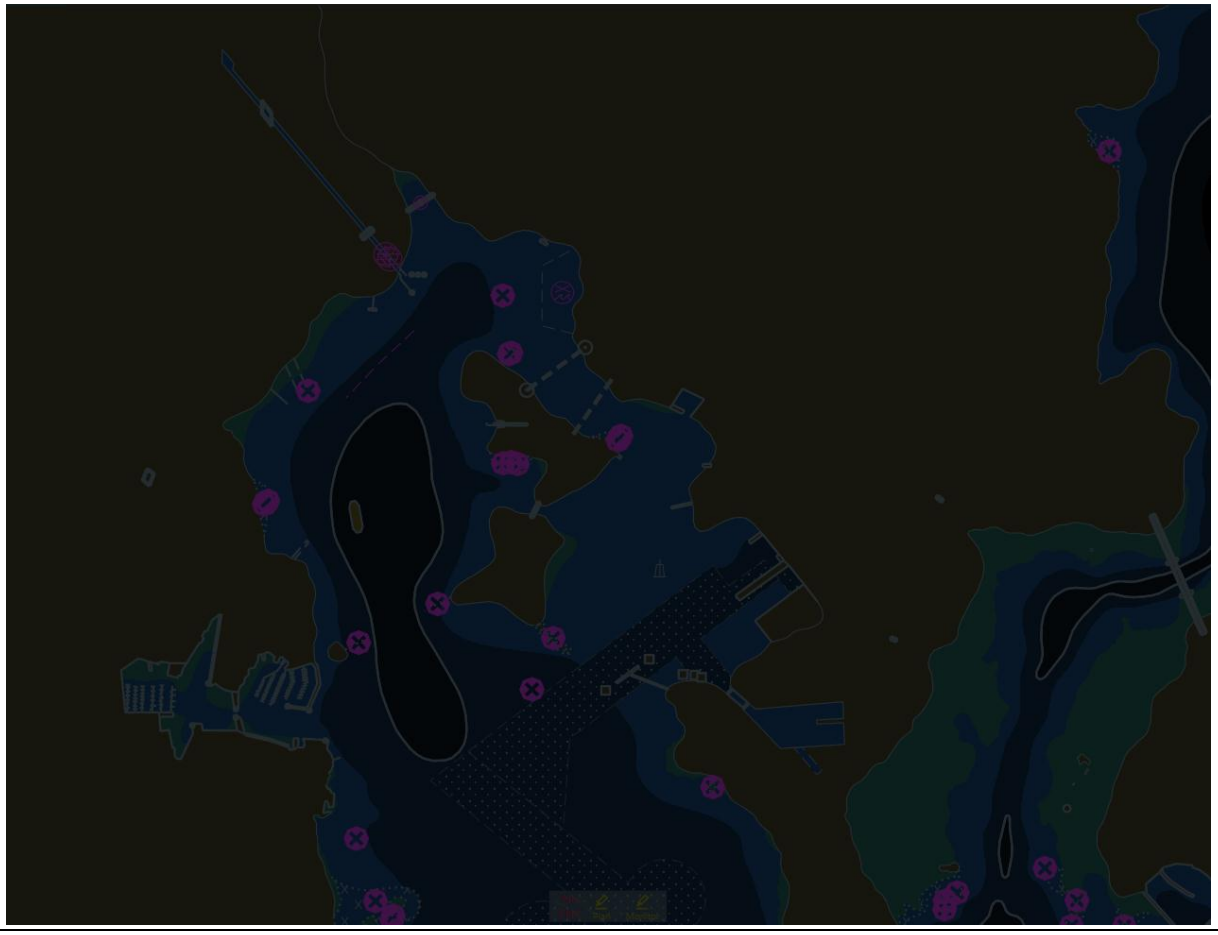


tbd

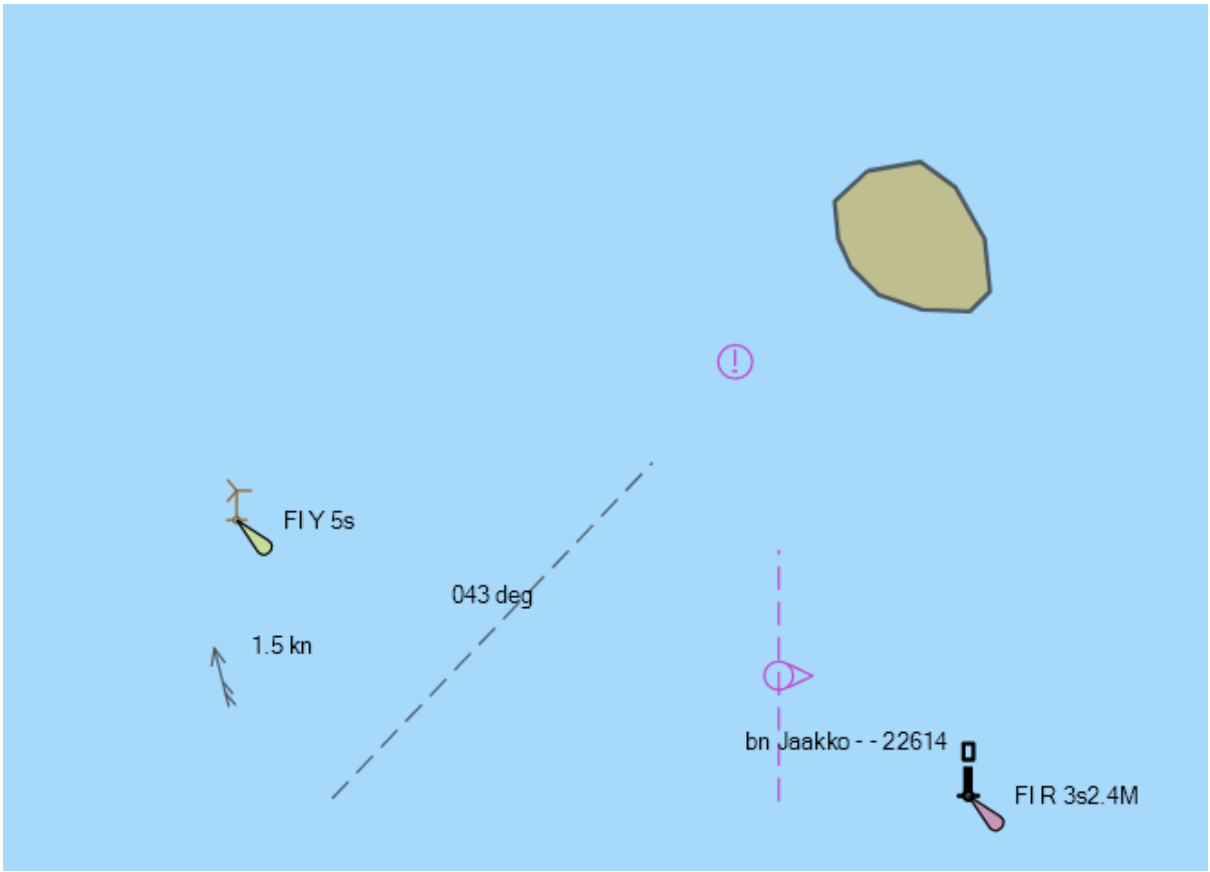
3.4.5 Colour palettes

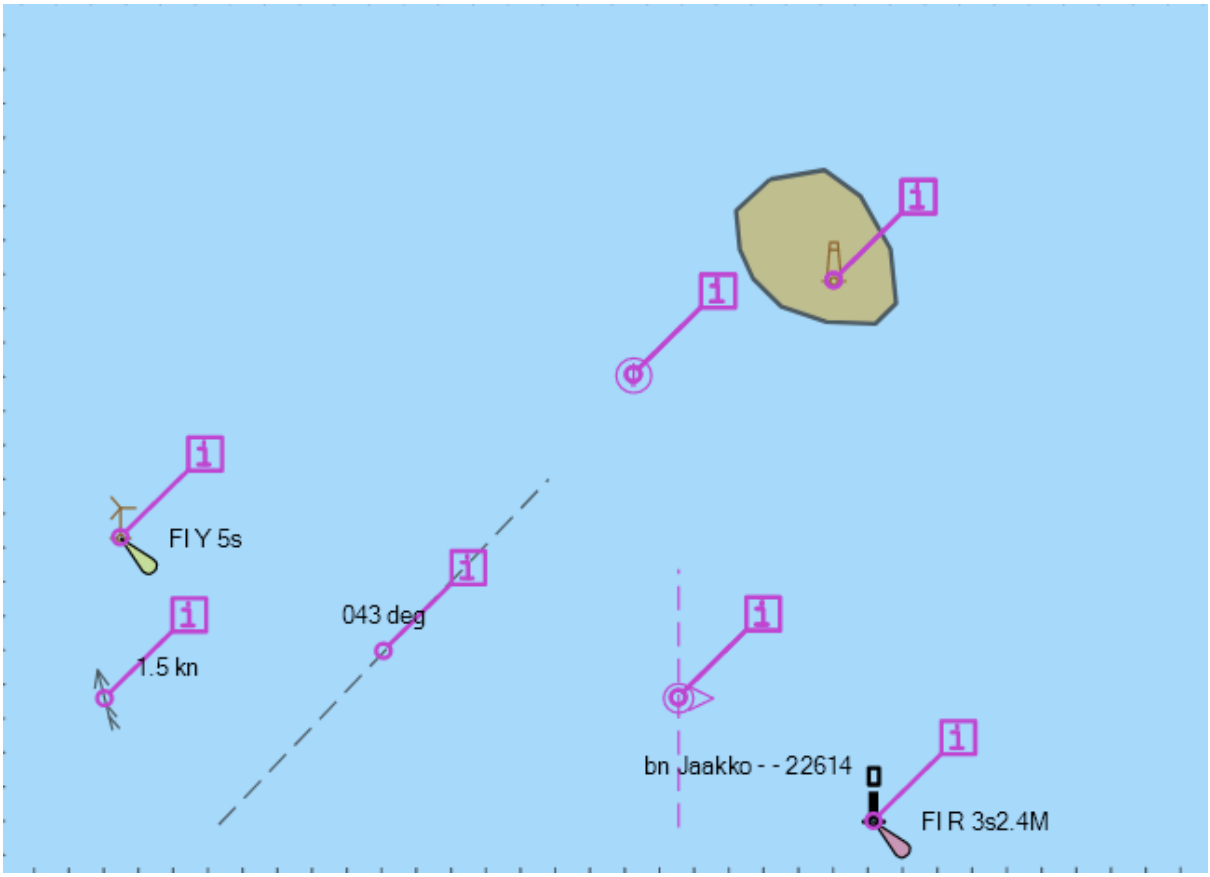
Test Reference	ColourPalettes1	IHO Reference	S-98 C-14.3
Test description			
Display of ENC in Day palette			
Setup			
*Load all datasets from the exchange set **PowerUp** with the following settings:* *Set the Safety Contour value to 10 m* *Set the Safety Depth to 10 m* *Set the Shallow contour to 5 m* *Set the Deep contour to 20 m* *Display Category Display Base* *Select Colour Palette **DAY*** *Select Symbolized Boundaries* *Select Depth Shades = 4* *Select Shallow Pattern*			
Action			
Display dataset 101AA00X01NW.000 at maximum display scale (1:25 000)			
Results			
Confirm that the features display as follows: 			

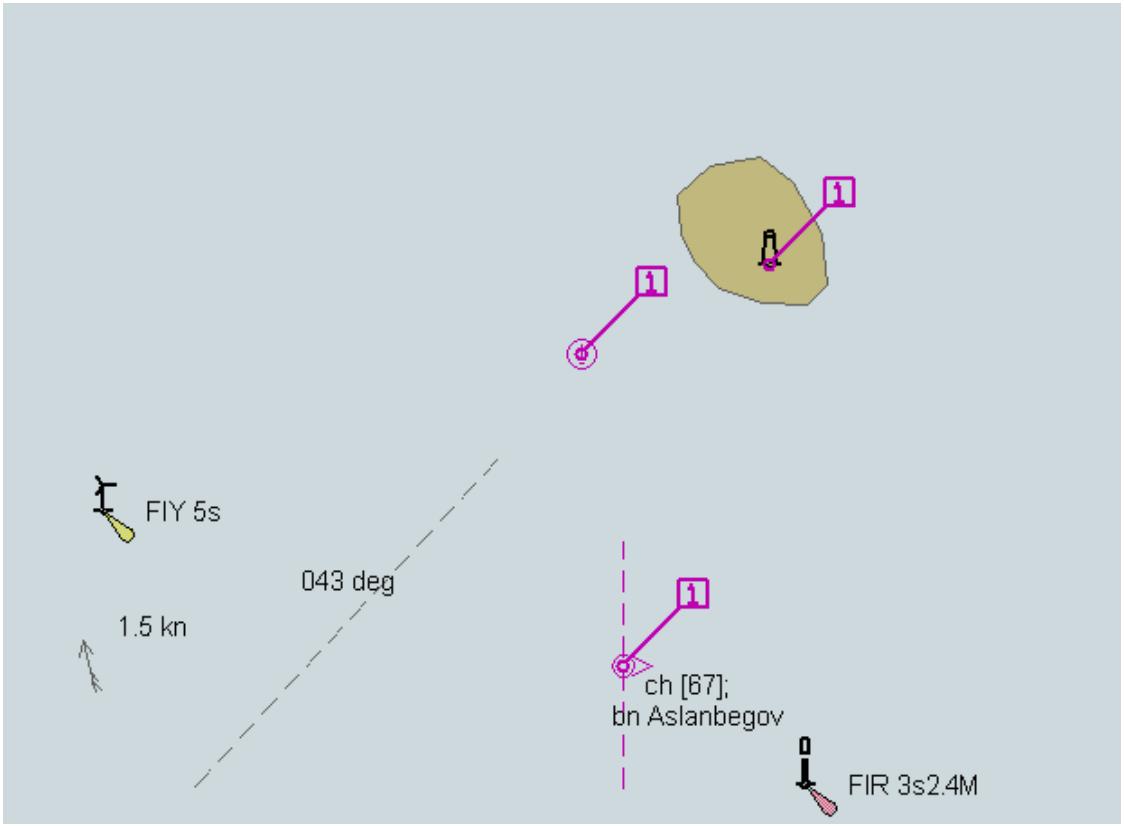
Test Reference	ColourPalettes2	**IHO Reference**	S-98 C-14.3
Test description			
Display of ENC in Dusk palette			
Setup			
As for test ColourPalettes1 *Colour Palette = "**DUSK**"*			
Action			
Display dataset 101AA00X01NW.000 at compilation scale (1:25 000)			
Results			
Confirm that the features display as follows:			

Test Reference	ColourPalettes3	**IHO Reference**	S-98 C-14.3
Test description			
Display of ENC in Night palette			
Setup			
As for test ColourPalettes1 *Colour Palette = "NIGHT"*			
Action			
Display dataset 101AA00X01NW.000 at maximum display scale (1:25 000)			
Results			
Confirm that the features display as follows: 			

3.4.6 Display of additional Chart Information Symbol

Test Reference	AdditionalInformation1	**IHO Reference**	
Test description			
*Display of additional chart information symbol (**Information**).*			
Setup			
*Load the exchange set **Settings** with the following settings:* *Select Display Category Other* *Select Symbolized Boundaries* *Select Simplified Point Symbols = false* *Select all Text groups* *Set Safety Contour value to 8 m* *Ensure that the system date is set to the current date and time.*			
Action			
Centre the display on position 32°34.000'S 61° 21.705'E and then zoom in to a scale of 1:20,000.			
Results			
Confirm that the features display as in the image below:  *Note: the display should show all of the features above without the chart information symbols.*			

Test Reference	AdditionalInformation2	IHO Reference	
Test description			
Display of additional chart information symbol (Information).			
Setup			
As for test AdditionalInformation1 *Select Highlight info*			
Action			
As for test AdditionalInformation1			
Results			
Confirm that the features display as in the image below: 			

Test Reference	AdditionalInformation3	IHO Reference	
Test description			
Display of additional chart information symbol (Information).			
Setup			
As for test 3.3.9 a) *Select Highlight document*			
Action			
As for test 3.3.9 a)			
Results			
Confirm that the features display as in the image below:  **tbd**			

3.4.7 Scale minimum

Test Reference	ScaleMinimum	IHO Reference	S-98 C-12.8

Test description

Disabling Scale Minimum using the Scale min context parameter

Setup

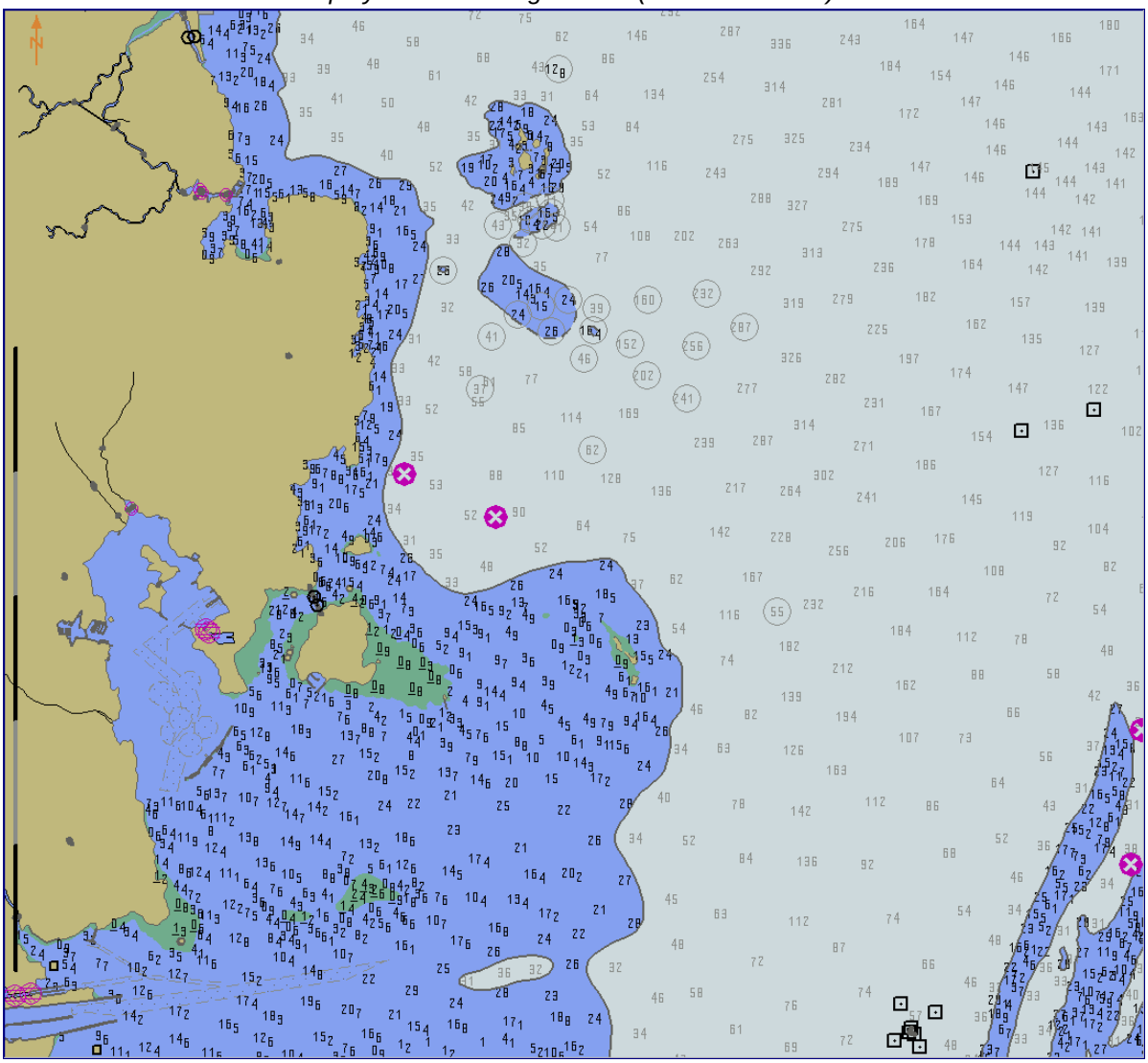
*Load the exchange set **PowerUp** with the following settings:*
Select Display Category Display Base
Set the Safety Contour value to 30 m
Set the Safety Depth value to 30 m
Select Symbolized Boundaries
Select Simplified Point Symbols = false
Select Spot soundings

Action

Centre the display on position 32°28.600'S 61° 02.800'E and then zoom in to a scale of 1:100 000.
1. Observe the display
*2. Select **Scale min***

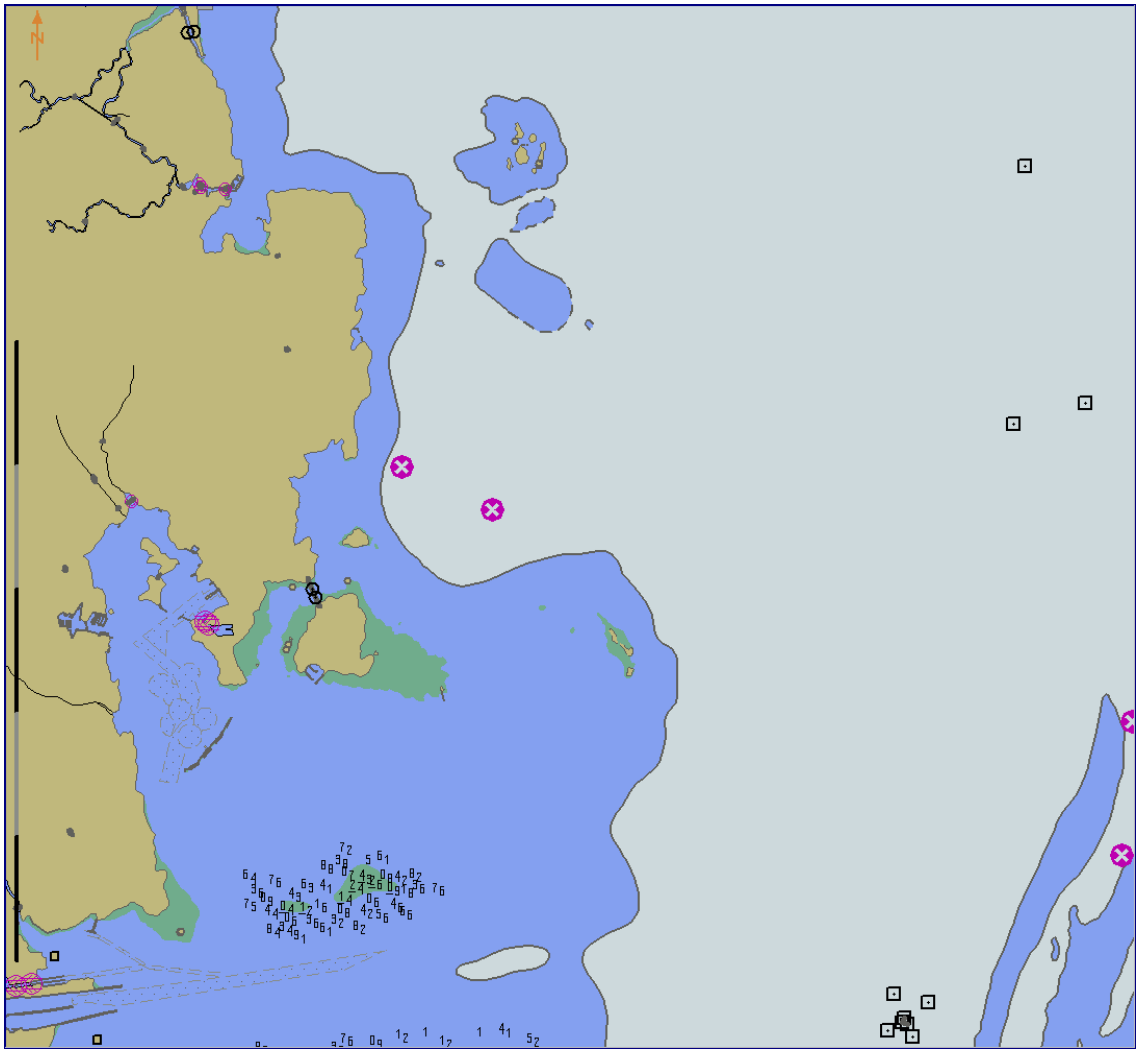
Results

1. Confirm that the features display as in the image below (scale 1:100 000):



tbd

2. After selecting Scale min confirm that the features display as in the image below:



tbd

3.4.8 Full Light Lines

Test Reference	FullLightLines	IHO Reference	S-98 C-9.8

Test description

Disabling Full light lines using the Full light lines Mariner's Selection

Setup

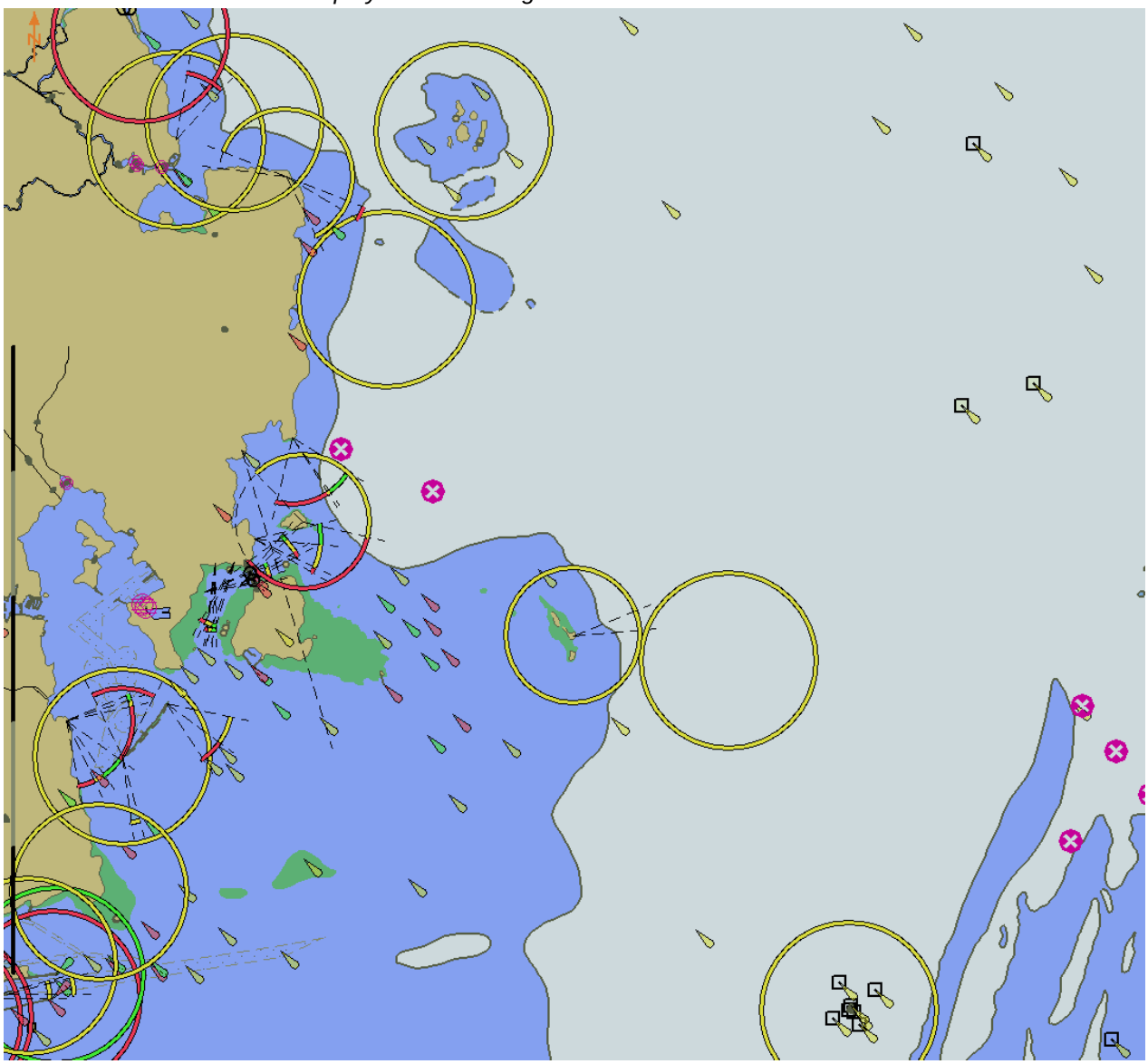
*Load the exchange set **PowerUp** with the following settings:*
Select Display Category Display Base
Set the Safety Contour value to 30 m
Set the Safety Depth value to 30 m
Select Symbolized Boundaries
Select Paper chart symbols
Select Lights

Action

Centre the display on position 32°29.000'S 61° 04.000'E and then zoom in to a scale of 1:100,000.
1. Observe the display
2.Select Full light lines

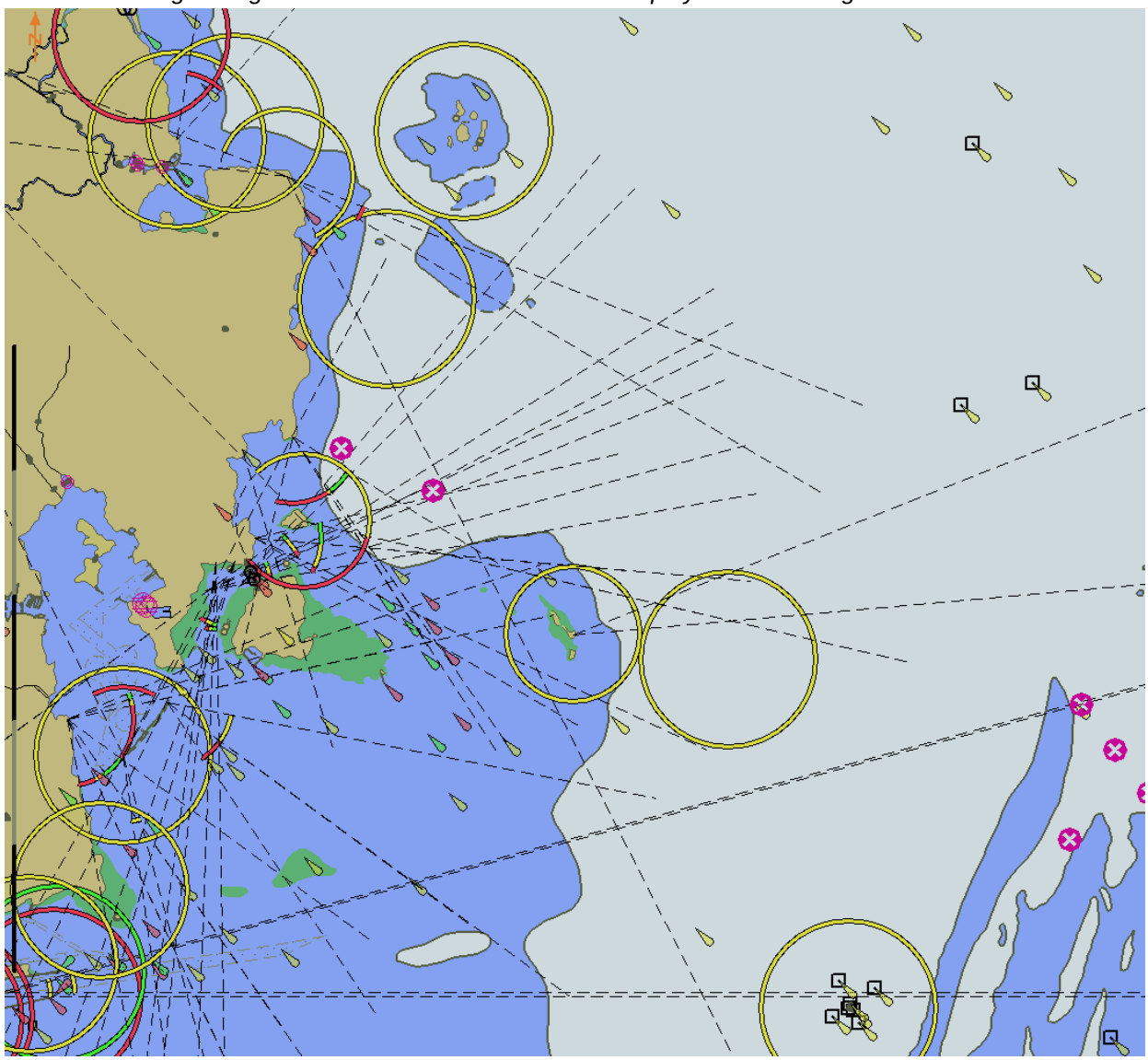
Results

1. Confirm that the features display as in the image below:



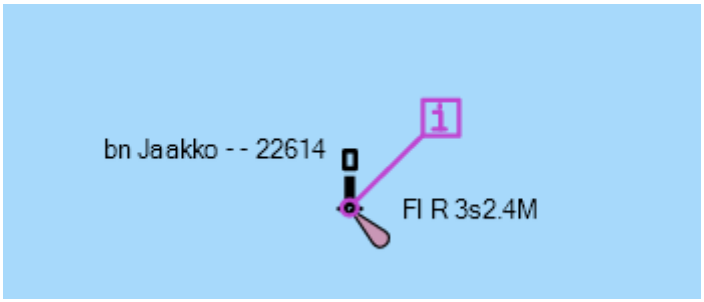
tbd

2. After selecting Full light lines confirm that the features display as in the image below:



tbd

3.4.9 Display of text in other languages

Test Reference	OtherLanguages	IHO Reference	S-98 C-12.10.2
Test description			
Selecting the display of text in other languages.			
Setup			
Load the following cell 3.3 Settings\ENC_ROOT\GB4X0001.000 with the following settings: *Select Display Category Other* *Select Symbolized Boundaries* *Select Simplified Point Symbols = false* *Select all Text groups* *Select Highlight Info*			
Action			
Centre the display on position 32°34.700'S 61° 22.300'E and then zoom in to a scale of 1:10 000. *1. Observe the display* *2.Select language setting "fra"*			
Results			
1. Confirm that the feature displays as in the image below: ***tbd*** *2. After selecting language "fra" confirm that the features display as in the image below:*  *Note: This feature has names in multiple languages.*			

3.4.10 Use of language packs.

Test Reference	LanguagePacks	**IHO Reference**	S-98 C-12.10.2
Test description			
This test ensures the ECDIS is capable of displaying text and catalogue entries in multiple languages.			
Setup			
- *Load exchange set **InitialPowerUp*** - *Load exchange set **LanguagePacks***			
Action			
Centre the display on position 32°34.700'S 61° 22.300'E and then zoom in to a scale of 1:10 000. *1. Observe the display* *2.Select language setting "fra"*			
Results			
Verify 1. Confirm that the pick report contains the following information: [**TBD]** 2. After selecting language "fra" confirm that the pick report contains the following information: [**TBD]**			

3.6 Display priority

3.6.1 Different priority

Test Reference	DifferentPriority	**IHO Reference**	S-98 C-7.2.9
Test description			
Different priority and different geometry			
Setup			
*Load the exchange set **DisplayPriorities1** (101AA002J5X0001.000)with the following settings:* • *Set the Safety Contour value to 30 m* • *Set Display Category Other* • *Text display = On* • *Shallow pattern = On* • *Information indication = On* • *Symbolized Boundaries = On* • *Simplified Symbols = Off*			
Action			
View the features at position 32°20.400'S 61°20.650' E scale 1:5000			
Results			
Confirm that items 1-6 display as shown in the graphic below:			

3.7 Portrayal of multiple datasets under Interoperability

3.7.1 Load invalid Interoperability Catalogue

Test Reference	CorruptInteroperabilityCatalogue	**IHO Reference**	S-98 C-7.2.9
Test description			
This test verifies that the ECDIS correctly rejects an inconsistent or corrupt interoperability catalogue.			
Setup			
Action			
*Load the exchange set **CorruptInteroperabilityCatalogue***			
Results			
Verify the installation of the interoperability catalogue is rejected and a suitable error message given to the end user.			

3.7.2 Load updated Interoperability Catalogue

Test Reference	UpdatedInteroperabilityCatalogue	**IHO Reference**	(S-100 Part 9/S-98)
Test description			
This test verifies that the ECDIS is able to load an updated interoperability catalogue.			
Setup			
Action			
*Load the exchange set **UpdatedInteroperabilityCatalogue***			
Results			

Verify the version of the interoperability catalogue installed on the ECDIS correspond to those in the following table:

Catalogue	***Version / Issue Date.***
Interoperability Catalogue	*2.0.0 / yyyymmdd*

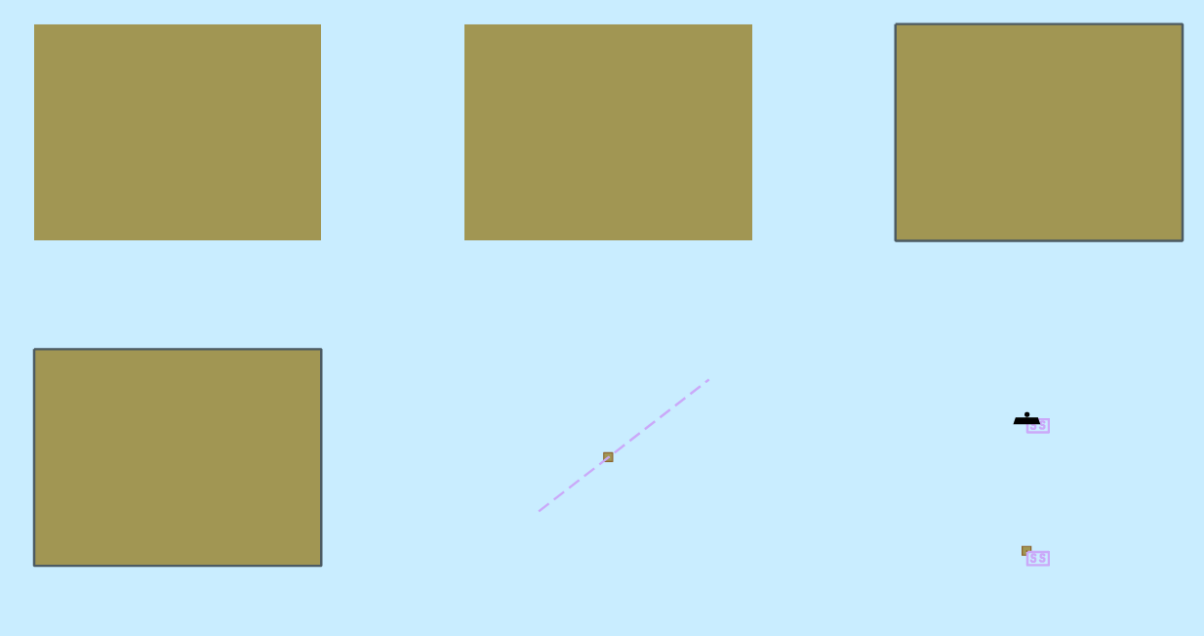
[Test effect of new interoperability catalogue: Changed interleaved behaviour, Changed Suppressed features, also change from L1 to L2 and vice versa between old/new catalogues]

3.7.3 Portrayal under Inteoperability.

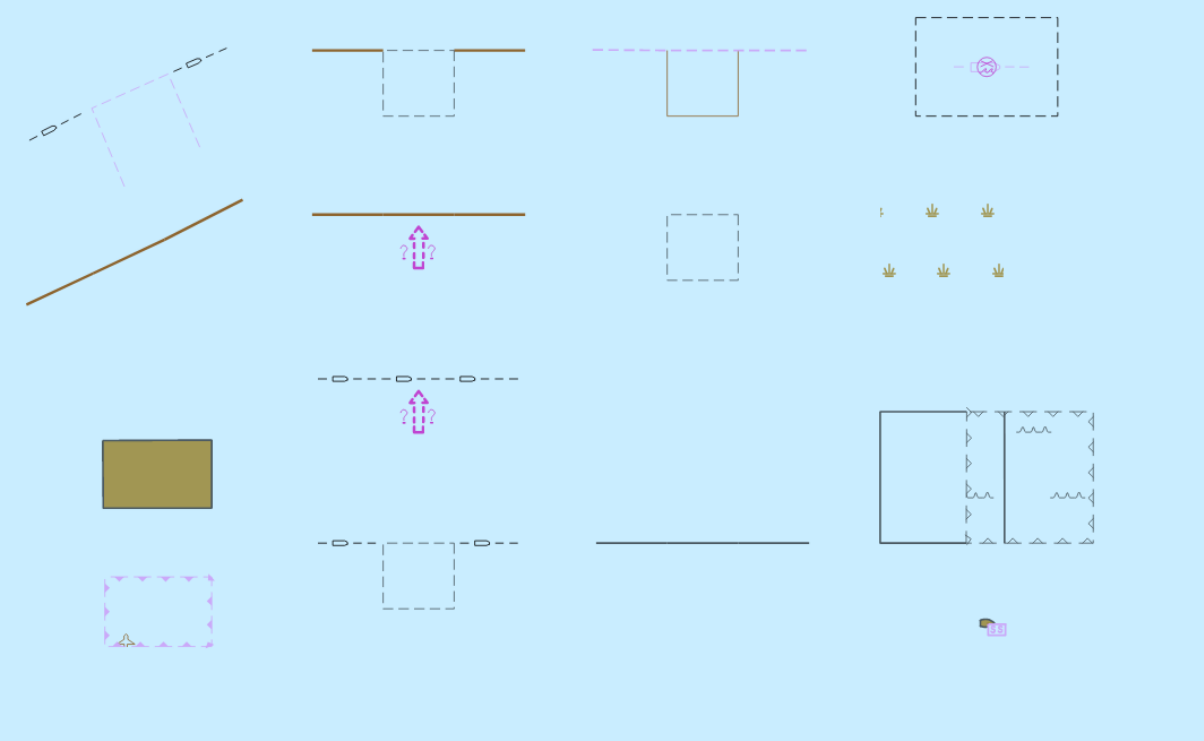
Test Reference	InteroperabilityCataloguePortrayal	**IHO Reference**	(S-100 Part 9/S-98)
Test description			
This test verifies that the ECDIS is capable of displaying multiple datasets using interoperability catalogues installed.			
Setup			
*Load exchange set **InitialPowerUp** with the following settings:*			
Action			
(A) Set Interoperability Level to 1. *(B) Set Interoperability Level to 2 with Predefined Display Combination = ???*			
Results			
Verify the user is informed of the operation of the interoperability mechanism at level 2 (feature substitution) *Verify portrayal according to the following images testing with settings (A) and (B) respectively:* ***[IMG – IC Level 2 Portrayal required:]*** ***1. S-101/S-102/S-104*** ***2. S-124/S-101*** ***3. S-129/S-101*** *WLA and user selected safety contour are tested separately.*			

3.8 Display Priorities

3.8.1 Same priority

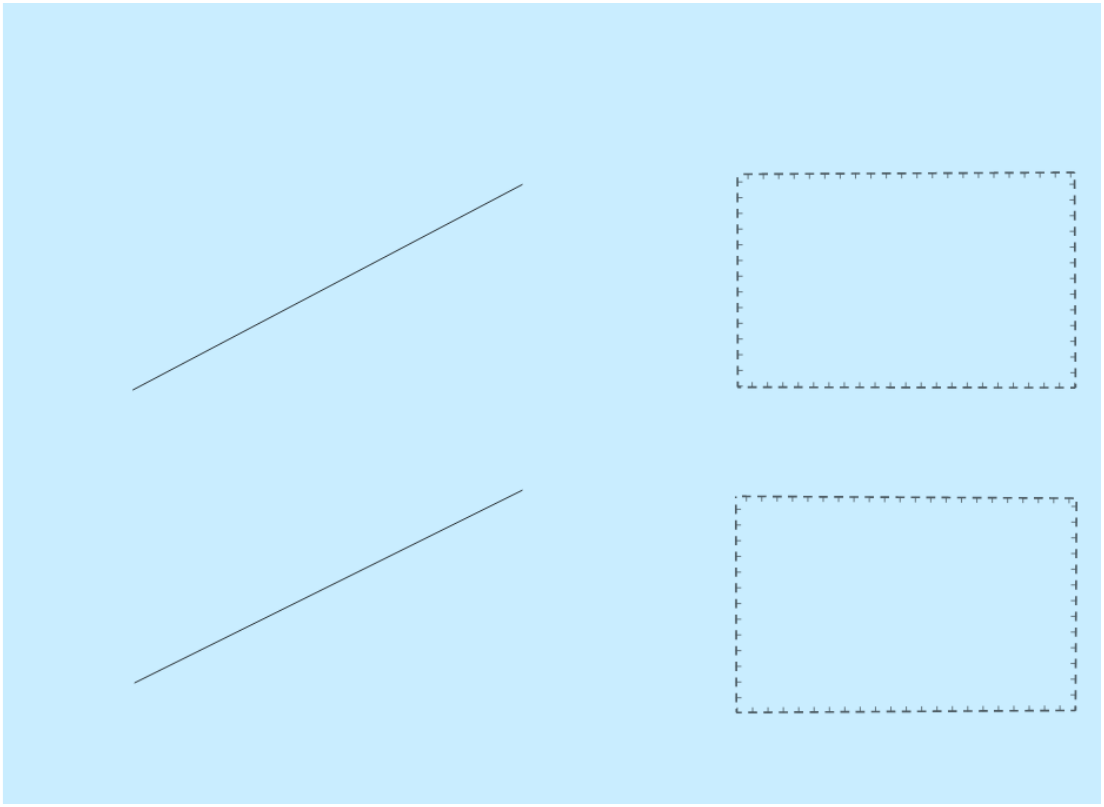
Test Reference	SamePriority	**IHO Reference**	S-98 C-7.2.9
Test description			
Same priority and different geometry			
Setup			
As for test DifferentPriority			
Action			
View the features at position 32°20.400'S 61°21.900' E scale 1:5000			
Results			
Confirm that items 1-6 display as shown in the graphic below: 			

3.8.3 Line Suppression

Test Reference	LineSuppression	IHO Reference	S-98 C-7.2.9
Test description			
Line suppression			
Setup			
As for test DifferentPriority			
Action			
View the features at position 32°20.400'S 61°23.150' E scale 1:5 000			
Results			
Confirm that items 1-16 display as shown in the graphic below: 			

3.8.4 Manual Updates

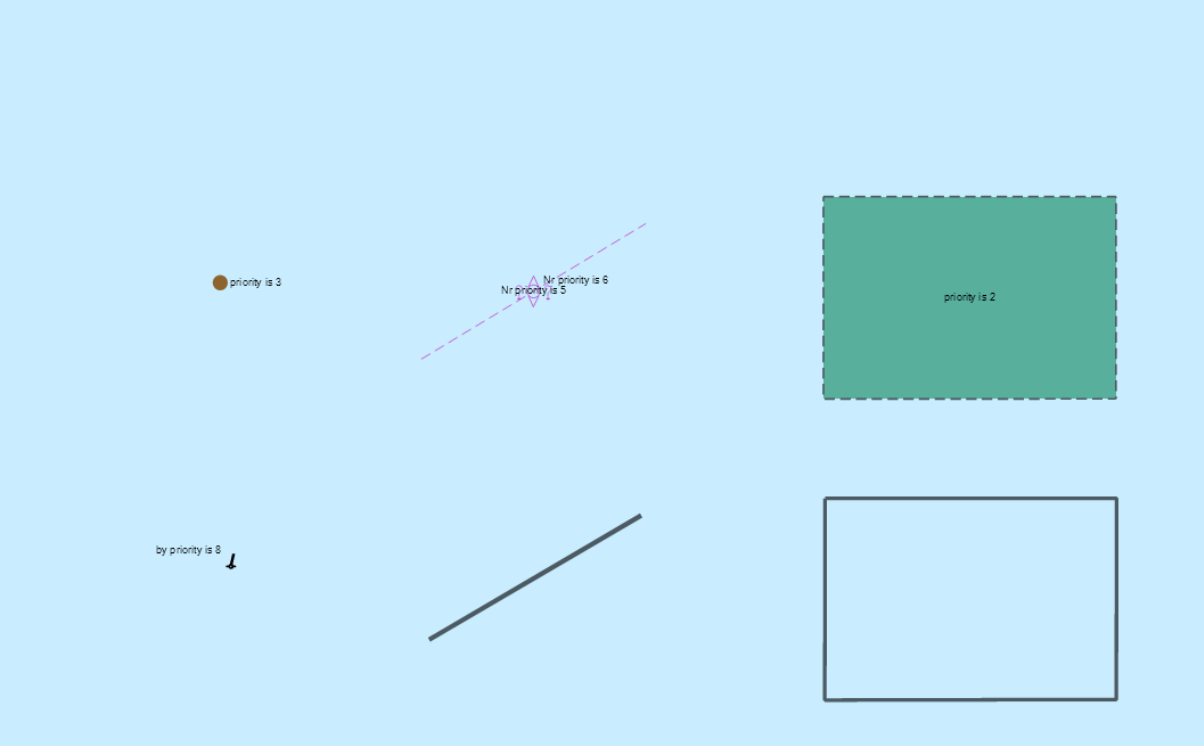
Test Reference	ManualUpdates	**IHO Reference**	
Test description			
Manual updates			
Setup			
As for test DifferentPriority			
Action			
View the feature at position 32°21.100'S-61°20.650'E scale 1:5 000			
Results			
Confirm that items 1-4 display as shown in the graphic below:			



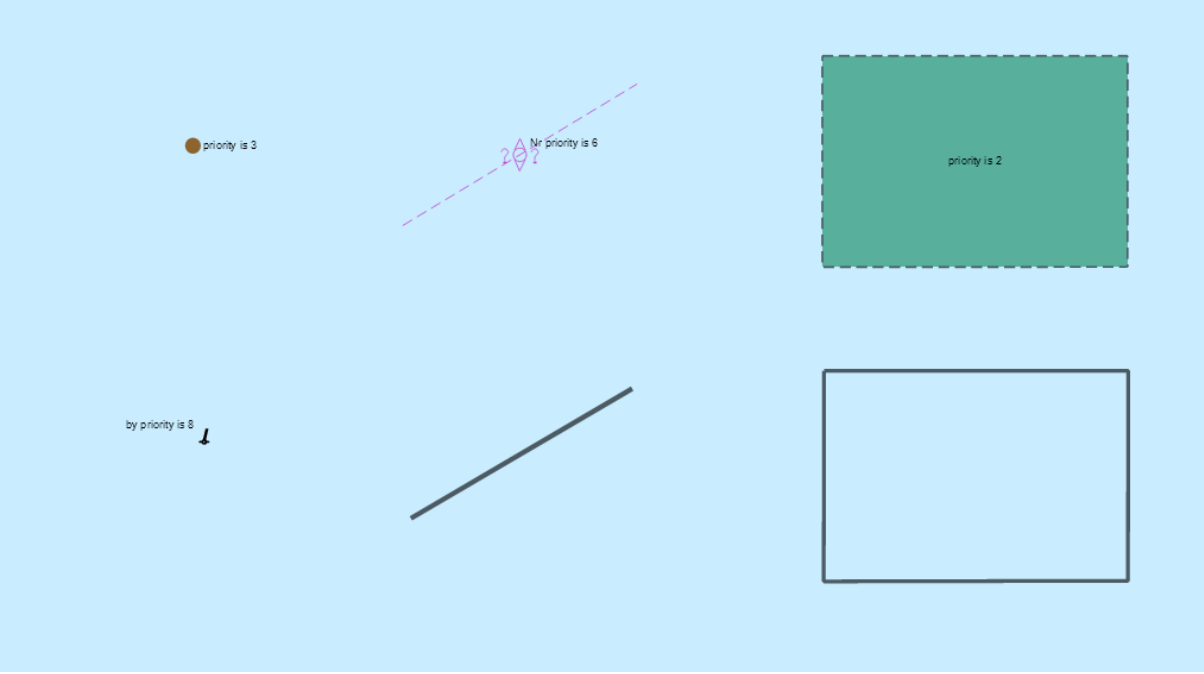
3.8.5 Text Display

Test Reference	TextDisplay1	IHO Reference	S-98 C-7.2.9
Test description			
Text display			
Setup			
As for test DifferentPriority			
Action			
View the features at position 32°21.100'S 61°21.900'E scale 1:5 000			
Results			

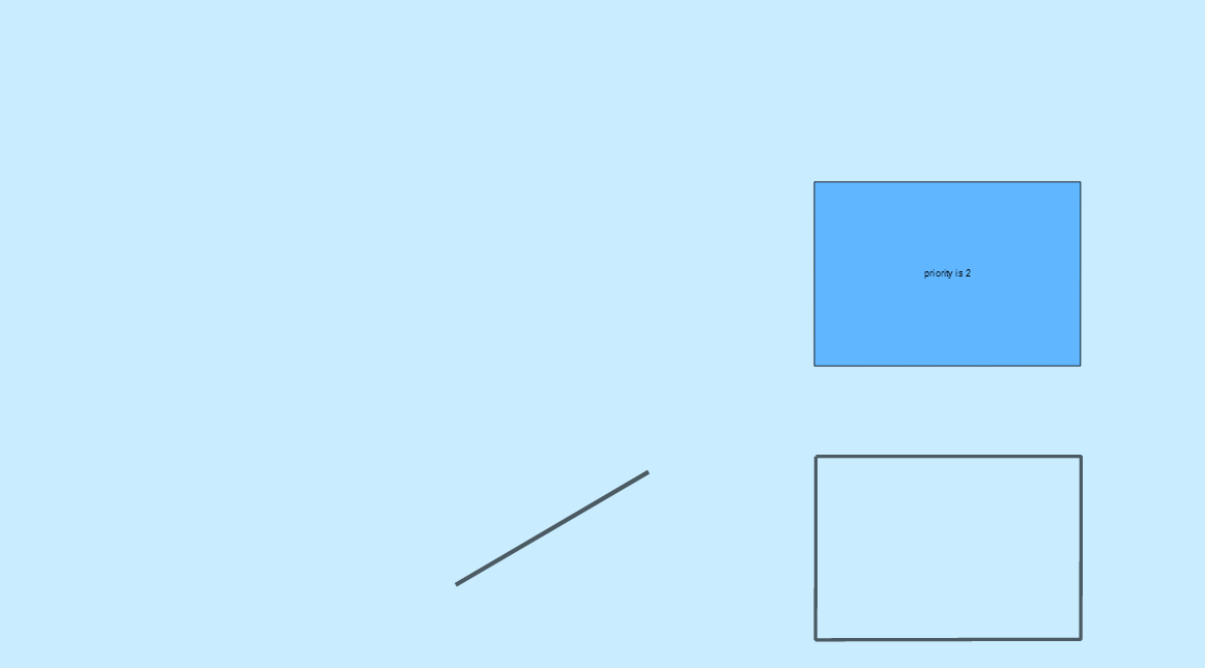
Confirm that items 1 to 6 display as shown in the graphic below:



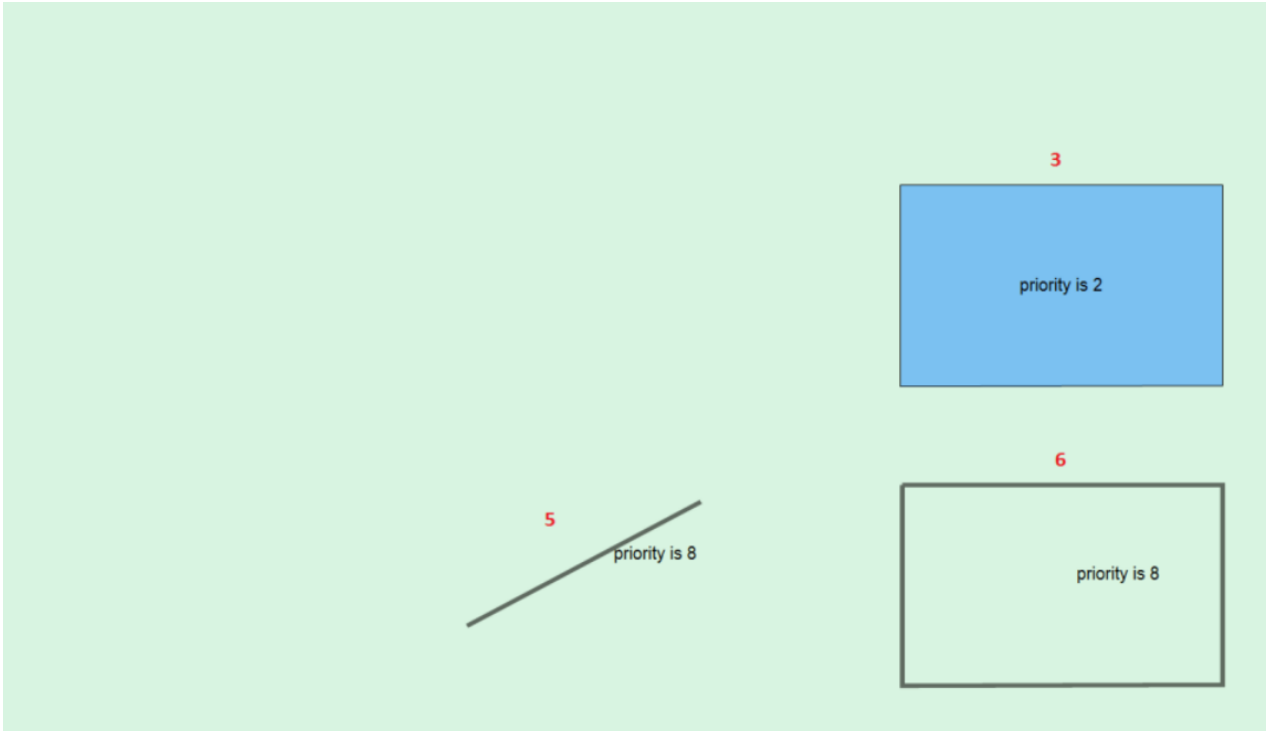
Alternative 1: Manufacturer may implement display of text only once for a feature which is masked



Alternative 2: Manufacturer may implement display of text across parts of a feature that is not masked.

Test Reference	TextDisplay2	**IHO Reference**	S-98 C-7.2.9
Test description			
Text display			
Setup			
As for test TextDisplay1 *except Set Display Category Standard*			
Action			
View the features at position 32°21.100'S 61°21.900'E scale 1:5 000			
Results			
Confirm that items 1 to 6 display as shown in the graphic below: 			

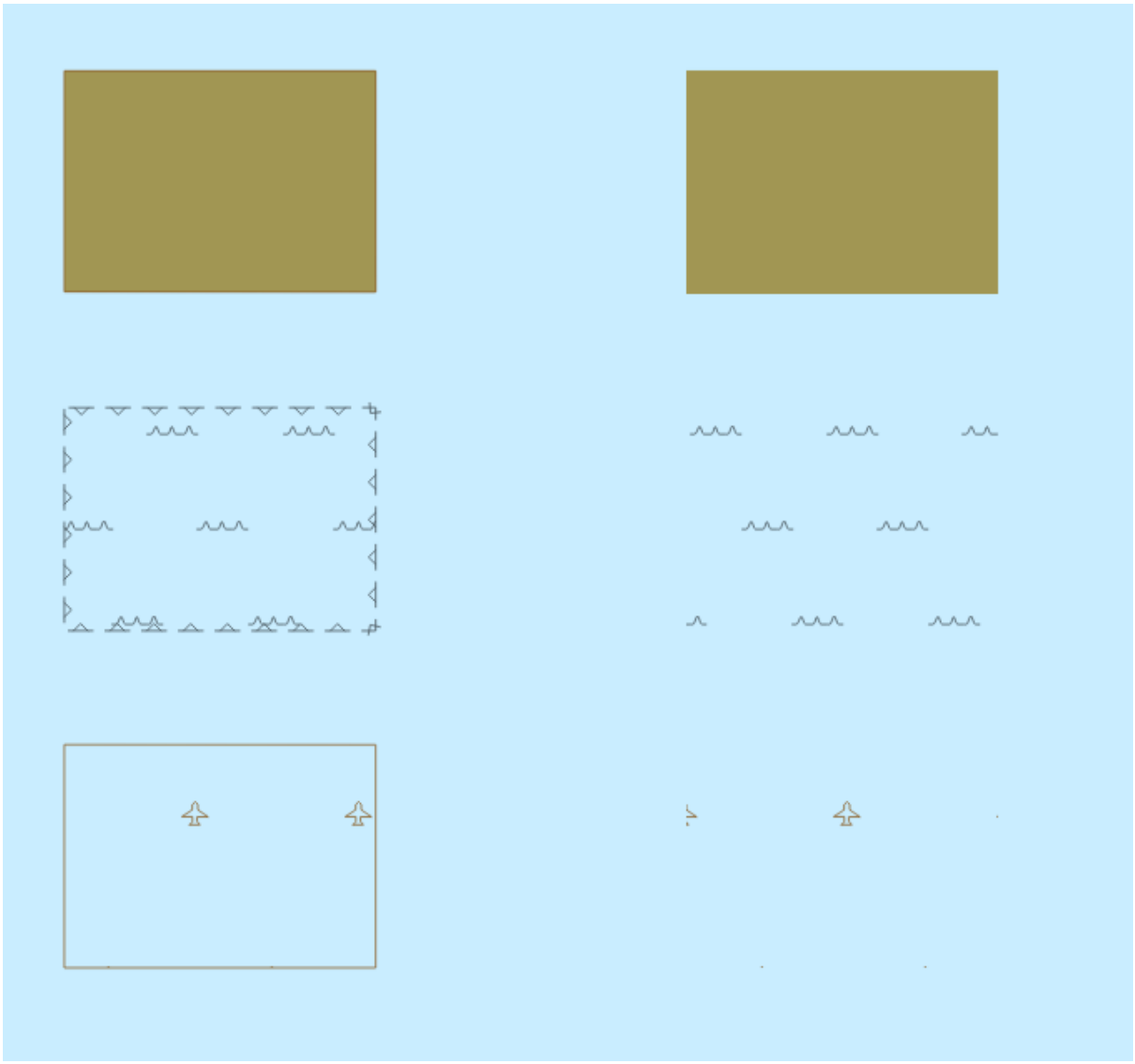
Test Reference	TextDisplay3	**IHO Reference**	S-98 C-7.2.9
Test description			
Text display			
Setup			
As for test TextDisplay1 *except set Display Category Base Display*			
Action			
View the features at position 32°21.100'S 61°21.900'E scale 1:5 000			
Results			
Confirm that items 3,5 and 6 display as shown in the graphic below:			



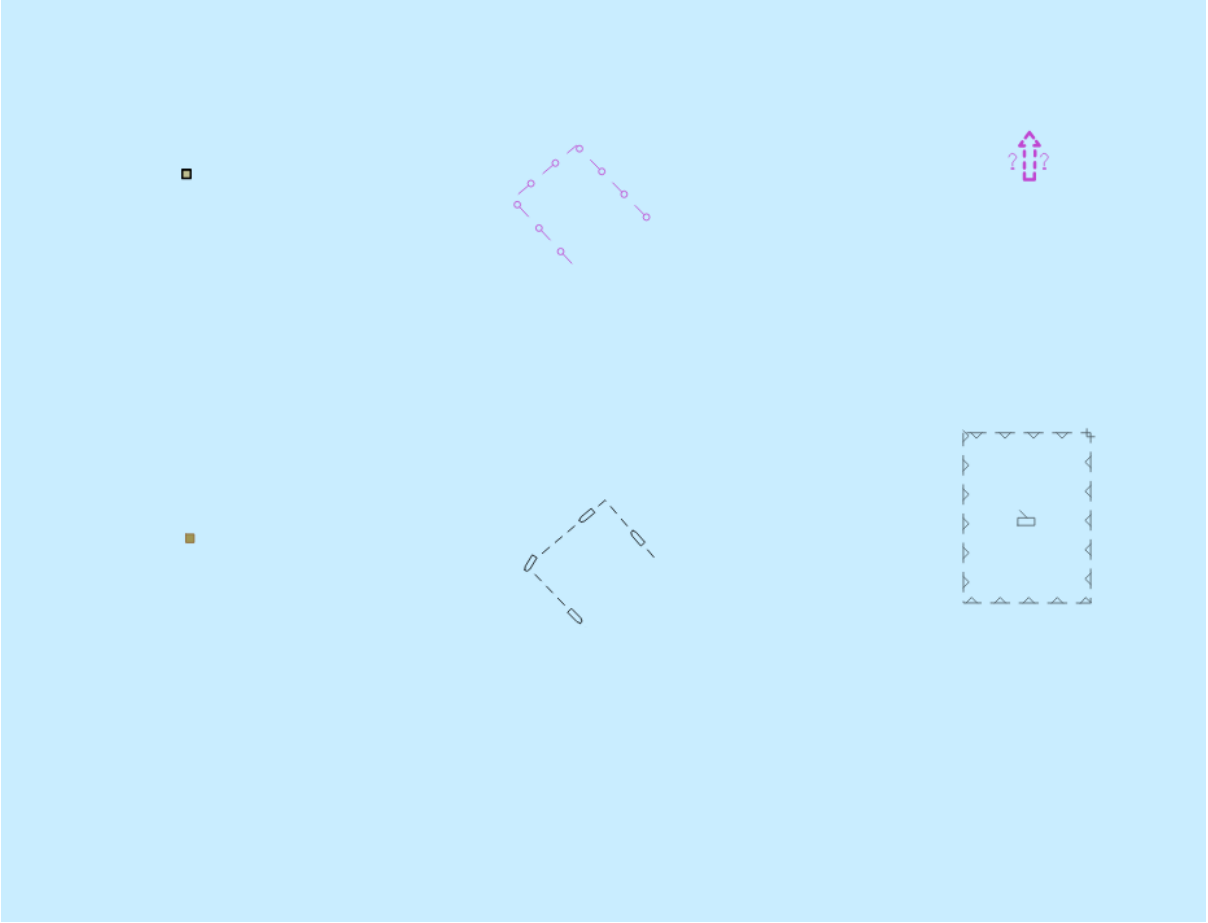
tbd

3.8.6 Display of area borders

Test Reference	AreaBorders	IHO Reference	S-98 C-7.2.9
Test description			
Display of area borders			
Setup			
As for test TextDisplay3 *except* *Set Display Category Other*			
Action			
View the features at position 32°21.100'S 61°23.150'E scale 1:5 000			
Results			
Confirm that items 1-6 display as shown in the graphic below:			

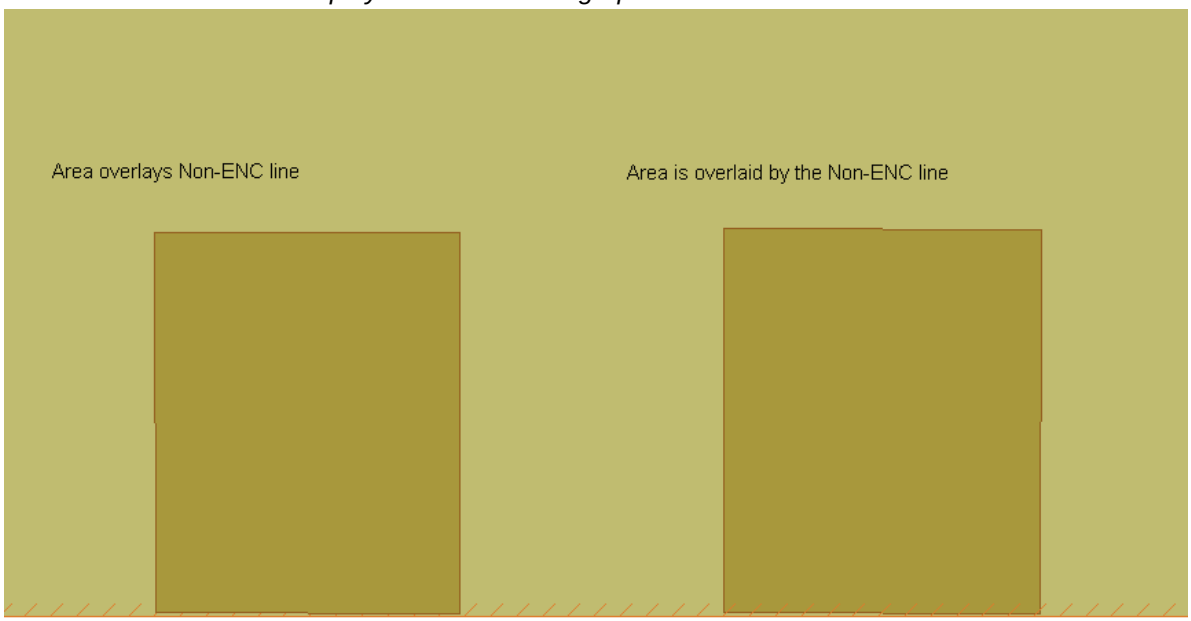


3.8.7 Display of unknown symbols

Test Reference	UnknownSymbols	IHO Reference	S-98 C-7.2.9
Test description			
Display of unknown symbol			
Setup			
As for test AreaBorders			
Action			
View the features at position 32°21.850'S 61°20.650'E scale 1:5 000			
Results			
Confirm that items 1-6 display as shown in the graphic below: 			

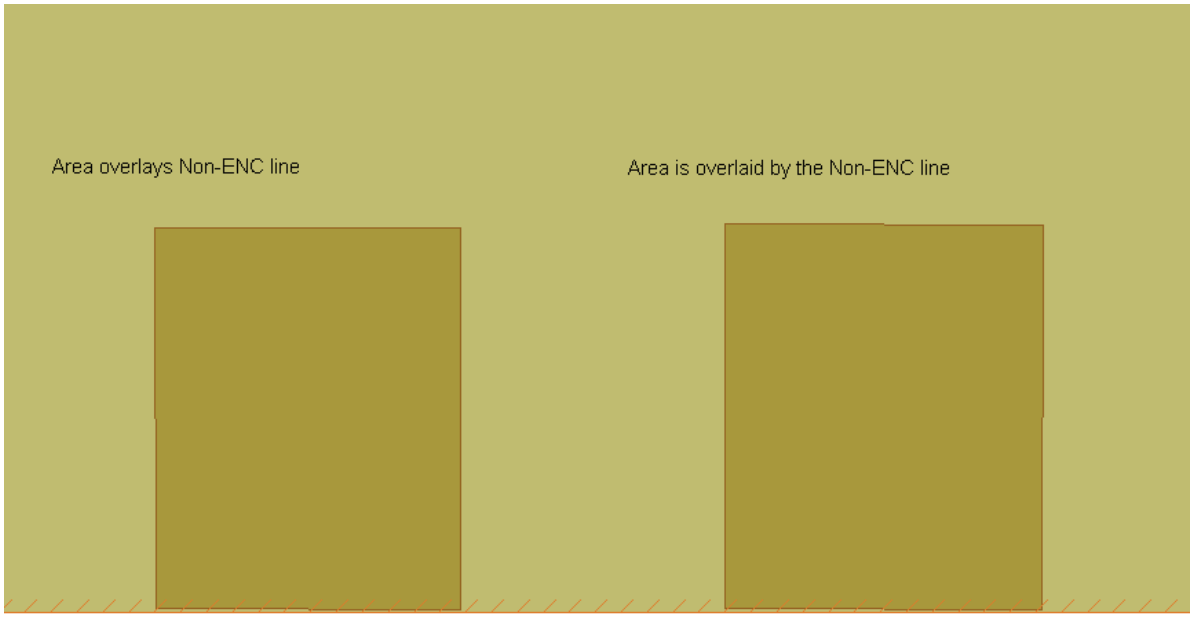
3.8.8 Boundary display for unofficial data

Test Reference	BoundaryDisplay1	**IHO Reference**	S-98 C-7.2.9
Test description			
Unofficial data boundary display			
Setup			
*As for test AreaBorders and in addition, load the exchange sets **Settings** and **2J5X0002***			
Action			
View the features at position 32°22.450'S 61°24.250'E scale 1:2 000			
Results			
Confirm that items 1 and 2 display as shown in the graphic below:			



Alternative 1: Orange slashes are under left hand side dark brown area

tbd

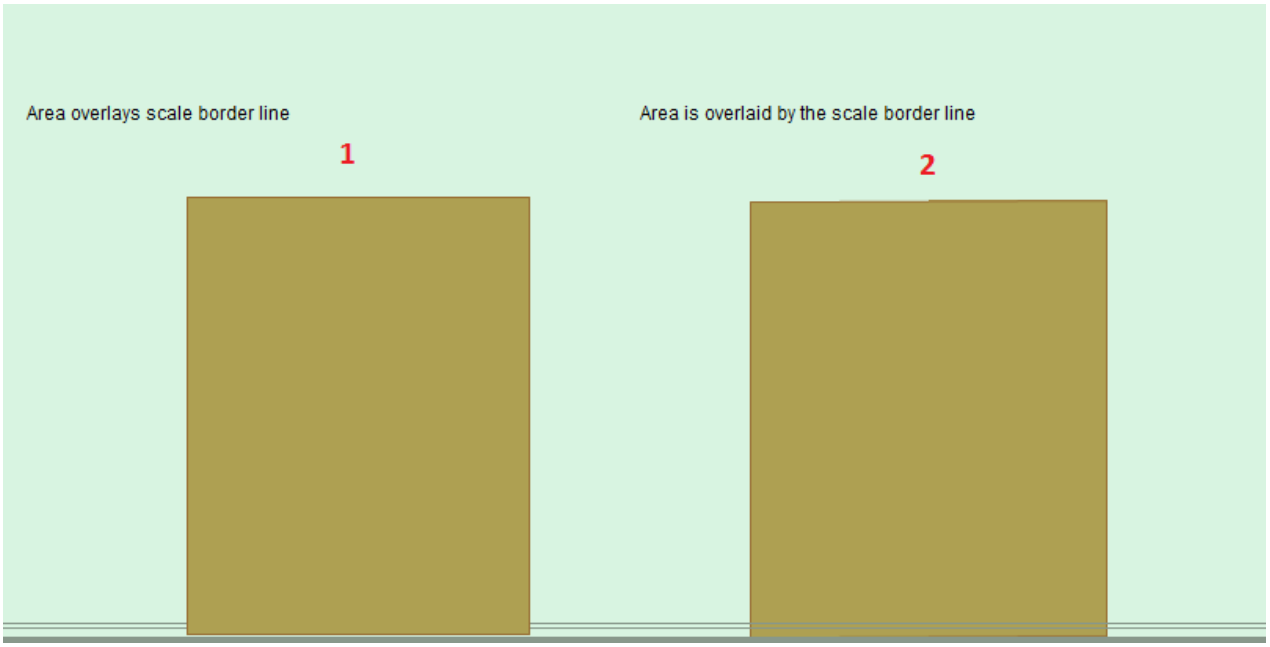


Alternative 2: Orange slashes are above left hand side dark brown area

tbd

Note: Alternative 2 allows for drawing speed optimization

Test Reference	BoundaryDisplay2	IHO Reference	S-98 C-7.2.9
Test description			
Scale boundary display			
Setup			
As for test AreaBorders and in addition Load dataset 101AA002J4X0001.000 from the exchange set ***DisplayPriorities*** *with the following settings.* *Chart scale boundaries = On*			
Action			
View the features at position 32°22.450'S 61°23.800'E scale 1:2 000			
Results			
Confirm that items 1 and 2 display as shown in the graphic below:			



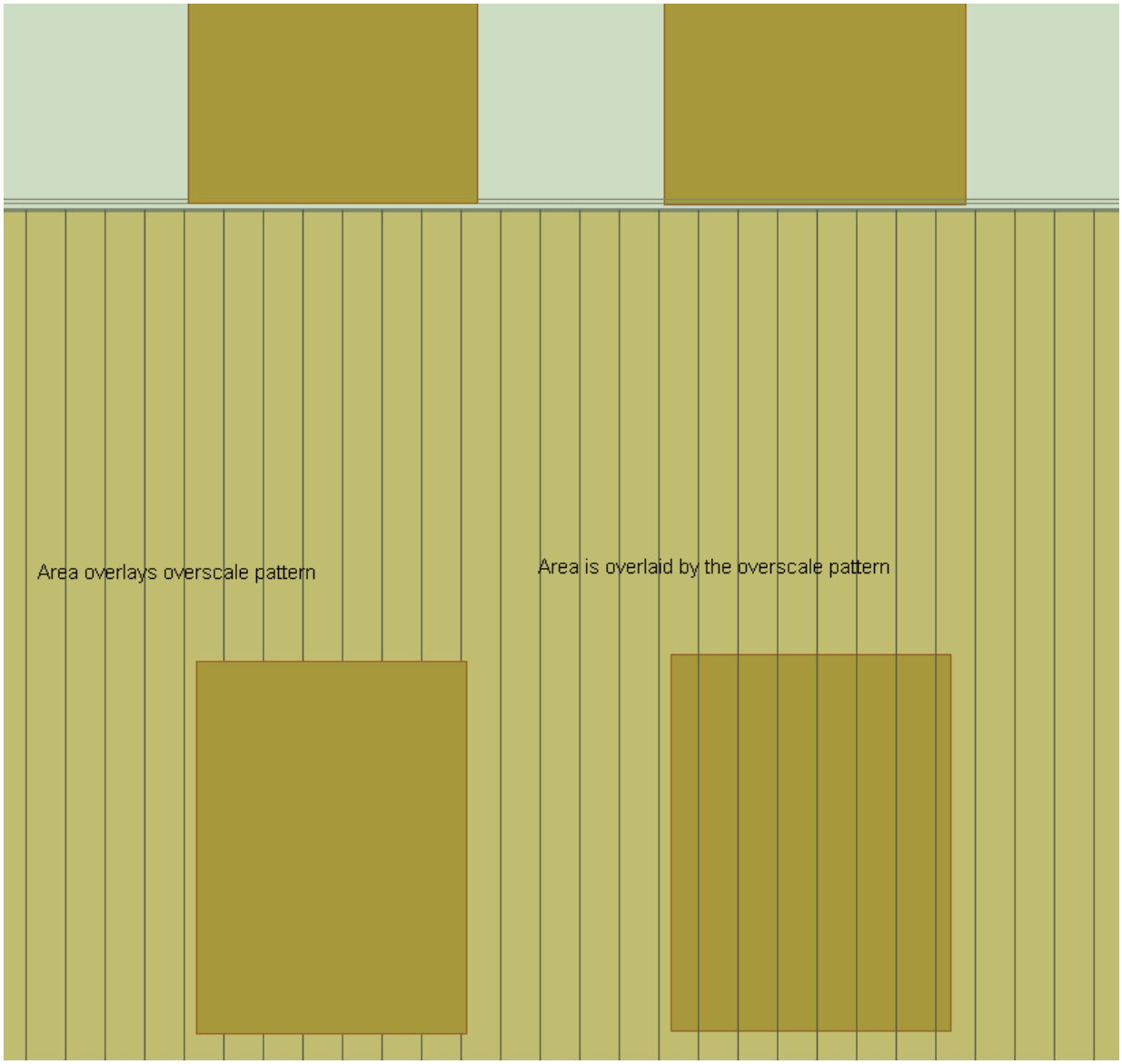
Alternative 1: Line style indicating side of larger scale available (complex line style with thick line at edge and double 1 pixel lines on larger scale available side)

tbd

Alternative 2: Line style just indicating scale border (1 pixel line)

tbd

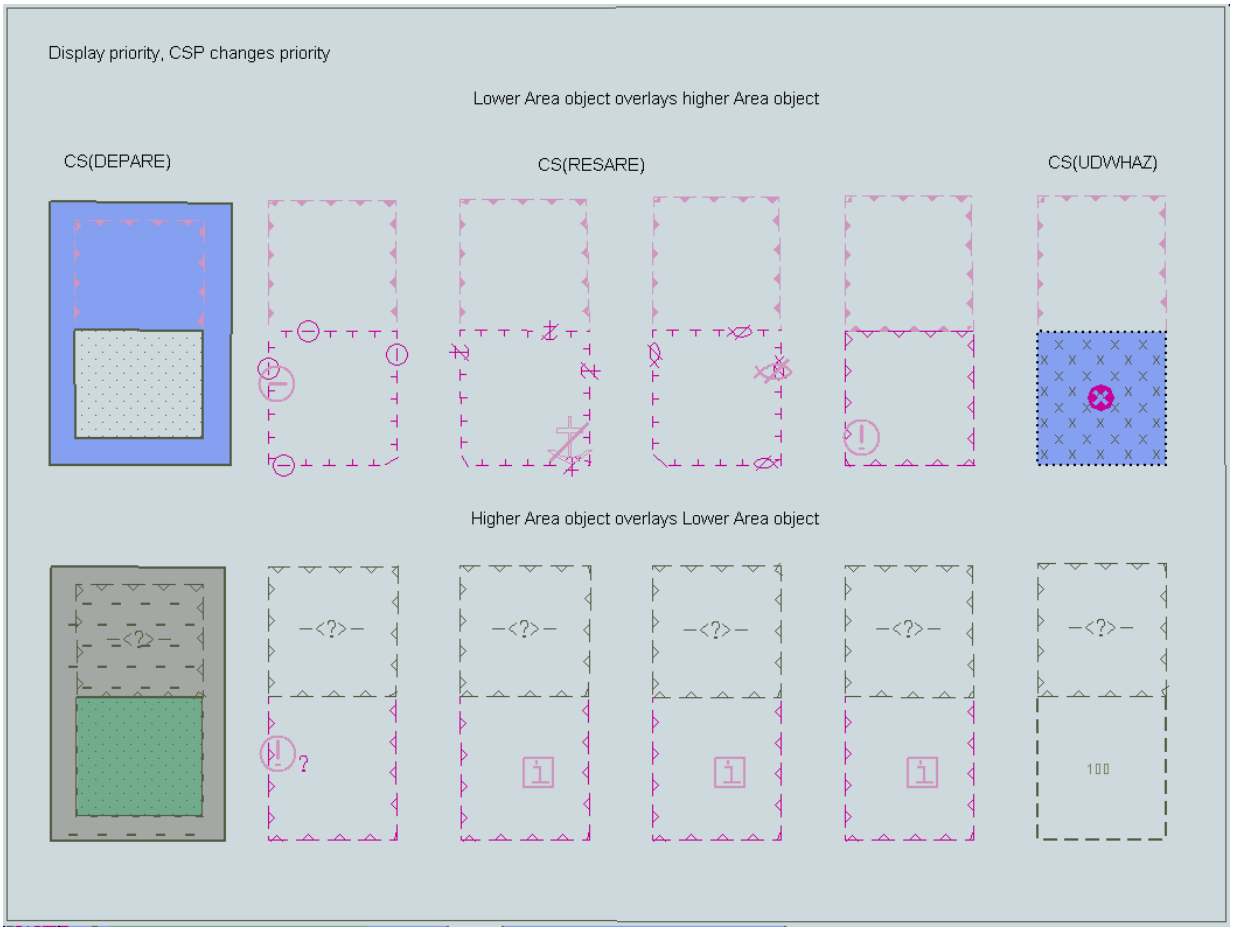
Test Reference	BoundaryDisplay3	IHO Reference	S-98 C-7.2.9
Test description			
Overscale pattern display			
Setup			
As for test BoundaryDisplay2			
Action			
View the features at position 32°22.600'S 61°23.800'E scale 1:2 000			
Results			
Confirm that items 1 and 2 display as shown in the graphic below:			



tbd

3.8.9 Display of features affected by Complex Portrayal Procedures

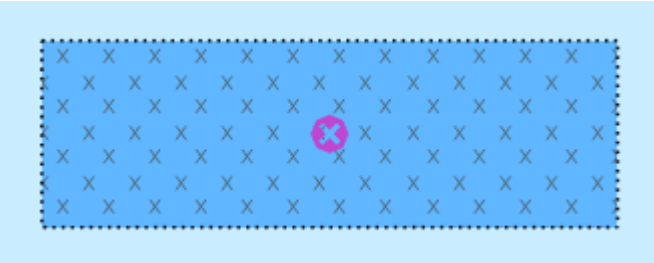
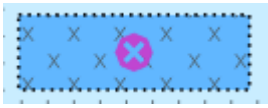
Test Reference	ComplexPortrayal	**IHO Reference**	S-98 C-7.2.9
Test description			
Display of features with priority affected by complex portrayal algorithms			
Setup			
As for test DifferentPriority			
Action			
View the features at position 32°21.850'S 61°23.150'E scale 1:5 000			
Results			
Confirm that items 1-12 display as shown in the graphic below :			

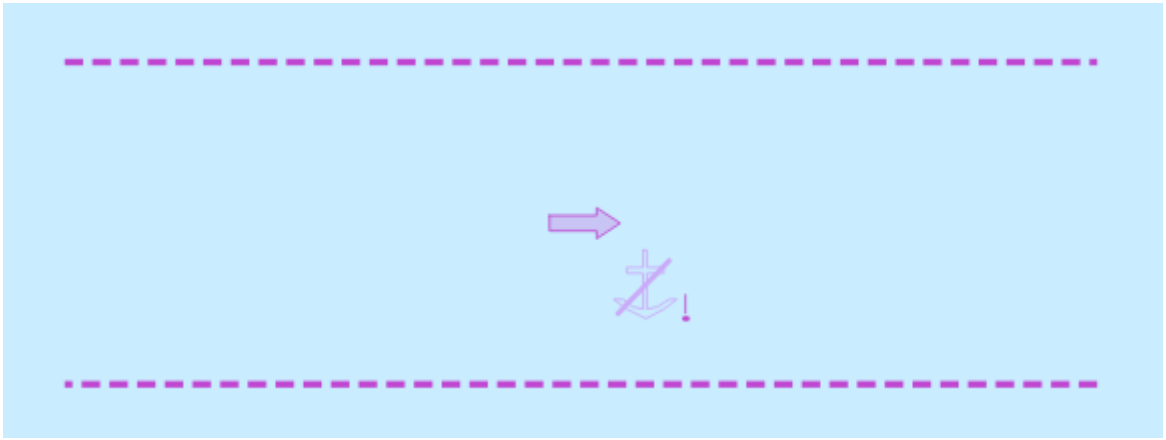
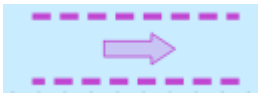


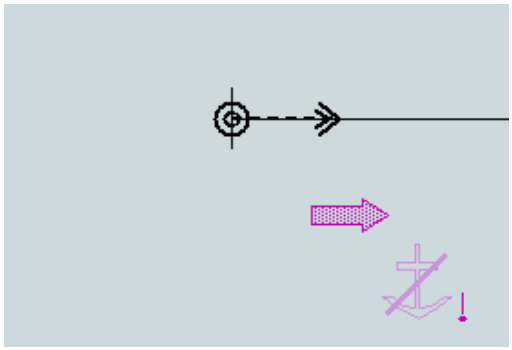
tbd

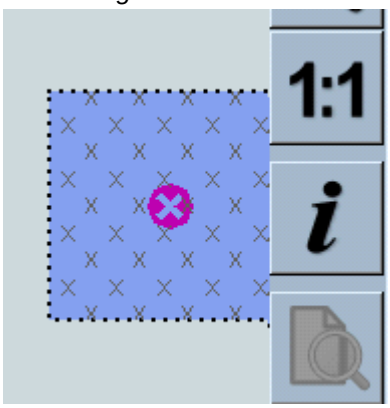
[TBD] – This test is for complex LUA-based portrayal based on current Portryal Catalogue rules..

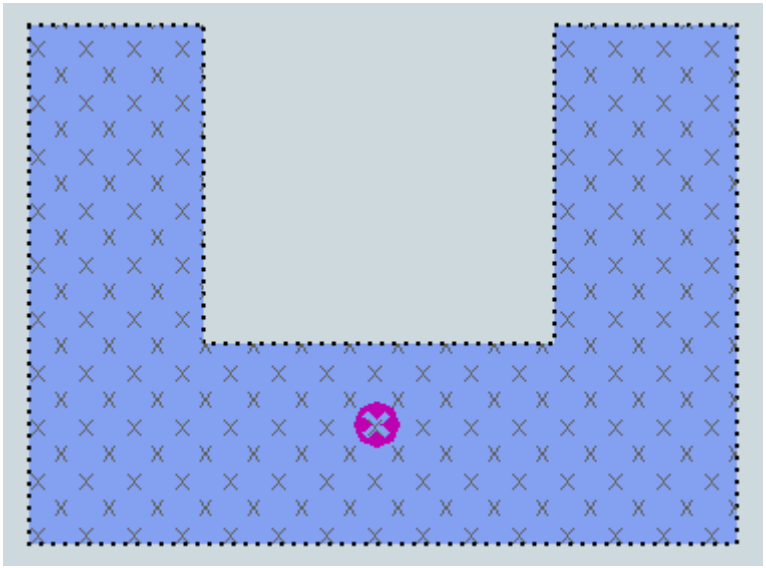
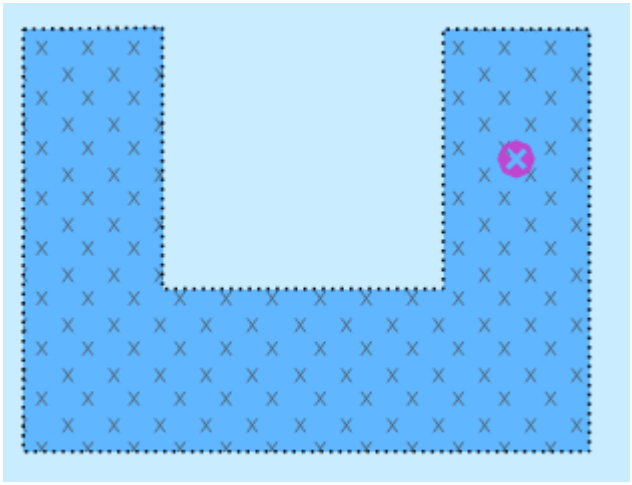
3.8.10 Display of Centred Symbols

Test Reference	CentredSymbols1	**IHO Reference**	S-98 C-7.2.4
Test description			
Display of centred symbol in the centre of an area.			
Setup			
*Load the exchange set **Settings** with the following settings:* • *Select Display Category Other* • *Select Symbolized Boundaries* • *Select Simplified Point Symbols = false* • *Set Safety Contour value to 10 m* • *Select Shallow water dangers*			
Action			
Centre the display on position 32°32.805'S 61° 21.290'E and then zoom in to a scale of 1:20 000.			
Results			
Confirm that the feature displays as in the image below:  *Zoom out to scale 1:50 000 and confirm that the feature now displays as follows:* 			

Test Reference	CentredSymbols2	IHO Reference	S-98 C-7.2.4
Test description			
Display of centred symbols offset.			
Setup			
As for test CentredSymbols1			
Action			
Centre the display on position 32°32.085'S 61° 21.415'E and then zoom in to a scale of 1:10 000.			
Results			
Confirm that the feature displays as in the image below:  *Note: the display should show the centred symbol(s) offset.* *Zoom out to scale 1:50 000 and confirm that the feature now displays as follows:*  *Note: the display should only show the arrow as above without the centred symbol(s) offset.*			

Test Reference	CentredSymbols3	**IHO Reference**	S-98 C-7.2.4
Test description			
Display of centred symbols which conflict with the own ship symbol.			
Setup			
As for test CentredSymbols1			
Action			
Centre the display on position 32°32.085'S 61° 21.415'E and then zoom in to a scale of 1:1 000. *Simulate own ship on position 32°32.085'S 61° 21.415'E*			
Results			
Confirm that the feature displays as in the image below:  **tbd** *Note: the display should show own ship symbol centred with the arrow and restriction symbol(s) offset. Even when changing the display scale the separation between own ship and the symbols shall be maintained.* *Note the offset between arrow and restriction symbol is specified while the own ship symbol just has to be not overlapping the centred symbols in the chart.*			

Test Reference	CentredSymbols4	**IHO Reference**	S-98 C-7.2.4
Test description			
Display of centred symbols when area is partially off screen.			
Setup			
As for test CentredSymbols1			
Action			
Centre the display on position 32°32.805'S 61° 21.290'E and then zoom in to a scale of 1:20 000.			
Results			
Confirm that the feature displays as in the image below:  **tbd** *Note: the display should show the centred symbol in the centre of the visible area.*			

Test Reference	CentredSymbols5	IHO Reference	S-98 C-7.2.4
Test description			
Display of centred symbols within complex areas.			
Setup			
As for test CentredSymbols1			
Action			
Centre the display on position 32°30.970'S 61° 21.330'E and then zoom in to a scale of 1:20 000.			
Results			
Confirm that the feature displays as in the image below:  **Tbd**  *Note: the display should show the centred symbol within the **Obstruction** area. The display may be different from the example shown above as long as the centre of the centred symbol remains within the **Obstruction** area.*			

3.9 Scale and navigation purpose

3.9.1 Display of overscale indication

Test Reference	OverscaleIndication1	**IHO Reference**	S-98 C-12.1.2
Test description			
Display of overscale indication.			
Setup			
*Load the exchange set **PowerUp***			
Action			
Zoom in beyond 1:25 000. This is the maximum display scale of the largest scale datasets.			
Results			
Confirm that an overscale indication is provided. *For example, if scale zoomed is 1:20 000 then for areas based on maximum display scale 1:25 000 the overscale factor shall be 1.3 and for areas based on maximum display scale 1:52 000 it shall be 2.6*			

Test Reference	OverscaleIndication2	IHO Reference	S-98 C-12.1.2

Test description

Display of overscale pattern.

Setup

*Load the exchange set **PowerUp***

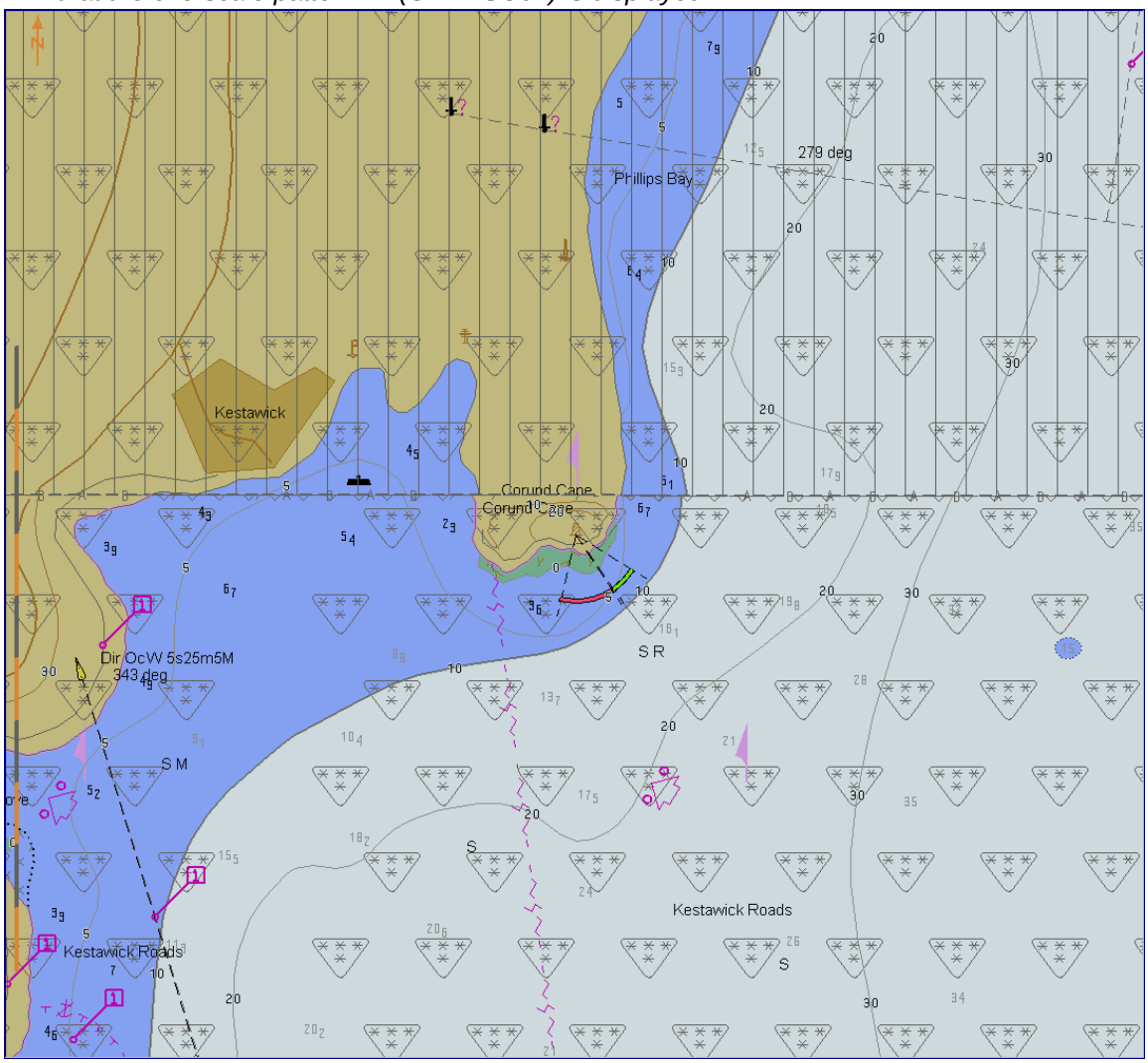
- *Select Display Category Other*
- *Select Other text*
- *Select Accuracy*
- *Select Highlight info*
- *Select Symbolized boundaries*
- *Set Safety Contour value to 7 m*
- *Set Safety Depth value to 7 m*

Action

Set chart centre at the lighthouse in the Corund Cape 32°27.447'S 060°58.599'E.
Zoom in beyond 1:10 000. This is the maximum display scale of the largest scale datasets.

Results

Confirm that the overscale pattern AP(OVERSC01) is displayed.

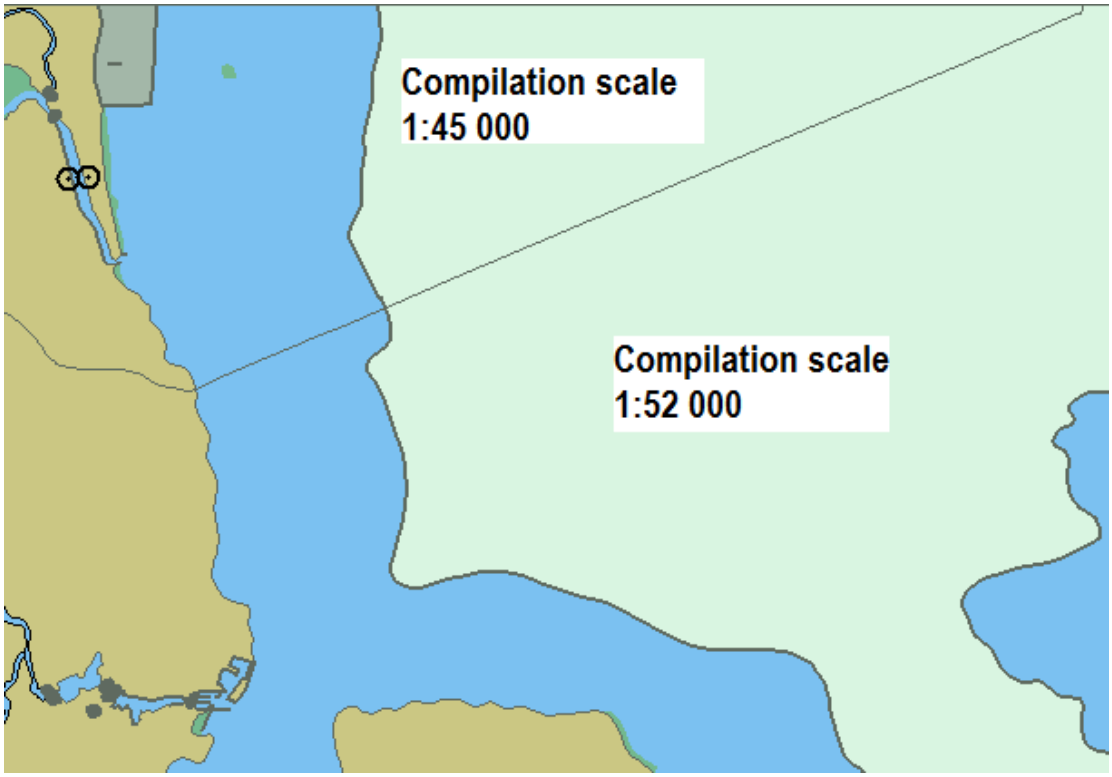


Tbd

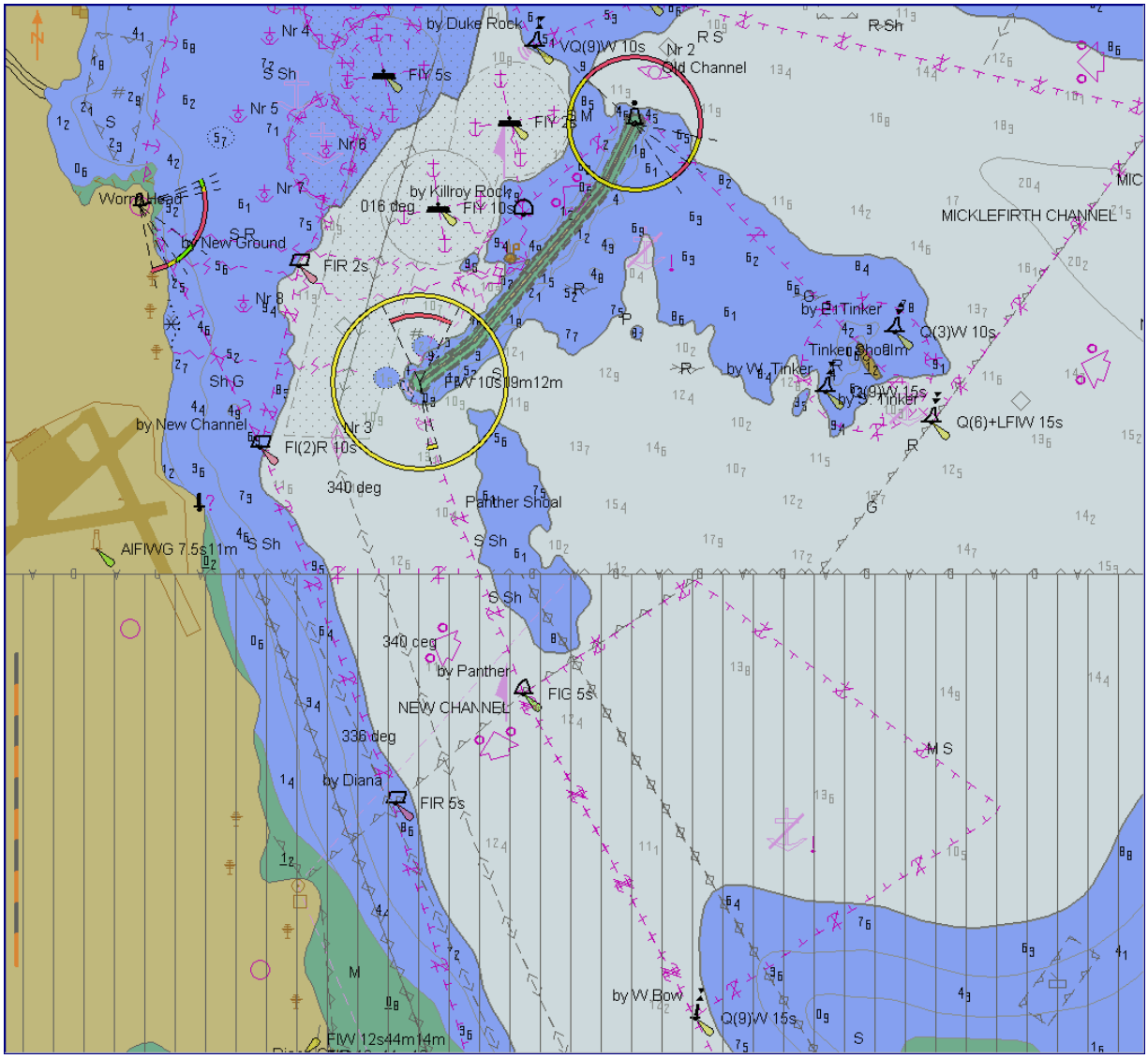
3.9.2 Indication of larger scale data

Test Reference	LargerScaleData	**IHO Reference**	S-98 C-12.1.2
Test description			
Indication of better (larger) scale data being available.			
Setup			
*Load the exchange set **PowerUp*** *Position the own ship at 32°29.668'S, 060°55.864'E with a heading of 234.0 degrees. This will place the ship at the jetty in Micklefirth.*			
Action			
Select the smaller scale dataset (GB4X0000.000). Observe this dataset.			
Results			
Position the displayed area over the own ship. Confirm that an indication is provided that larger scale is available.			

3.9.3 Boundaries between maximum display scales

Test Reference	ScaleBoundary	**IHO Reference**	S-98 C-12.1.3
Test description			
Boundaries between maximum display scales.			
Setup			
*Load the exchange set **PowerUp*** • *Select Display Category Display Base* • *Select Chart scale boundaries*			
Action			
Centre the display on 32°21.010'S 060°57.920'E and zoom to 1:45 000			
Results			
*Confirm that either the **LS(SOLD,1,CHGRD) or LC(SCLBDY51)** is shown for the diagonal limit across the dataset. Also confirm that the overscale indication is provided for the area in which the maximum display scale is 1:52 000.*  **Tbd**			

3.9.4 Display of data from another scale

Test Reference	DifferentScale1	IHO Reference	S-98 C-12.1.5
Test description			
Display of data from a smaller scale navigational purpose to completely cover the display.			
Setup			
*Load the exchange set **PowerUp*** • *Select Display Category Other* • *Select Safety Contour value to 10 m* • *Select Safety Depth value to 10 m* • *Select Symbolized Boundaries* • *Select Simplified Points Symbols = false*			
Action			
Centre the display at 32°33.000'S 60°56.000'E *Select scale 1:20 000 so that larger scale detail (buoyage, lights) is shown.*			
Results			
Confirm that south of 32°33.141'S data from the smaller scale is shown. *Note: Screen plot is based on the full text natureOfSurface attribute. To reduce undue clutter in the ECDIS chart display, the use of the abbreviations of the natureOfSurface attribute is recommended.* 

Tbd

Test Reference	OverlappingData	IHO Reference	S-98 C-21.2

Test description

Display of overlapping data.

Setup

*Load exchange set **Overlap***

*Load exchange set **ScaleMinimum***

- *Select Display Category Other*
- *Select Safety Contour value to 10 m*
- *Select Safety Depth value to 10 m*
- *Select Symbolized Boundaries*
- *Display cell 101AA00OVRLP at maximum display scale (1:90 000)*

Action

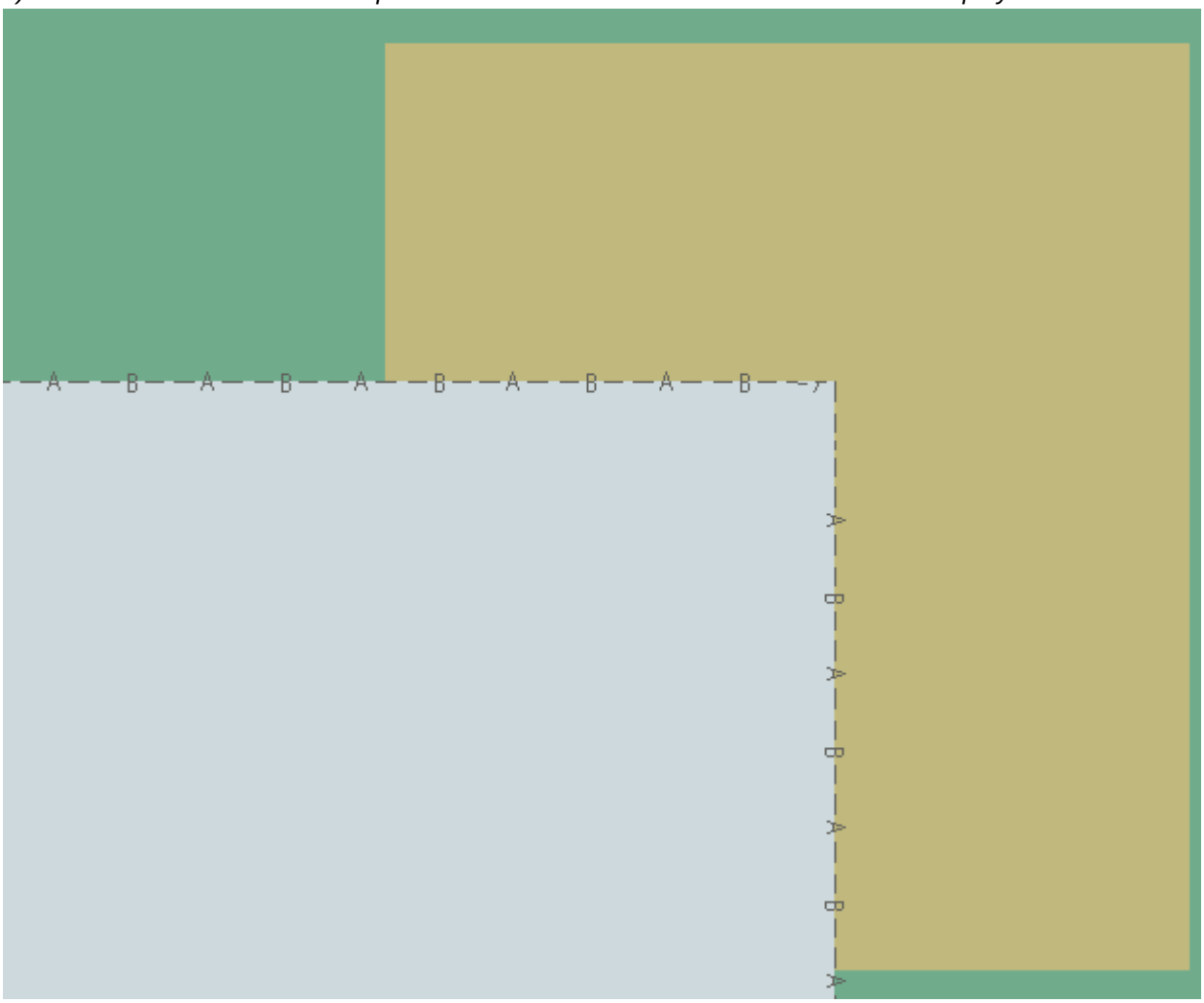
Centre the display on position 32°23.000'S 60°40.000'E

Results

Confirm that only one cell is displayed in a given area. In this case displays as shown in a) or b) are acceptable.

Confirm also that a permanent indication "overlap" is provided.

a) Chart 101AA00SCAMN overlaps chart 101AA00OVRLP at the same MaximumDisplayScale



Tbd

b) Chart 101AA00OVRLP overlaps chart 101AA00SCAMN

Tbd

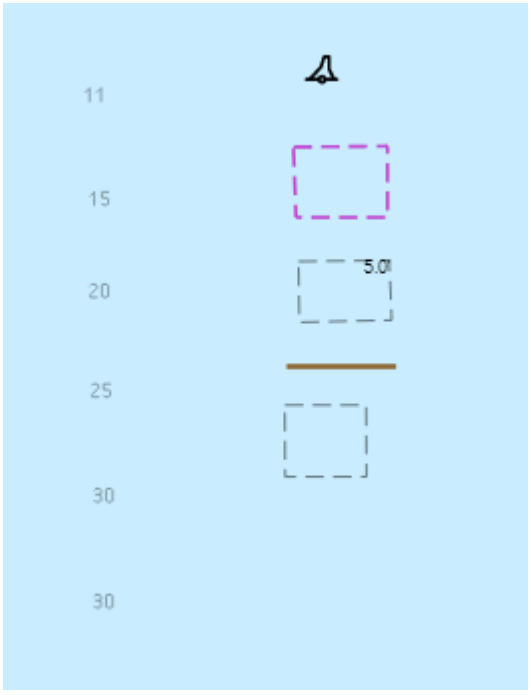
3.9.5 Display of graphical index

Test Reference	GraphicalIndex	**IHO Reference**	S-98 C-12.2
Test description			
Display of graphical index of cell boundaries.			
Setup			
*Load the exchange set **PowerUp***			
Action			
Navigate to a graphical index of dataset boundaries.			
Results			
Confirm that a graphical index of the dataset boundaries is displayed and access to the edition number and, where applicable, update number of each dataset is available.			

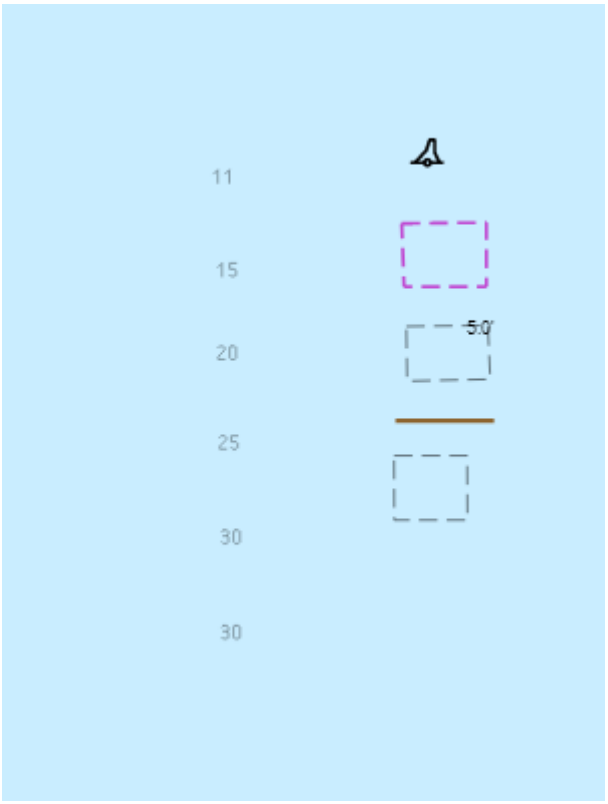
3.9.6 Change of display scale

Test Reference	DisplayScaleChange	**IHO Reference**	S-98 C-12.8
Test description			
Change of display scale by chart scale values and by increments of displayed range values in nautical miles.			
Setup			
*Load the exchange set **PowerUp***			
Action			
Change display scale by chart scale values or by increments of displayed range values in nautical miles.			
Results			
Confirm that the display changes accordingly.			

3.9.7 Impact of ScaleMinimum on display

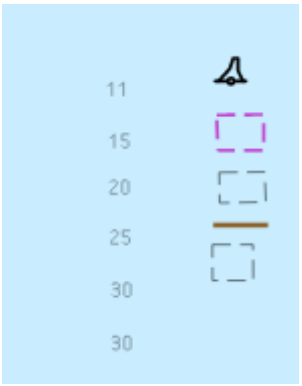
Test Reference	ScaleMinimum	**IHO Reference**	S-98 C-12.8
Test description			
Impact of ScaleMinimum values on display of charted features.			
Setup			
*Load the exchange set **ScaleMinimum*** • *Select Display Category Other* • *Select Safety Contour value to 10 m* • *Select Safety Depth value to 10 m* • *Select Symbolized Boundaries* • *Select Simplified Point Symbols = false* • *Display cell 101AA00SCAMN at maximum display scale (1:90 000)*			
Action			
1. Centre the display on position 32°24.000'S 60°20.500'E *2. Change scale to 1:100 000* *3. Change scale to 1:200 000* *4. Deselect ScaleMinimum*			
Results			
1. All features shall be shown. 			

2. All features shall be shown



3. The features with ScaleMinimumvalues of 119 000 and 179 999 shall not be shown.

4. All features shall be shown



3.10 Display and Operation of Water Level Adjustment.

3.10.1 Enabling Water Level Adjustment

Test Reference	WaterLevelAdjustment	**IHO Reference**	S-98 C-4.2.1
Test description			
This test verifies the ECDIS can harmonise S-104 Water Level with S-101 Depth Values.			
Setup			
*Load the exchange set **PowerUp** with the following settings.* - *User Selected Safety Contour = 11.4m* - *Water Level Adjustment = true* - *Interoperability Level = 2* - *Water Level Adjustment boundary = 100 metres (S-98 Annex C C-4.2.7)*			
Action			
Navigate to point (Xx,YY Coverage Area S-102, S-104)			
Results			
Verify 1. Water Level Adjustment is enabled and a permanent message is displayed to user as per S-98 Annex C Appendix C-4.2 **WLA 12:34 08 Nov 2021** 2. The boundary of the Water Level Adjustment is shown. 3. Verify the ECDIS legend correctly reports the vertical datum of the S-102 and S-104 data (S-98 Annex C C-4-3.2) **tbd**			

3.10.2 Adjustment of Other Depth Values

Test Reference	AdjustmentOfDepthValues	**IHO Reference**	(S-100 Part 9/S-98 S-98 C-4-2

Test description

This test verifies the ECDIS can harmonise S-104 Water Level with S-101 Depth Values on other features.

Setup

As for test WaterLevelAdjustment

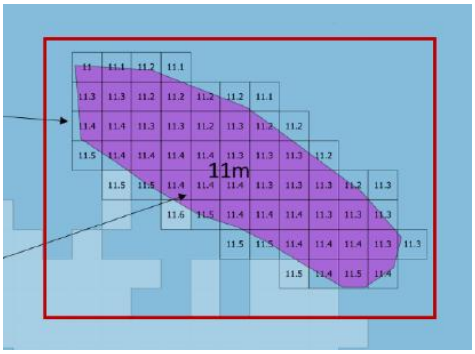
Action

A) Navigate to Point (XX,YY). Inspect Adjusted Depth Values (S-102 and S-104)
B) Navigate to Point (XX,YY) Inspect Adjusted Depth Values (S-104 only)

Results

Verify

1. All depth values in ENC are adjusted according to the S-104 values as shown

4. 

tbd

3.10.3 Feature information - Water Level Adustment.

Test Reference	WLAFeatureInformation	**IHO Reference**	(S-100 Part 9/ S-98 C-4-2

Test description

This test verifies the ECDIS Water Level Adjustment communicates correct information to the user during feature interrogation..

Setup

As for test WaterLevelAdjustment

Action

A) Navigate to Point (XX,YY).
B) Interrogate each of the features as shown in the image.

Results

Verify

1. All depth values in ENC are adjusted according to the S-104 values as shown
2. Pick Report information contains the correct values including the source of the depth values as defined in S-98 Annex C C-4-2.2

S-102 Coverage only.	**Value Of Sounding 12.3 m [S-102]**
S-104 and S-102 Coverage	**Value Of Sounding 15.5m [WLA 12:34 08 Nov 2021]**
Vertical Clearance value	**Vertical Clearance Value 5.3 m Mean Sea Level [WLA 12:34 08 Nov 2021]**

3.10.4 Water Level Adjustment across a time period

Test Reference	WLATimePeriod	**IHO Reference**	(S-100 Part 9/ S-98 C-4-2
Test description			
This test verifies that the ECDIS is able to correctly adjust water level depth values across a user defined time period.			
Setup			
As for test WaterLevelAdjustment *Set Water Level Adjustment time Period = 2021-11-08 12:30:00 to 2021-11-08 14:00:00*			
Action			
A) Navigate to Point (XX,YY). *B) Interrogate features as shown in the image.*			
Results			
Verify the permanent indication is given: **WLA from 12:34 08 Nov 2021 to 14:56 08 Nov 2021** *Verify the Adjusted Water Level values as follows:* *[ADJUSTED values from S-102, S-104 and S-102/S-104 features across the area of coverage]*			

3.10.5 WLA with non matching vertical datums ?

Test Reference	IncompatibleDatums	**IHO Reference**	(S-100 Part 9/ S-98 C-4-2.6
Test description			
This test verifies the ECDIS will correctly reject the installation of data for Water Level Adjustment if the layers are incompatible.			
Setup			
*Load Exchange set **PowerUp***			
Action			
*Load exchange set **WLAInvalid***			
Results			
Verify the ECDIS rejects the installation of the following datasets: - *104AA005X01NW.H5* - *102AA005X01NW.H5* - *111AA005X01NW.H5* *Verify the ECDIS correctly load the following dataset* - *102AA005X01SE.H5*			

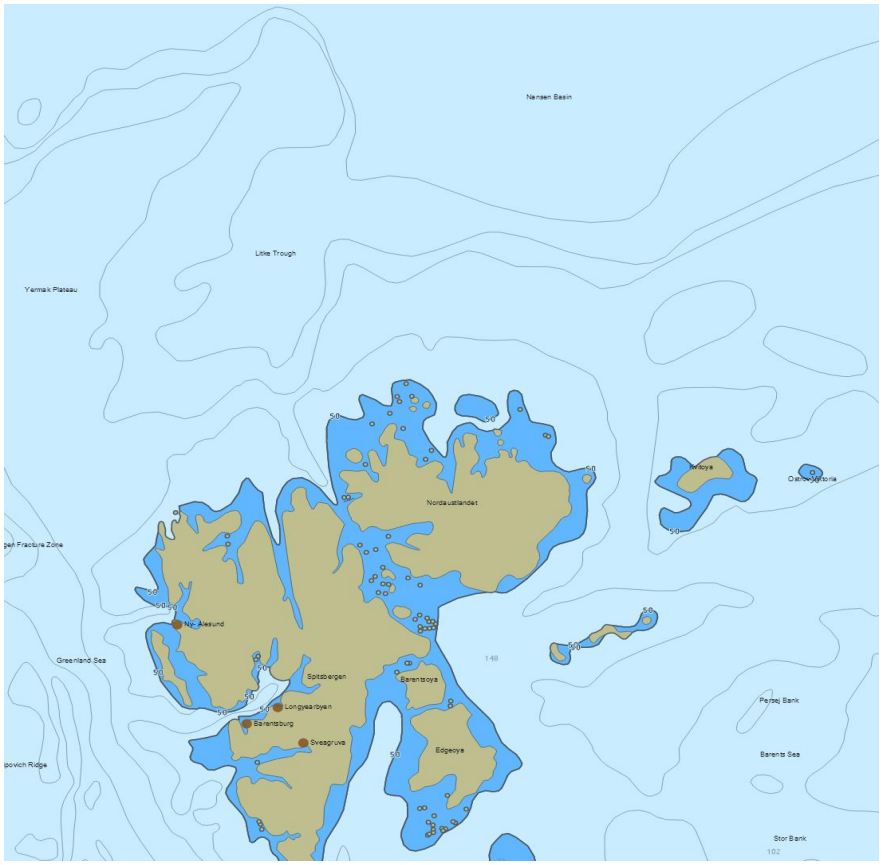
3.10.6 Route planning with Water Level Adjustment

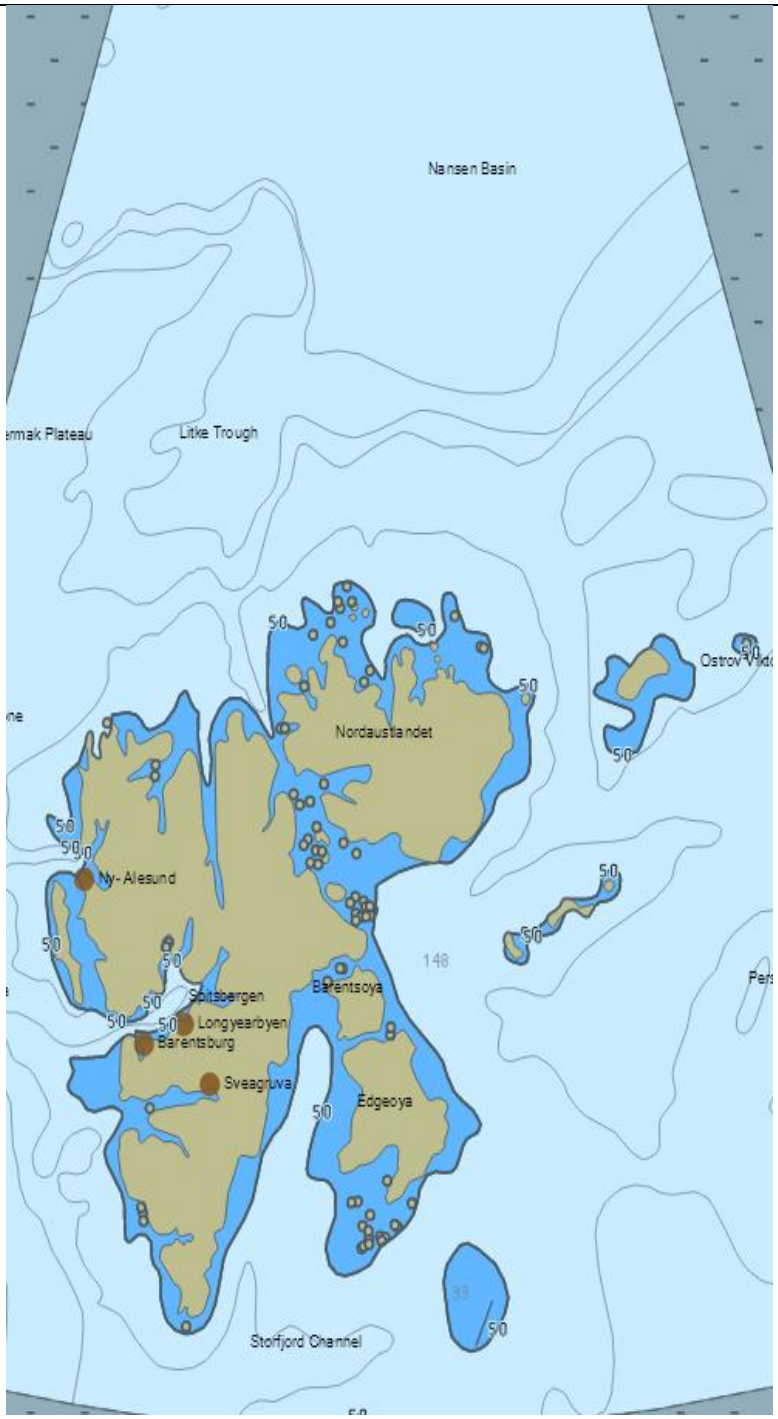
Test Reference	WLAPlanning1	**IHO Reference**	(S-100 Part 9/ S-98 C-4-2.7
Test description			
Verify the ECDIS correctly allows routes to be planned accounting for Water Level Adjustment corrections			
Setup			
As for test WaterLevelAdjustment			
Action			
1. Ensure exchange set is loaded correctly *2. Load cell 101AA00X01NW.000* *3. Plot a route between the waypoints WP1-WP4 using the following parameters* *i) Speed = 11knots* *ii) Planned route start date/time = 2022-14-11:00:00:00* *4. Run a route check on the defined route.* *5. Reset route start date/time to 2022-04-22:00:00:00* *6. Rerun the route check*			
Results			
Verify the route contains the following warnings when run at (4) *[list of warnings – this is because the S-104/S-102 adjusts Water Level to shoaler than 11.4m at the defined time)* *Verify the route check is clear when run at (6) (Water Level adjustment is clear at this time)* *Verify a permanent message is shown to the user as per S-98 C-4-2.7* **WLA from 12:34 08 Nov 2021 to 14:56 08 Nov 2021**			

3.11 Display of ENC covering Polar Regions

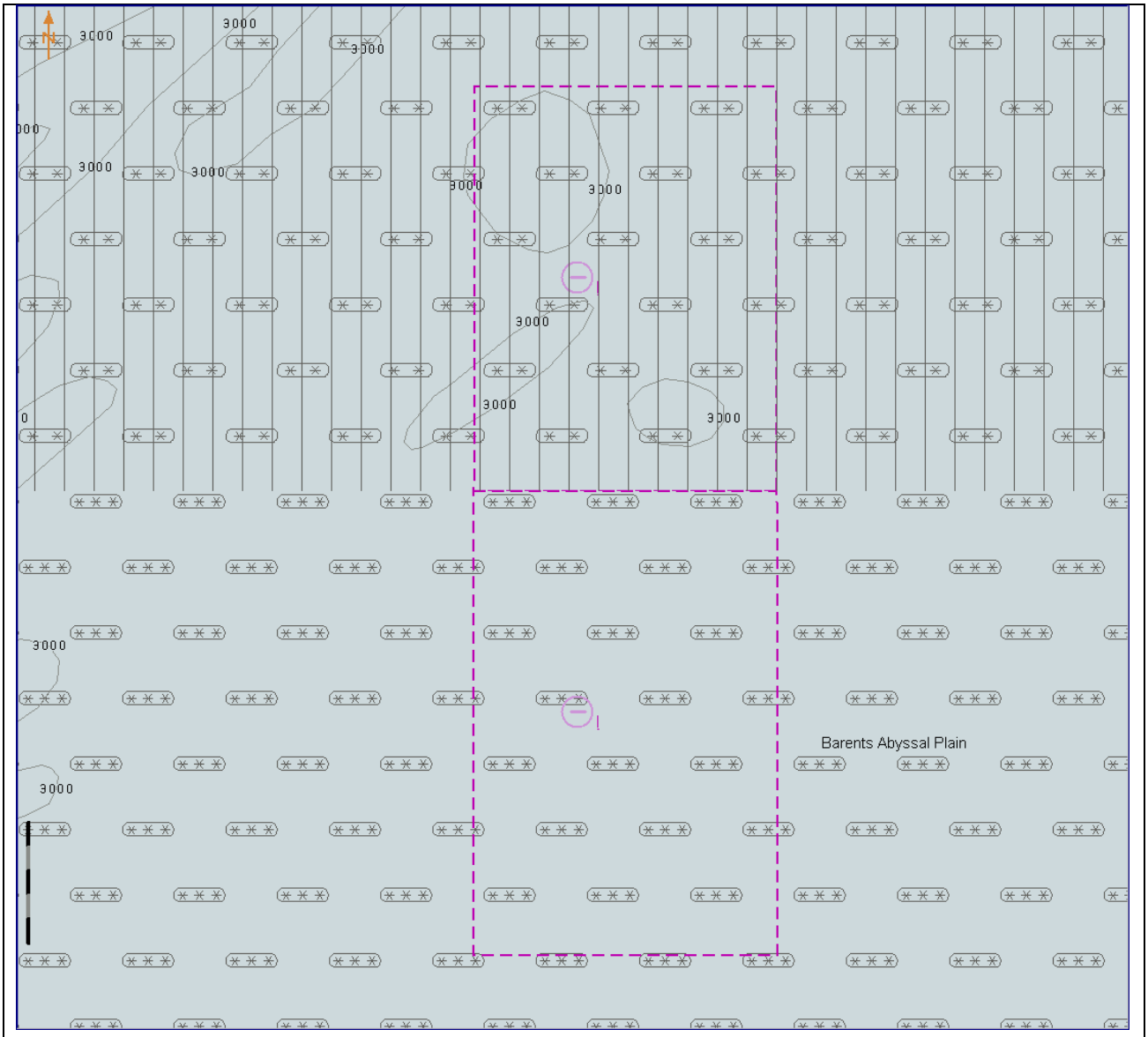
Test 3.9.1 is for all ECDIS. Test 3.9.2 is optional and should only be carried out on ECDIS claiming to be approved to function in Polar Regions.

3.11.1 Display of ENC Data up to 85 degrees

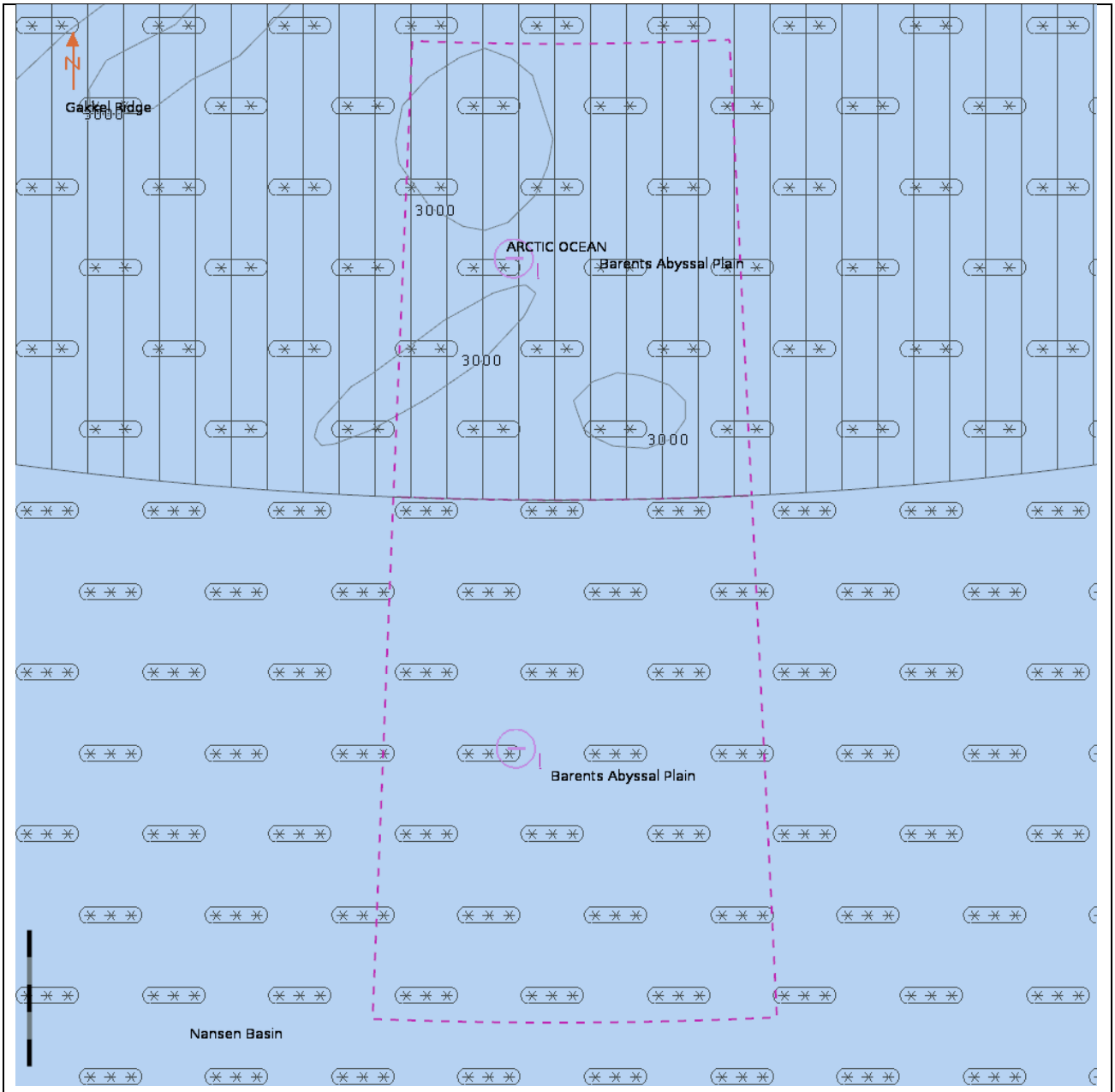
Test Reference	PolarData1	**IHO Reference**	
Test description			
Display of charts up to 85 degrees.			
Setup			
*Load the exchange set **PolarData*** • *Select Display Category Other* • *Select Safety Contour value to 30 m* • *Select Plain Boundaries* • *Select Simplified Point Symbols = false* • *Select Accuracy* • *Select Contour label*			
Action			
Select chart 101AA00NPOL3.000 at maximum display scale (1:3 000 000). Check ENC symbols shown in the ECDIS against the graphical plot.			
Results			
The ENC should be displayed in the ECDIS like one of the options below:  ***TBD:** Display is based on Mercator projection*			



TBD: *Note: Implementation of support for latitudes higher than 85º is an option for ECDIS. Polar projection is typically used for latitudes higher than 85º. ECDIS image in this example is based on polar projection*



Select 85°00.000'N 25°00.000'E as centre of the display, scale is 1:500 000
Display is based on Mercator projection
tbd
Note: Implementation of support for latitudes higher than 85º is an option for ECDIS. If not implemented, then there should be no chart displayed above latitude 85º. If implemented, the chart above latitude 85 º may or may not have overscale pattern depending of the chart available in the ECDIS for the area above latitude 85 º.



tbd

Select 85°00.000'N 25°00.000'E as centre of the display, scale is 1:500 000
Display is based on polar projection

Note: Implementation of support for latitudes higher than 85º is an option for ECDIS. If not implemented, then there should be no chart displayed above latitude 85º. If implemented, the chart above latitude 85 º may or may not have overscale pattern depending of the chart available in the ECDIS for the area above latitude 85 º.

3.11.2 Display of Data at Extreme High Latitudes

Test Reference	PolarData2	IHO Reference	S-52 10.1.10.2

Test description

ONLY TO BE TESTED FOR EQUIPMENT CLAIMING THE CAPABILITY TO DISPLAY ENC DATA AT LATITUDES GREATER THAN 85 DEGREES

Display of charts above 85 degrees.

Setup

*Load the exchange set **PolarData***

- *Select Display Category Other*
- *Select Safety Contour value to 30 m*
- *Select Plain Boundaries*
- *Select Paper chart symbols*
- *Select Accuracy*
- *Select Contour label*

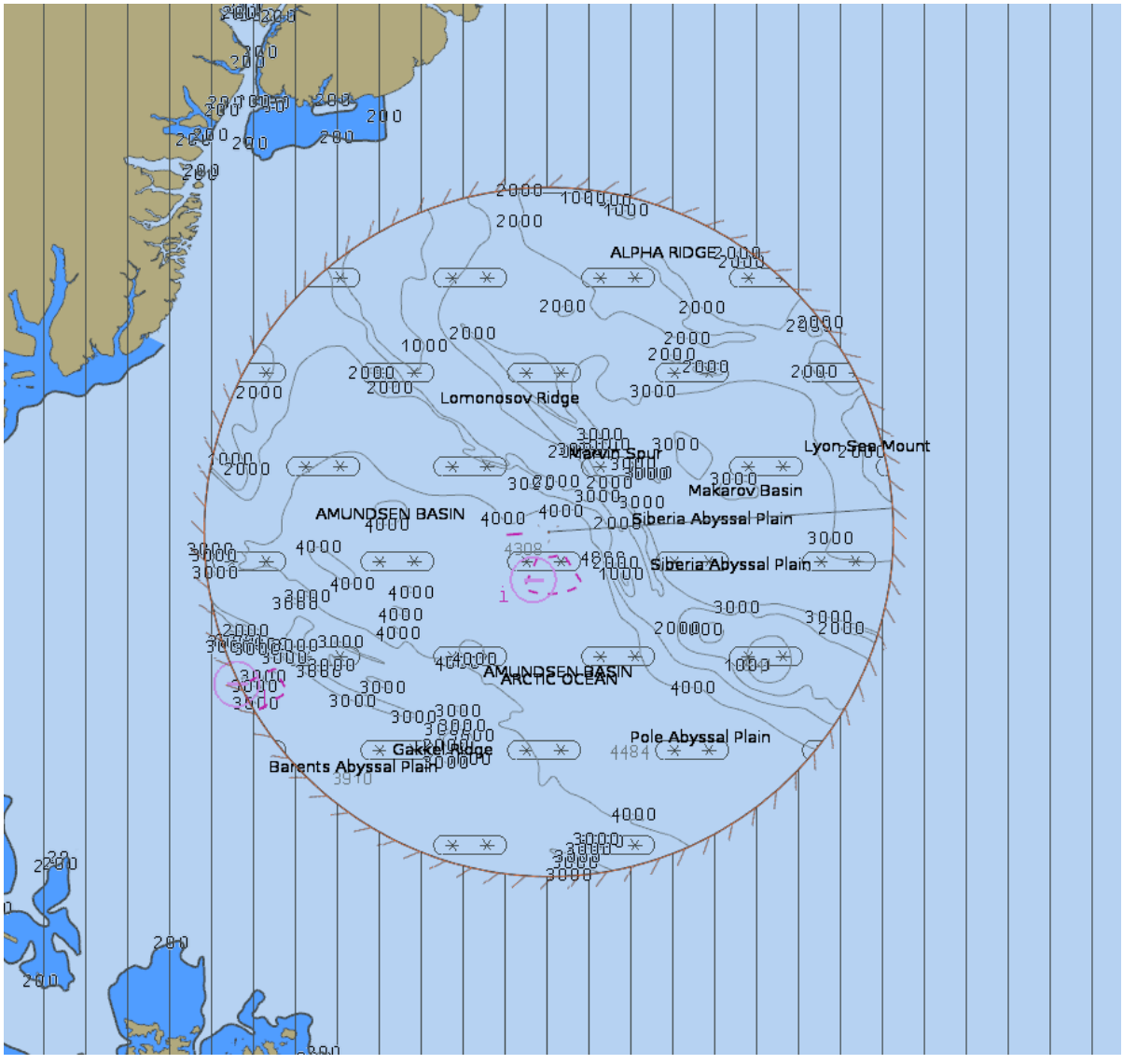
Action

Check ENC symbols shown in the ECDIS against the graphical plot.

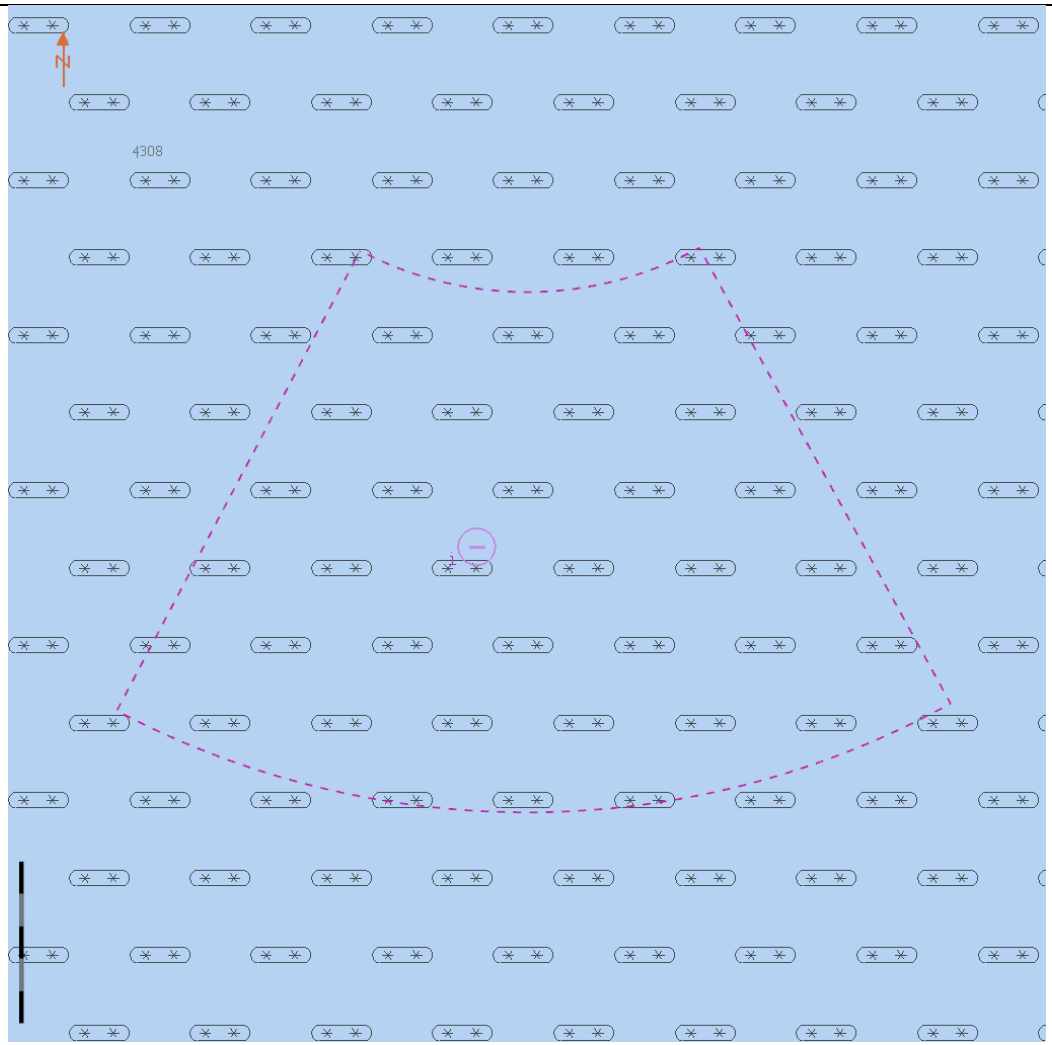
Results

The ENC in the ECDIS should be shown like in the picture below.

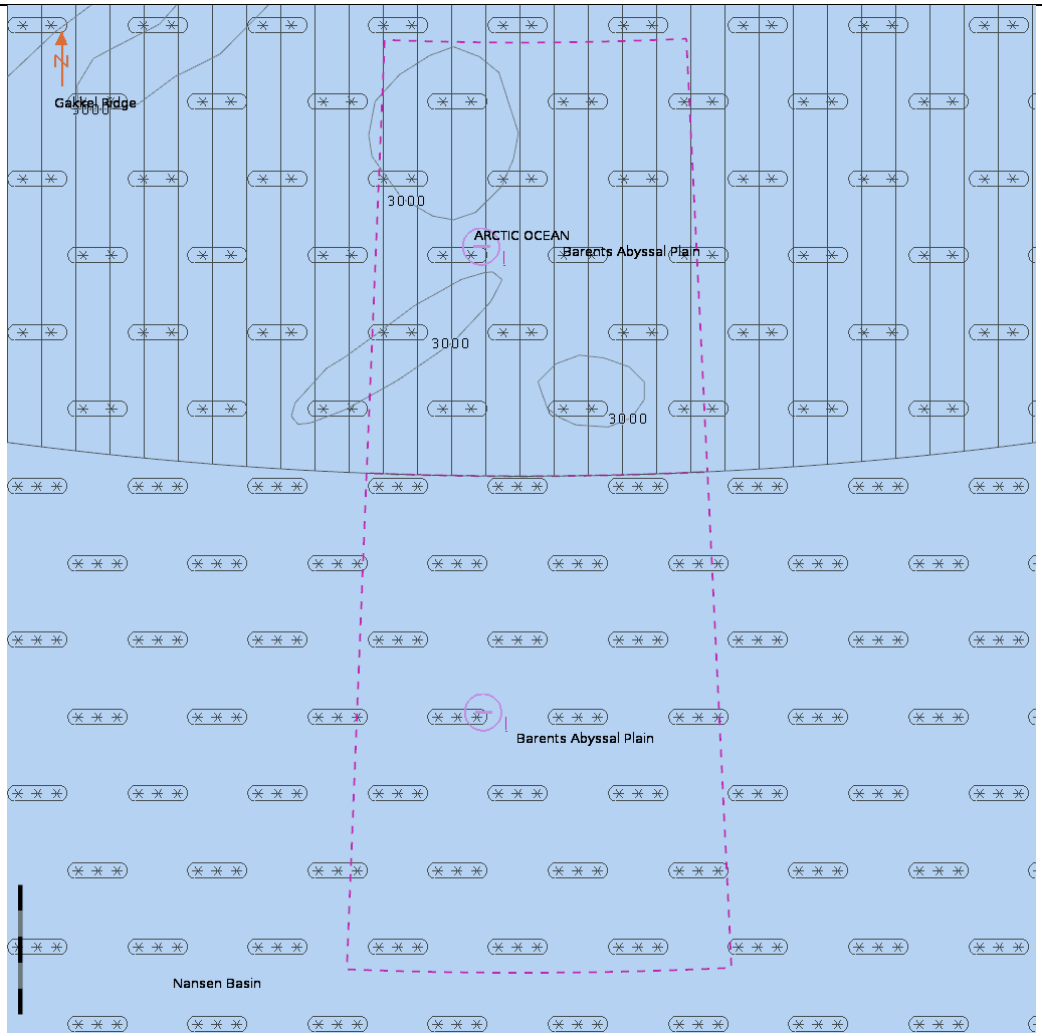
Note: The chart outside the circular area is an example of an optional background chart.



*North Pole is in the centre of the display **tbd***



Select 89°22.000'N 90°00.000'E as centre of the display ***tbd***



Select 85°00.000'N 025°00.000'E as centre of the display ***tbd***

4 Chart related functions

4.1 Mode and orientation

Test Reference	ModeOrientation1	**IHO Reference**	S-98 C-12.9.2
Test description			
Display of the north arrow symbol.			
Setup			
*Load the exchange set **PowerUp***			
Action			
Observe the display. *If the EUT offers the capability to show other than north-up presentation; Change the presentation to non-north up and observe the display.*			
Results			
Confirm that the north arrow symbol is always displayed at the top left corner of the chart area, not overlapping the scale or latitude bar. If the EUT supports changing to non-north up presentations confirm that the symbol realigns to north.			

Test Reference	ModeOrientation2	**IHO Reference**	S-98 C-4.2
Test description			
True motion operation.			
Setup			
As for ModeOrientation			
Action			
Ensure that true motion is provided. *Reset the display and check that the generation of the neighbouring area takes place automatically at a distance selected by the Mariner.*			
Results			
Confirm that true motion operation is provided and that the generation of the neighbouring area takes place automatically at a distance selected by the Mariner.			

Test Reference	ModeOrientation3	**IHO Reference**	S-98 C-4.2
Test description			
Manual adjustment of chart display area and own ship position.			
Setup			
As for ModeOrientation			
Action			
Manually adjust the chart display area. *Change the position of own ship relative to the edge of the display.*			
Results			
Confirm that it is possible to change manually the chart area and the position of own ship relative to the edge of the display.			

Test Reference	NoDataAvailable	**IHO Reference**	S-98 C-9.4
Test description			
No ENC data available.			
Setup			
As for ModeOrientation *Ship position as follows: 32°27.88'S 061°20.66'E (an area with no ENC)*			
Action			
Observe the display.			
Results			
Confirm that a "No ENC available" indication is provided.			

Test Reference	NonNorthUp	**IHO Reference**	S-98 C-10.4
Test description			
Display in non 'north-up' orientation.			
Setup			
As for ModeOrientation			
Action			
For each bearing-stabilised orientation other than 'north-up' that may be provided, confirm by analytical evaluation that for turning rates between 0 deg/s and 20 deg/s the displayed chart symbols and text do not re-orient more often than 2 times per second and remain legible if they do not remain fixed.			
Results			
Confirm that the displayed symbols and text do not re-orient more often than 2 times per second and remain legible. The symbols and text may remaining fixed and in this case will not re-orientate.			

4.2 Display of scale bar

Test Reference	ScaleBar	**IHO Reference**	S-98 C-12.9.1
Test description			
Display of scale bar at appropriate scales.			
Setup			
Load exchange set ***PowerUp*** *Set Display Category Base Display.*			
Action			
Zoom to a display scale greater than 1:80 000 (such as 1:25 000), observe the display.			
Results			
Confirm that a scale bar is displayed. Also confirm that the scale bar is displayed between 2mm and 4mm from the left side of the chart display area.			

4.3 Display of latitude bar

Test Reference	LatitudeBar	**IHO Reference**	S-98 C-12.9.1
Test description			
Display of latitude bar at appropriate scales.			
Setup			
*Load exchange set **PowerUp*** *Set Display Category Base Display.*			
Action			
Zoom to a display scale less than 1:80 000 (such as 1:300 000), observe the display.			
Results			
Confirm that a latitude bar is displayed. Also confirm that the scale bar is displayed between 2mm and 4mm from the left side of the chart display area.			

4.4 Feature information

Test Reference	FeatureInformation1	**IHO Reference**	S-98 C-9.1.4
Test description			
General rules for cursor pick report			
Setup			
*Load exchange set **PowerUp*** *Select Display Category Other.*			
Action			
1. Select several features of *- depth area;* *- restricted area;* *- sea area;* *- depth contour;* *- ferry route;* *- recommended track;* *- buoy (for example buoy and light at 32°29.50'S 061°00.46'E);* *- light;* *- wreck.* *2. Observe feature information.* *3. Remove feature information from display.*			
Results			
1. The following rules shall be applied to the pick report: *a. Full S-100 Feature and Attribute names shall be displayed.* *b. Enumerate value names shall be displayed. Enumerate attribute numbers should not be displayed.* *c. There shall not be any padding of attribute values, for example a height of 10 m shall not be padded to 10.000000 m as this could potentially confuse or mislead the Mariner.* *d. Units of measure shall be included after all attribute values which are weights or measures.*			

e. The pick report shall only return information about the features present on the ECDIS display. This means all features in the viewing layers enabled even if those features have no resultant display. For example the meta feature M_SREL has no display but should be detailed in the pick report.
f. Cursor enquiry shall extend to the spatial feature, which carries accuracy attributes Quaklity of Position and Positional Accuracy.
g. It shall include feature association information which carry additional information and related attribution, e.g.
2. Text associated with chart features must be removed from the display.

Note: The text and background colour of pick report is specified by the OEM

Test Reference	FeatureInformation2	**IHO Reference**	S-98 C-9.1.4
Test description			
Pick report descriptions and sorting			
Setup			
As for test 4.4 a)			
Action			
Select several features as mentioned in 4.4a)			
Results			
1. A plain language explanation of each symbol shall be used as included in portrayal catalogue to provide quick and understandable information which is not always obvious from the feature class and attribute information. *2. Attribute values provided in addition to the above explanation shall be connected to their meaning, and the definitions shall also be available.* *3. The feature information shall be sorted by the drawing priority of the feature as defined in the portrayal catalogue. When the drawing priority of features is equal, the geometric primitive shall be used to order the information (points followed by curves and finally surfaces).* *4. Check that the content displayed in the pick report is configurable by the user.*			

Test Reference	FeatureInformation3	**IHO Reference**	S-98 C-9.1.4
Test description			
User defined cursor pick parameters, if available			
Setup			
As for test 4.4 a)			
Action			
1. Configure the cursor pick parameter as available. *2. Select several features as mentioned in 4.4a)*			
Results			
1. The cursor pick parameters may be configurable by the user and available for presentation. *2. The content of the pick report shall be presented as configured.*			

Test Reference	FeatureInformation4	IHO Reference	S-52 10.8.5

Test description

Hover-over function for feature information (optional)
Test shall only be performed if a hover-over function for feature information is provided.

Setup

As for test 4.4 a)

Action

1. Configure the hover-over function OFF.
2. Move cursor to one of the features in the table below and to features where additional information is available or date dependent features:
3. Configure the hover-over function ON.
4. Move cursor to one of the features mentioned in 2.
5. Move cursor to any other features.

Features	S-101 Acronym
Lights	*AllRoundLight*
Beacon, cardinal	*BuoyCardinal*
Beacon, isolated danger	*BuoyIsolatedDAnger*
Beacon, lateral	*BeaconLateral*
Beacon, safe water	*BeaconSafeWater*
Beacon, special purpose/general	*BeaconSpecialPurpose*
Buoy, cardinal	*BuoyCardinal*
Buoy, installation	*BuoyInstallation*
Buoy, isolated danger	*BuoyIsolatedDanger*
Buoy, lateral	*BuoyLateral*
Buoy, safe water	*BuoySafeWater*
Buoy, special purpose/general	*BuoySpecialPurpose*
Landmarks	*Landmark*

Results

1. It shall be possible to switch OFF the hover-over function.
2. There shall be no information of chart features displayed when hovering over it.
3. It shall be possible to switch ON the hover-over function.
4. Important information of chart features shall be displayed when hovering over it.
5. When hovering over other chart features no information shall be displayed.

Test Reference	FeatureInformation5	IHO Reference	S-98 C-12.6.2

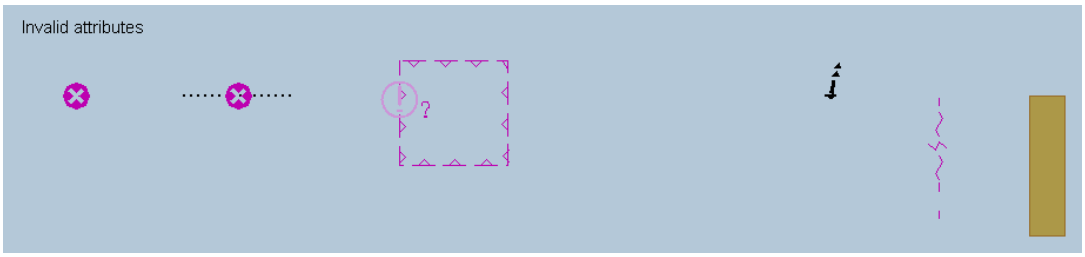
Test description

Presentation of unknown attributes
There is no generic special presentation for unknown attributes. Some presentations may indicate question mark, but that is because something mandatory is missing for the feature. The main purpose of this test is to check
that ECDIS is able to accept ENC datasets which contain unknown attributes. The real use case is when ECDIS is not upgraded for latest IHO standard and therefore the
ECDIS does not understand all attributes.

Setup

*Load the exchange set **InvalidFeatures** dataset 101AA00INVOB.000 :*

- *Select Display Category Other*
- *Set the Safety Contour value to 0 m*
- *Select Symbolized Boundaries*
- *Select Paper chart symbols*

Action
Select chart features with unknown attribute for cursor pick report.
Results
Check ENC symbols shown in the ECDIS against the corresponding graphical plot. Select one by one each of 6 features for cursor pick report. *The result of cursor pick shall be* *a) Wreck with attribute Water level effect (covers and uncovers)* *b) Obstruction with attribute Value of sounding (no value)* *c) Restricted area without any attribute* *d) Buoy, cardinal with attributes Buoy shape (spar (spindle)), Category of cardinal mark (north cardinal mark) and Color pattern (horizontal stripes)* *e) Cable, submarine without any attribute* *f) Silo/Tank without any attribute*  ***tbd***

Test Reference	TidalStreamPanelData	**IHO Reference**	S-98 Annex C C15.4
Test description			
Display of tidal stream panel Data			
Setup			
*Load exchange set **PowerUp***			
Action			
1. Select an example of TidalStreamPanelData (tidal stream panel information) *1a. select the complex attribute tidal stream panel values at 32°31.45'S 60°56.35'E for display;* *2. Select an example of TidalAStreamPanelData (tidal stream prediction by harmonic methods)* *2a. select tidal stream prediction by harmonic methods feature at 32°32.57'S 60°57.69'E for display;* *3. Repeat step 1 and 2 for different light conditions (DAY, DUSK, NIGHT).*			

Results

1a. The data must be displayed in a way that it can be easily read and is logically presented, in a format as follows:

Tidal Station: PLYMOUTH (DEVONPORT)			
Tidal Station Identifier: 0014		Data from: ENC	
	Hours	Direction of stream (degrees)	Rates at spring tides (knots)
Before	-6	113	0.1
	-5	332	0.6
	-4	331	1.1
	-3	342	1.0
	-2	347	0.7
	-1	333	0.5
high water	0	317	0.3
After	+1	178	0.3
	+2	146	0.6
	+3	140	1.0
	+4	143	1.1
	+5	143	0.8
	+6	138	0.3

TBD

2a. The data must be displayed in a way that it can be easily read and is logically presented, in a format as follows:

	amplitude	phase
M2	0.962	165
S2	0.361	243
K1	1.223	097
O1	0.875	143

3. The data must be displayed as appropriate for the selected light condition (DAY, DUSK, NIGHT).

Test Reference	SupplemnentaryFile2	**IHO Reference**	S-98 Annex C C-10.5.2

Test description

Display of supplementary text file

Setup

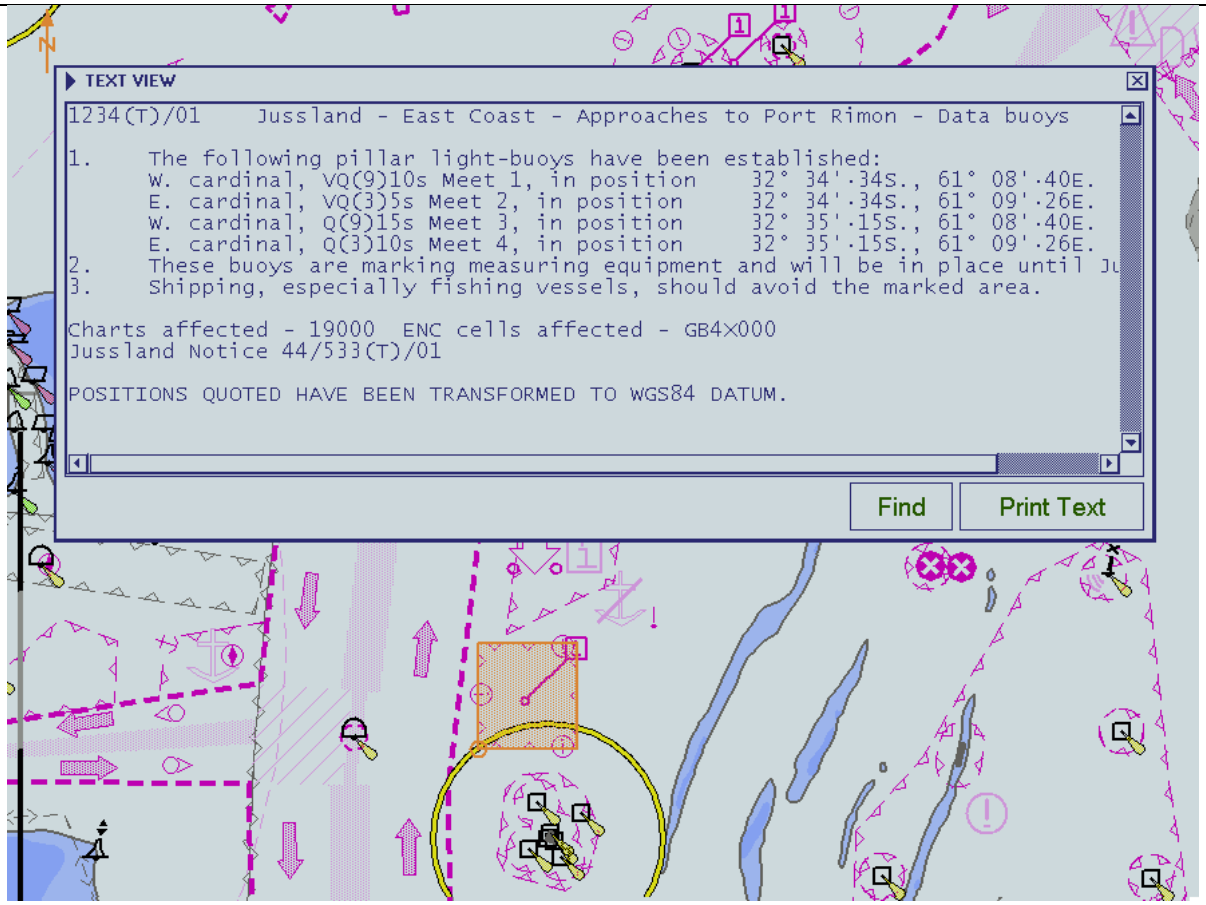
As for test FeatureInformation

Action

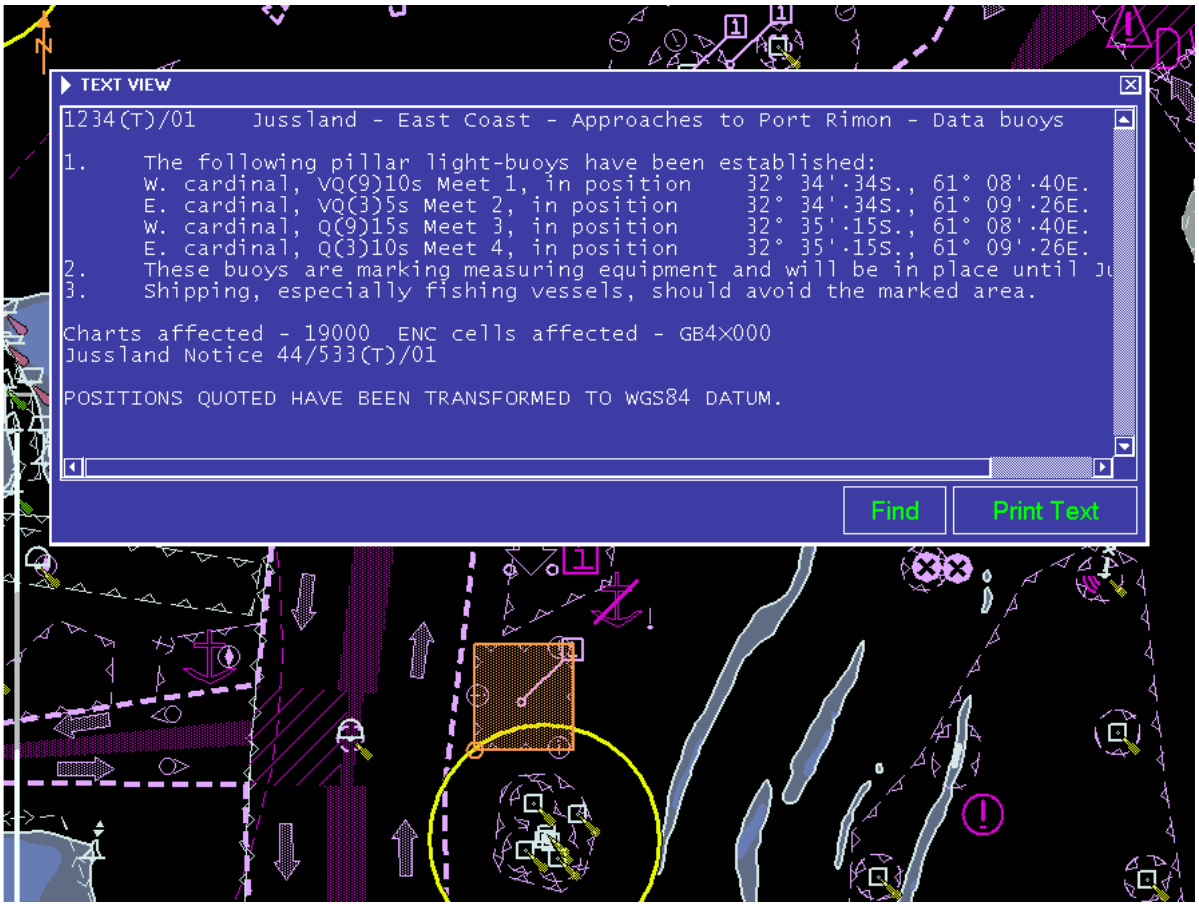
1. Select an example of a note encoded using information attributes (for example caution area at approximately 32°34.74'S 061°08.92'E);
2. Repeat step 1 for different light conditions (DAY, DUSK, NIGHT).

Results

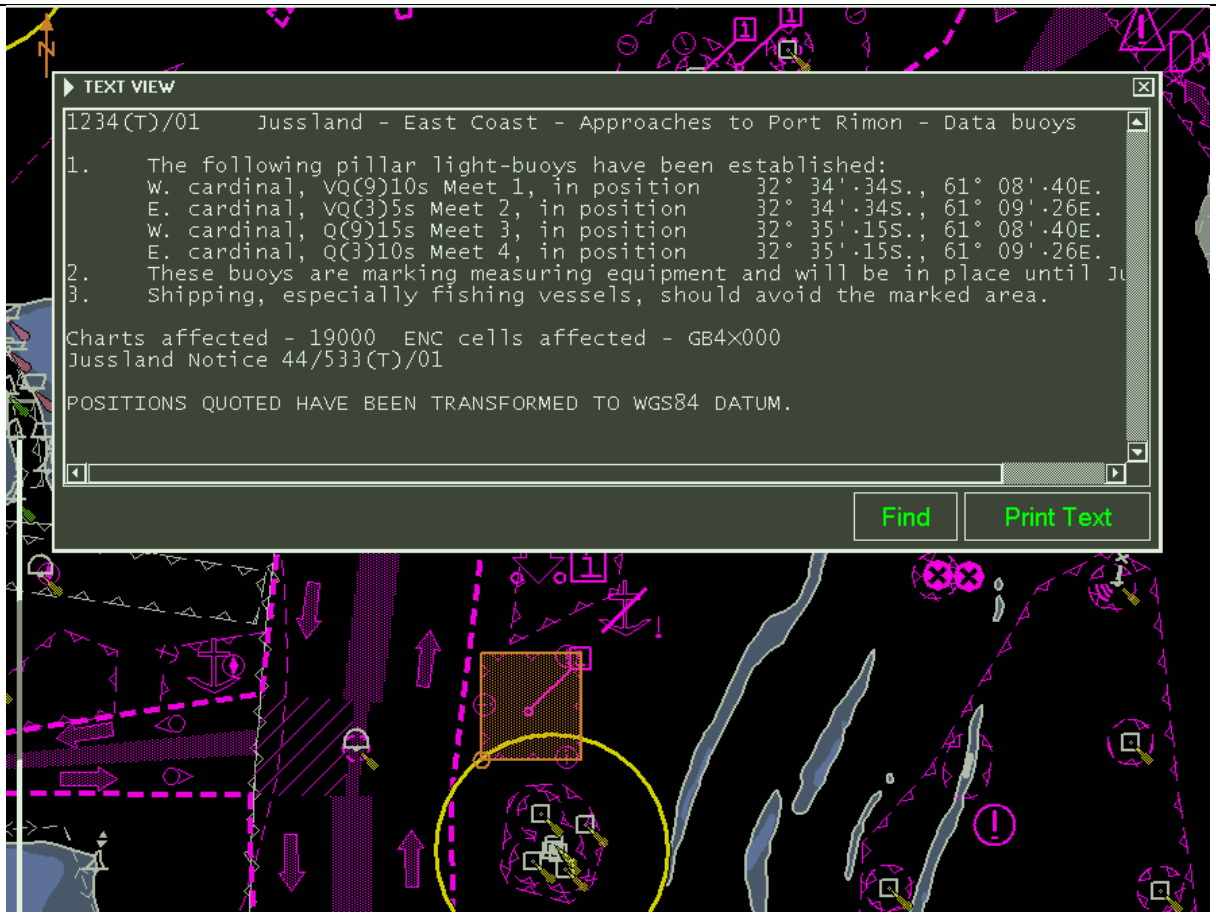
1. The note must be displayed within the light level of the current display and in a way that it can be easily read, for example by displaying the note as it might appear on a paper chart (for example content of 101AA00GBIECTMP.TXT file as contained in the directory of loaded ENCs).
2. The note must be displayed as appropriate for the selected light condition (DAY, DUSK, NIGHT).
3. The content of the note must commence at the location specified by the fileLocator reference, as shown in the image



*Example of Text 101AA00IECTMP.TXT over cell 101AA00X0000.000, Day palette **tbd***



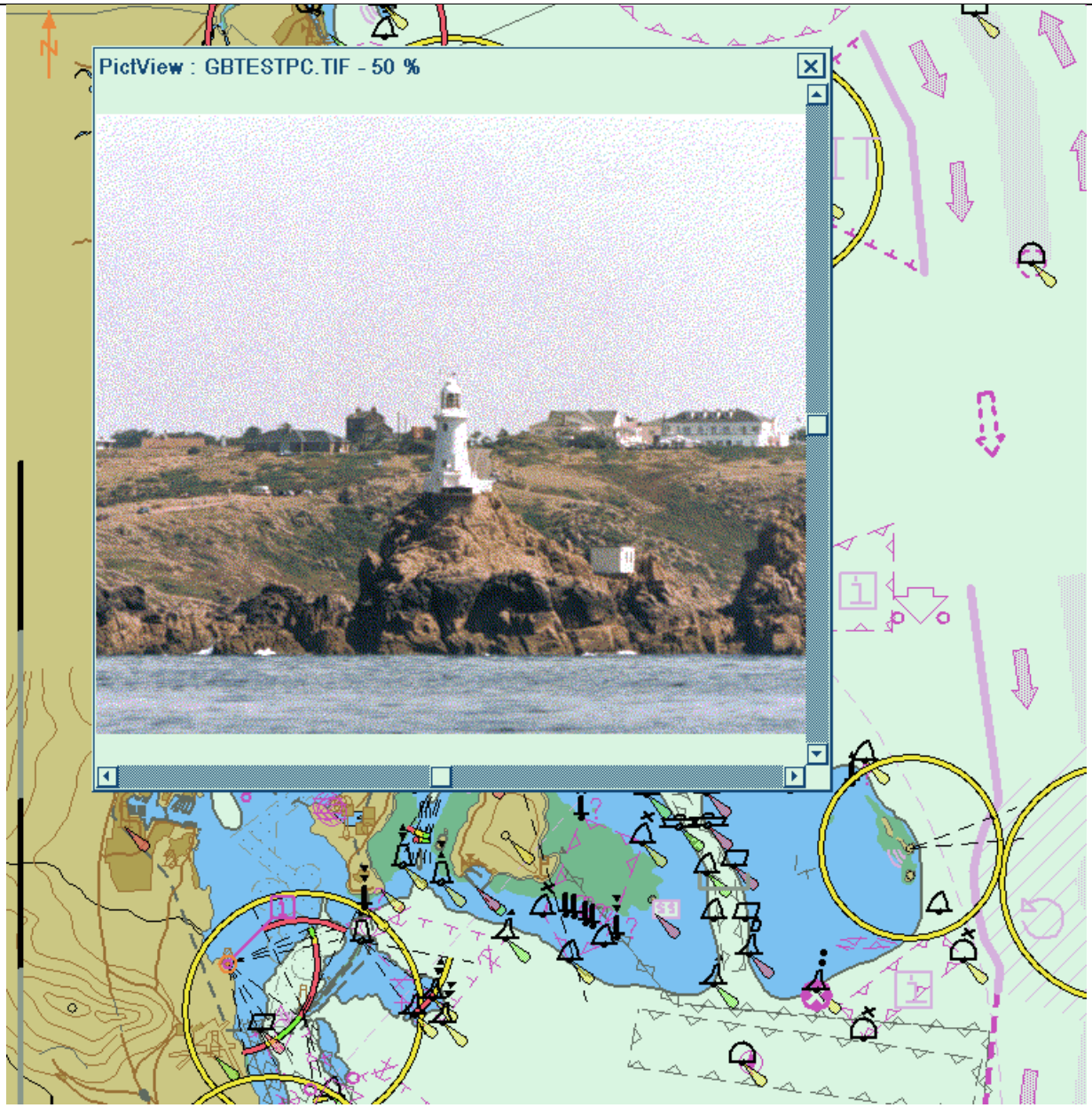
*Example of Text GBIECTMP.TXT over cell 101AA00X0000.000, Dusk palette **tbd***



Example of Text 101AA00IECTMP.TXT over cell 101AA00X0000.000, Night palette ***tbd***

Test Reference	SupplmentaryFile1	**IHO Reference**	
Test description			
Display of supplementary text file using file locator attributes			
Setup			
As for test FeatureInformation			
Action			
1. Select an example of a note encoded using text (text description) (caution area at approximately 32°34.74'S 061°08.92'E); *2. Repeat step 1 for different light conditions (DAY, DUSK, NIGHT).*			
Results			
1. The note must be displayed within the light level of the current display and in a way that it can be easily read, for example by displaying the note as it might appear on a paper chart (for example content of 101AA00IECTMP.TXT file as contained in the directory of loaded ENCs). *2. The note must be displayed as appropriate for the selected light condition (DAY, DUSK, NIGHT).* *3. The content of the note must commence at the location specified by the fileLocator reference, as shown in the image*			
IMG: fileLocator attributes.			

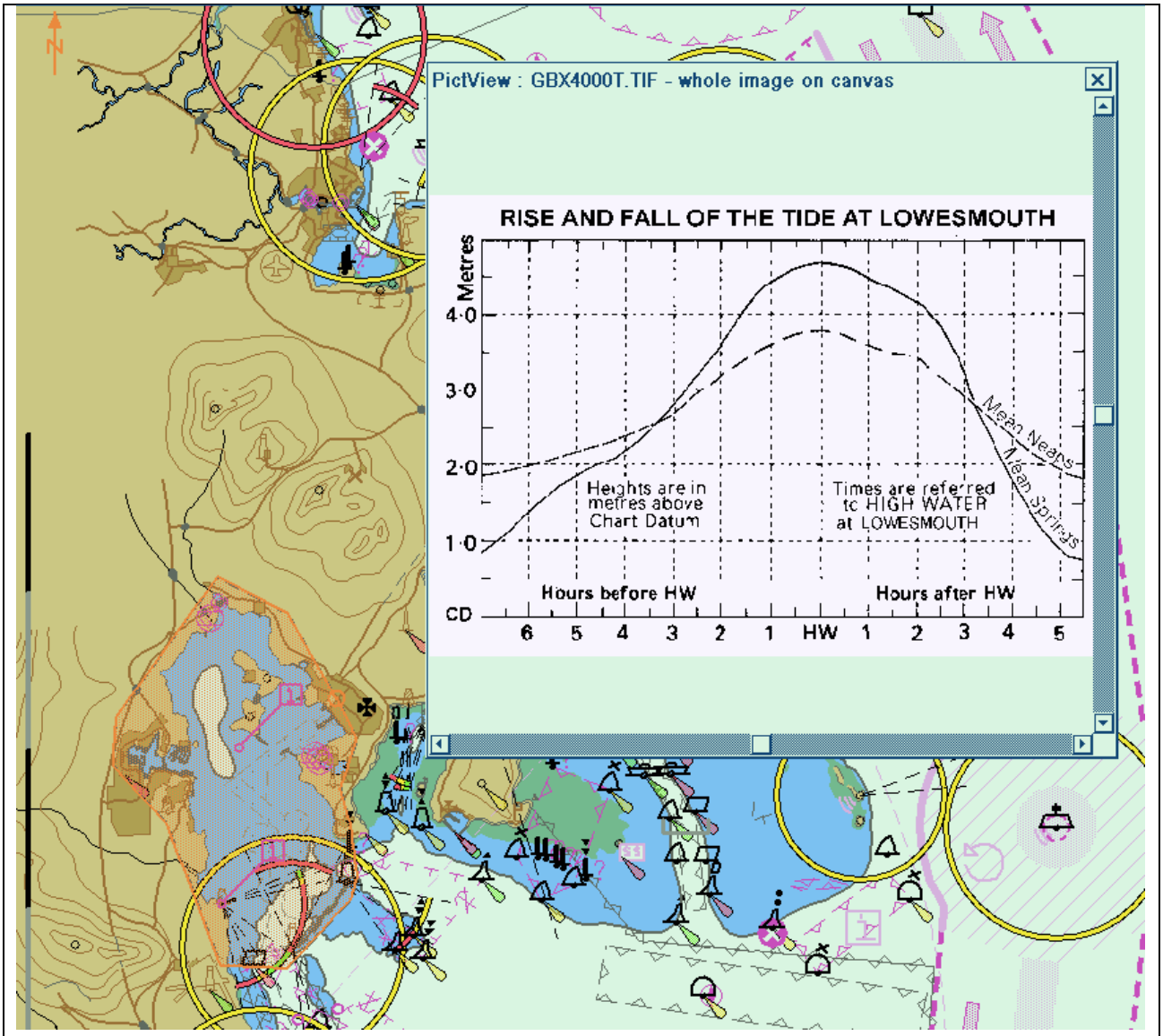
Test Reference	PictorialRepresentation	**IHO Reference**	S-98 C-11.6
Test description			
Display of picture representation			
Setup			
As for test FeatureInformation			
Action			
1. Select an example of the attribute pictorialRepresentation *1a. select landmark feature at 32°31.95'S 60°54.34'E and select picture representation for display;* *1b. select area feature of 32°30.25'S 60°54.64'E with NauticalInformation and select picture representation for display;* *2. Repeat step 1a and b for different light conditions (DAY, DUSK, NIGHT).*			
Results			
1a. The picture 101AA00TESTPC.TIF must be displayed; *1b. The picture 101AA00X4000T.TIF must be displayed;* *2. The pictures must be displayed as appropriate for the selected light condition (DAY, DUSK, NIGHT). It shall not affect the user's night vision.*			



*Example of Picture 101AA00TESTPC.TIF over cell 101AA00X0000.000, Day palette **tbd***

*Example of Picture 101AA00TESTPC.TIF over cell 101AA00X0000.000, Dusk palette **tbd***

*Example of Picture 101AA00TESTPC.TIF over cell 101AA00X0000.000, Night palette **tbd***

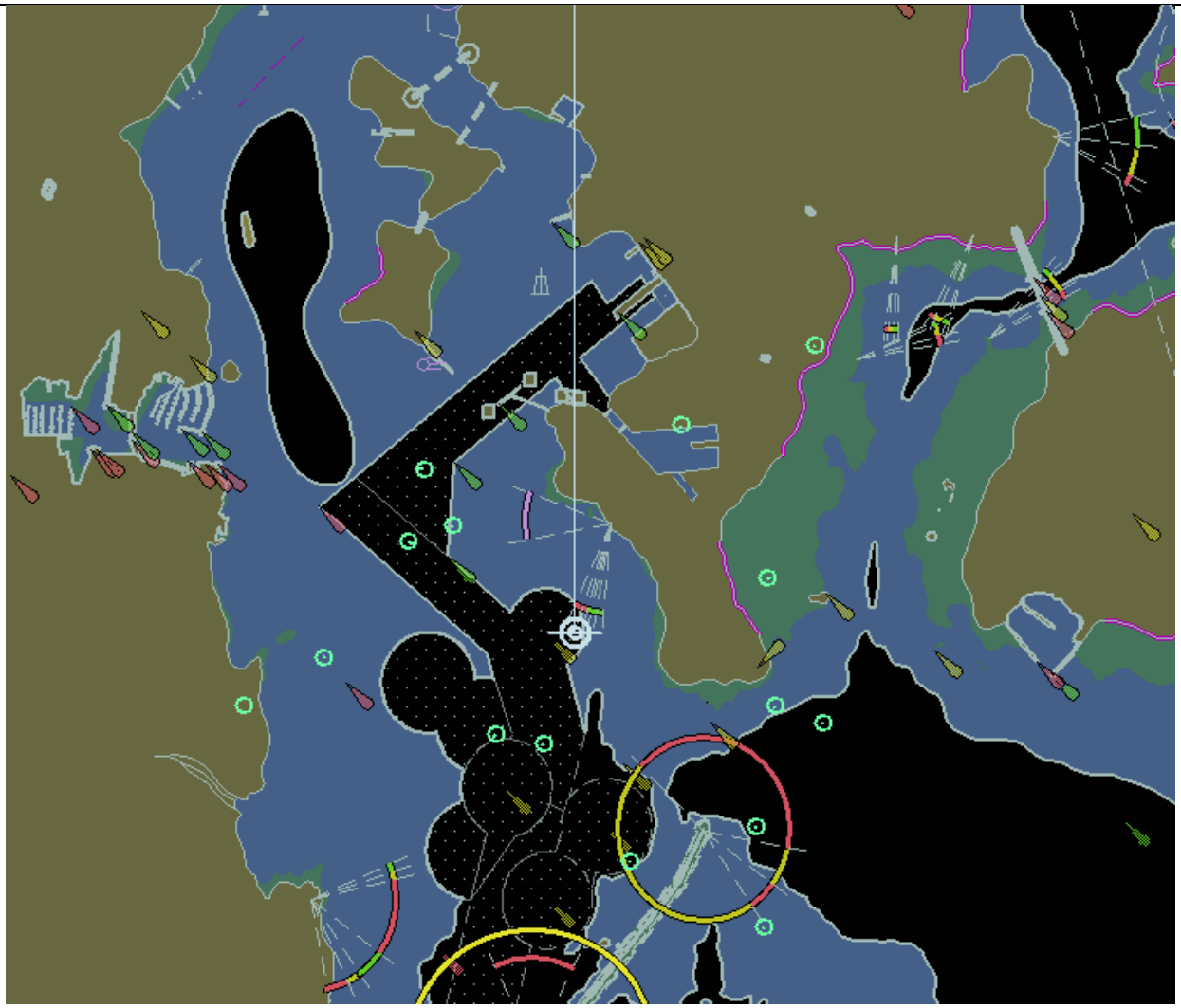


*Example of Picture 101AA00X4000T.TIF over cell 101AA00X0000.000, Day palette **tbd***

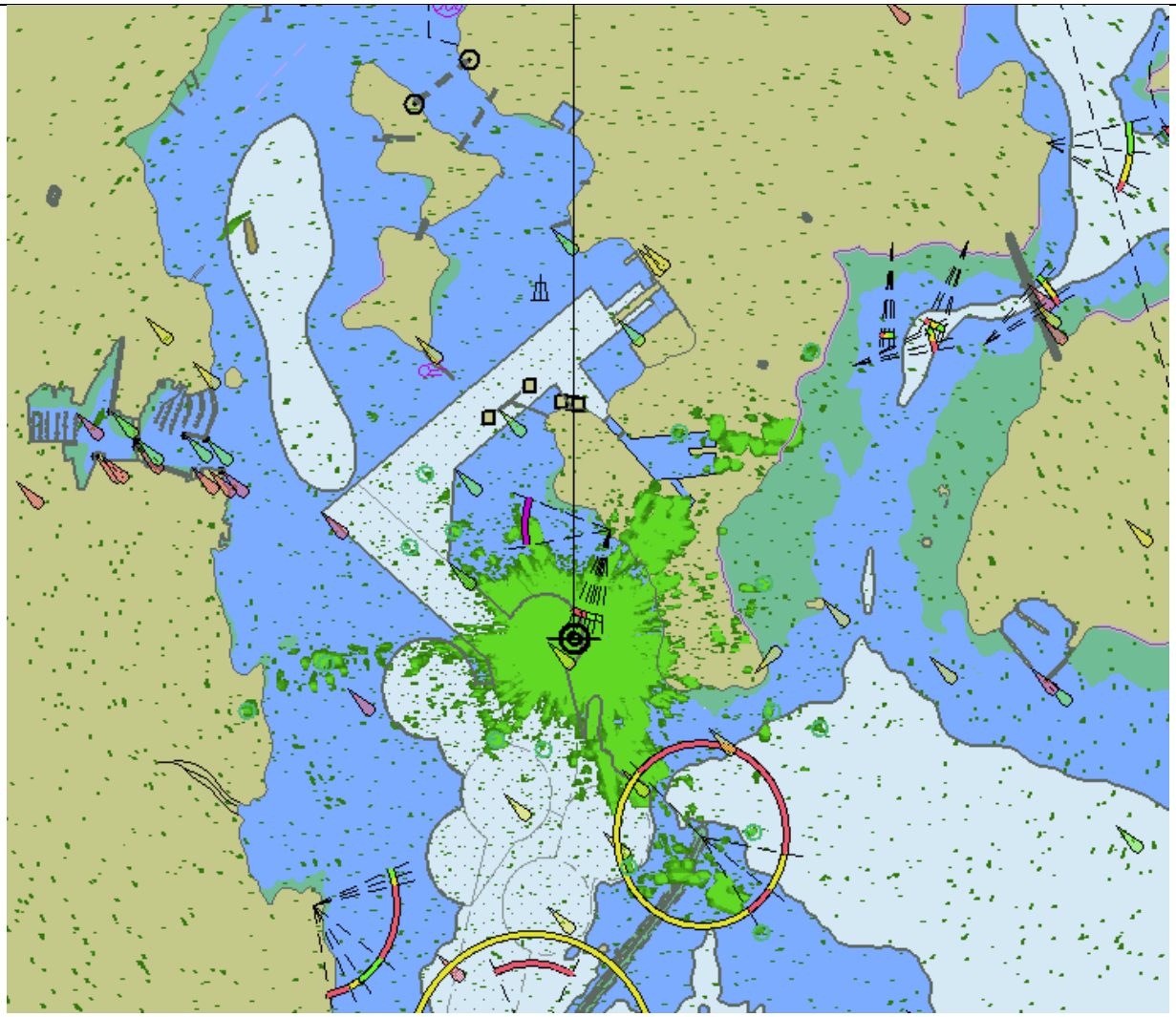
4.5 Radar and Plotting Information

Where the capability for displaying radar or radar tracks is provided, in addition to the requirements of IEC 62288 for radar displays and presentation of target information, perform the following:

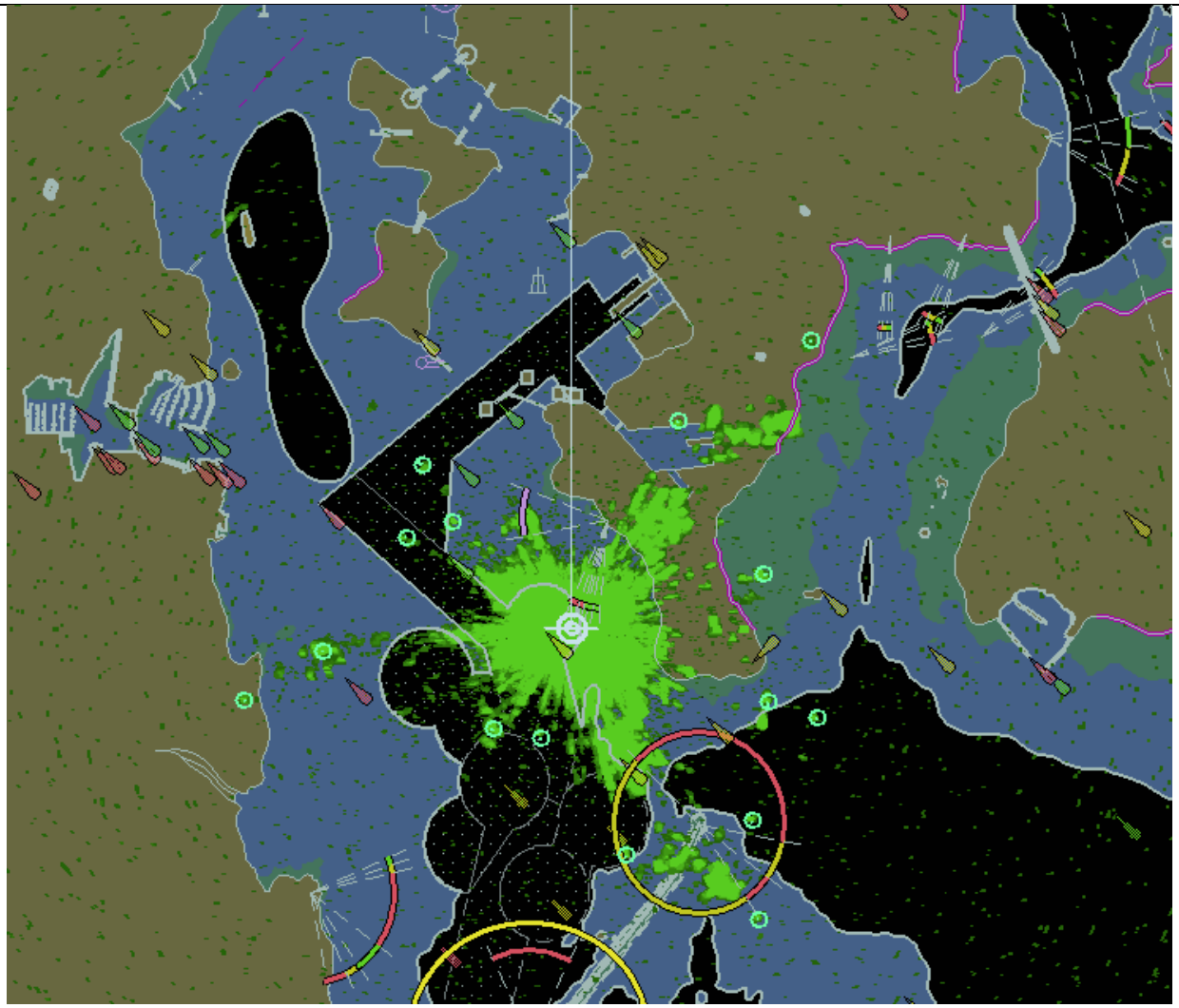
Test Reference	RadarOverlay	**IHO Reference**	S-98 C-9.2.2
Test description			
Display of Radar overlays with System Database information			
Setup			
*Load exchange set **PowerUp*** *Display cell 101AA00X01NE at 3 NM range scale* • *Select Safety Contour value to 8 m* • *Select Safety Depth value to 8 m* • *Select Plain Boundaries* • *Select Paper chart symbols*			
Action			
Switch on the following (where available): • *Radar image overlay* • *Radar tracked target information* • *AIS information*			
Results			
Confirm by observation that same System Database features are under or over radar echoes as in the example pictures. Note that some examples contain intentionally a lot of radar echo noise in order to give many examples of the System Database features which shall be over or under radar echoes. *Day with radar tracked targets. Display Category Display Base + Lights **tbd***			



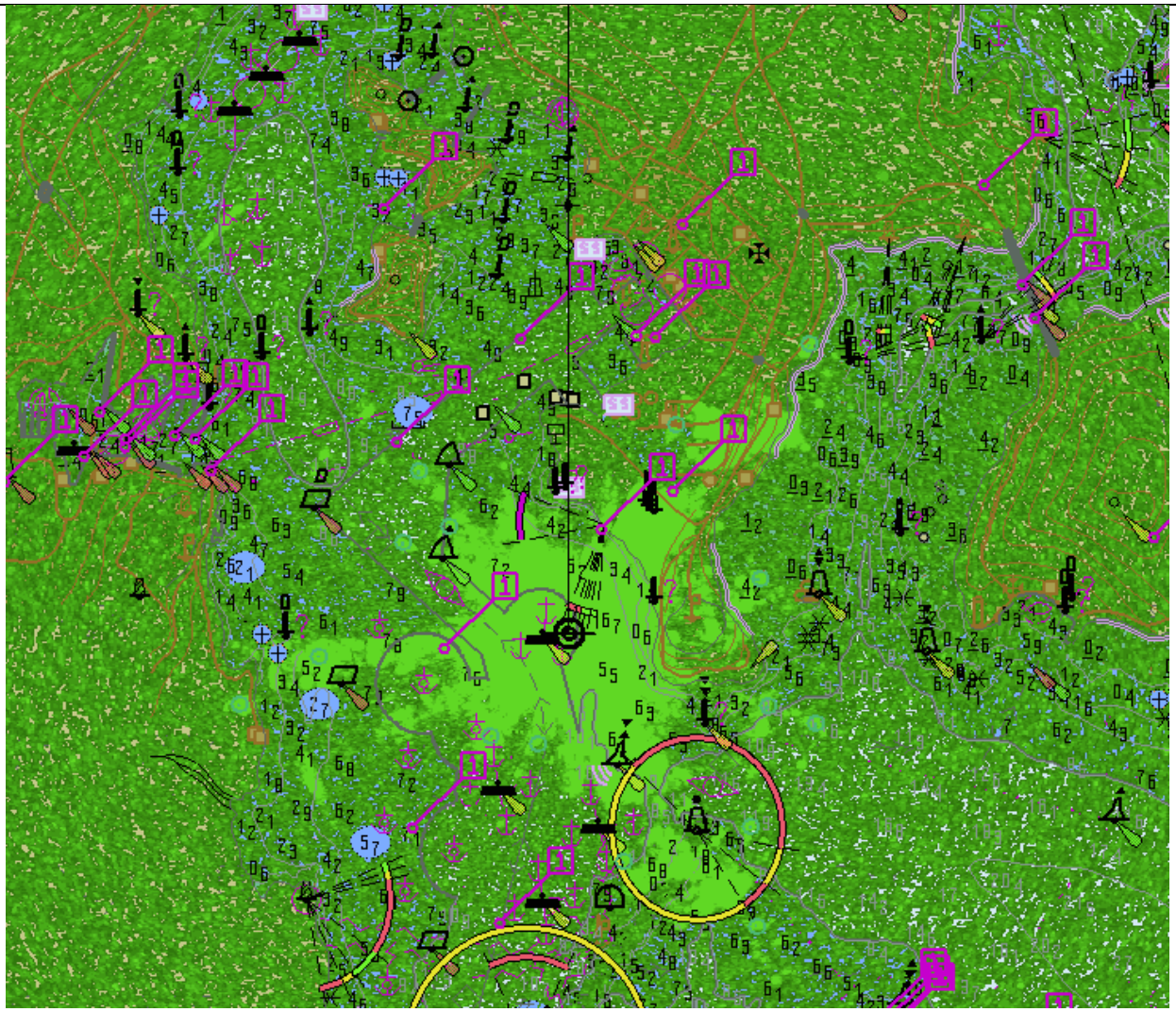
Dusk with radar tracked targets. Display Category Display Base + Lights ***tbd***



Day with radar echoes and tracked targets. Display Category Display Base + Lights ***tbd***

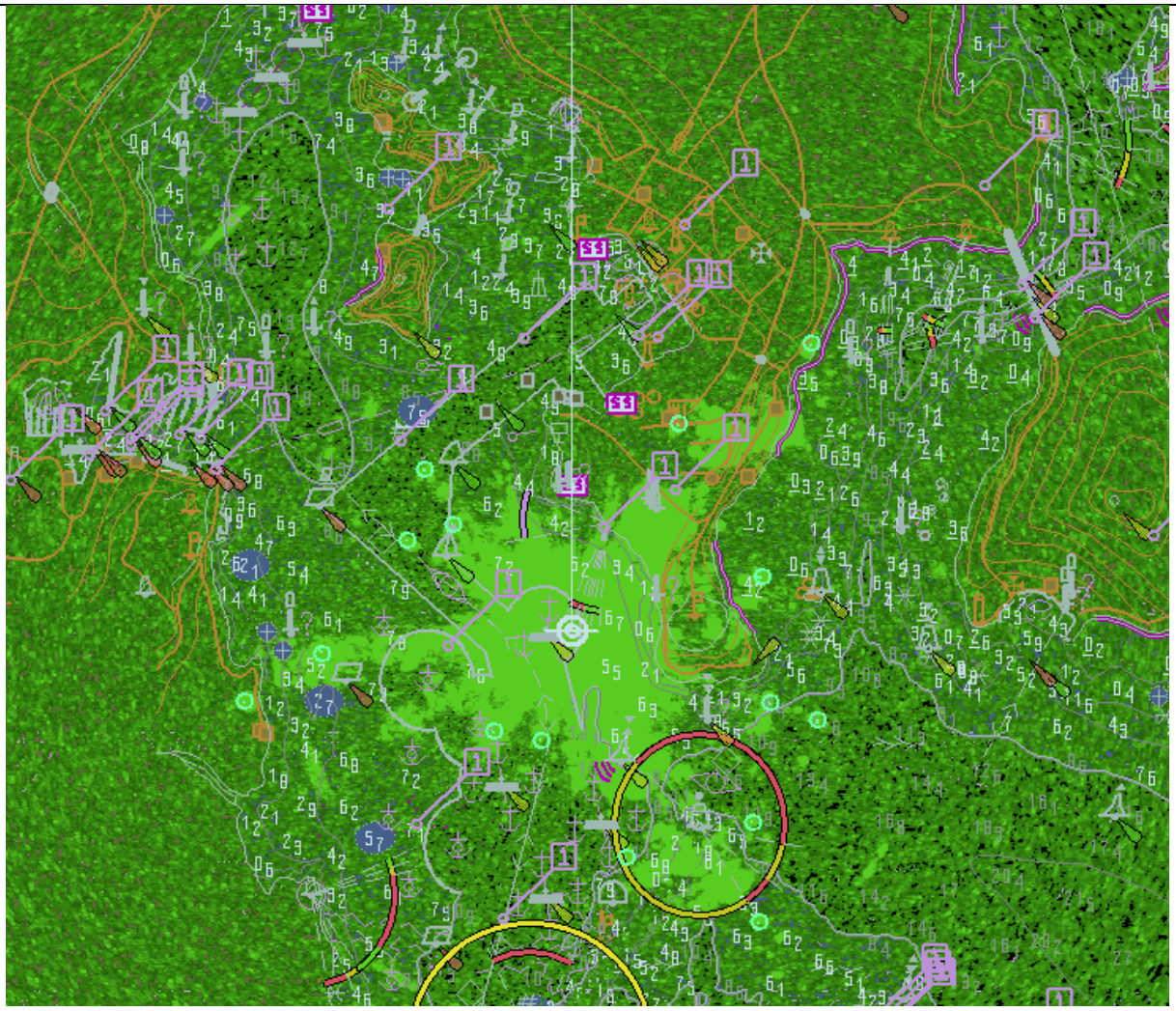


Dusk with radar echoes and tracked targets. Display Category Display Base + Lights ***tbd***



Day with very noisy radar echoes and tracked targets. Display Category Other, Select Highlight info, Select Shallow water dangers.

Note: This example clearly shows which SYSTEM DATABASE features are above radar echoes ***tbd***



Dusk with very noisy radar echoes and tracked targets. Display Category Other, Select Highlight info, Select Shallow water dangers.

Note: This example clearly shows which SYSTEM DATABASE features are above radar echoes ***tbd***

4.6 Accuracy

Note:
In this section calculations are based on the WGS-84 spheroid:
Semi-major axis 6378137.0000m
Semi-minor axis 6356752.3142m
Eccentricity squared 0.00669437999013
Flattening 298.257223563

The WGS-84 spheroid is defined by its semi-major axis and flattening 1/f = 1/298.257223563.
The other parameters are derived from a and f.

Conversion of metres (m) to nautical miles (NM) uses
1 NM = 1852 m.

The tests contained within this section shall be executed using the Electronic Bearing Line (EBL) and Variable Range Marker (VRM) tools provided by the ECDIS system.

The tolerance for distances is 1% or 30m whichever is greater. The tolerance for bearings is 1º.

The positions used in this section are also included in the files “4.6 Accuracy-Geodesic.doc” and “4.6 Accuracy-Rhumb Lines.doc” in the “4.6 Accuracy” folder within the TDS.

4.6.1 Distance and azimuth between geographical positions

Test Reference	Accuracy1	**IHO Reference**	-
Test description			
True distance and azimuth between two geographical positions a).			
Setup			
Load the exchange set ***PowerUp***			
Action			
Measure the distance and azimuth between the following two features: *Viking 49/27-B 32º35.224’S 061º17.710’E* *Corund Cape Light 32º27.436’S 060º58.609’E*			
Results			
Confirm that the results are as follows: *True Distance 33193.554 m / 17.9231 NM* *Bearing from Viking 49/27-B to Corund Cape Light is 295.614 degrees* *Bearing from Corund Cape Light to Viking 49/27-B is 115.785 degrees*			

Test Reference	Accuracy2	**IHO Reference**	-
Test description			
True distance and azimuth between two geographical positions b).			
Setup			
As for test Accuracy1			
Action			
Measure the distance and azimuth between the following two features: *Viking 49/27-B 32º35.224’S 061º17.710’E* *Castlerigg Light 32º23.280’S 060º58.496’E*			
Results			
Confirm that the results are as follows: *True Distance 37326.351 m / 20.1546 NM* *Bearing from Viking 49/27-B to Castlerigg Light is 306.172 degrees* *Bearing from Castlerigg Light to Viking 49/27-B is 126.344 degrees*			

Test Reference	Accuracy2 4.6.1 c)	**IHO Reference**	-
Test description			
True distance and azimuth between two geographical positions c).			
Setup			
As for test Accuracy1			
Action			
Measure the distance and azimuth between the following two features: *Corund Cape Light 32°27.447'S 060°58.599'E* *Worm Head Light 32°31.958'S 060°54.337'E*			
Results			
Confirm that the results are as follows: *True Distance 10680.859 m / 5.7672 NM* *Bearing from Corund Cape Light to Worm Head Light is 218.665 degrees* *Bearing from Worm Head Light to Corund Cape Light is 38.703 degrees*			

4.6.2 Geographical position from a known position and distance/azimuth

Test Reference	Accuracy3	**IHO Reference**	-
Test description			
Geographical position from known position and distance/azimuth a).			
Setup			
As for test Accuracy1*)*			
Action			
From the following position: *Viking 49/27-B 32°35.224'S 061°17.710'E* *Enter a distance and bearing of:* *True Distance 33193.554 m / 17.9231 NM* *Bearing 295.614 degrees*			
Results			
Confirm that the end geographical position is: *Corund Cape Light 32°27.436'S 060°58.609'E*			

Test Reference	Accuracy4	**IHO Reference**	-
Test description			
Geographical position from known position and distance/azimuth b).			
Setup			
As for test Accuracy1			
Action			
From the following position: *Viking 49/27-B 32°35.224'S 061°17.710'E* *Enter a distance and bearing of:* *True Distance 37326.351 m / 20.1546 NM* *Bearing 306.172 degrees*			
Results			
Confirm that the end geographical position is: *Castlerigg Light 32°23.280'S 060°58.496'E*			

Test Reference	Accuracy5	**IHO Reference**	-
Test description			
Geographical position from known position and distance/azimuth c).			
Setup			
As for test Accuracy1			
Action			
From the following position: *Corund Cape Light 32°27.447'S 060°58.599'E* *Enter a distance and bearing of:* *True Distance 10680.859 m / 5.7672 NM* *Bearing 218.665 degrees*			
Results			
Confirm that the end geographical position is: *Worm Head Light 32° 31.958'S 60° 54.337'E*			

4.6.3 Rhumb line distance and azimuth between geographical positions

Test Reference	Accuracy6	**IHO Reference**	-
Test description			
Rhumb line distance and azimuth between two geographical positions a).			
Setup			
Load the exchange set ***PowerUp***			
Action			
Measure the distance and azimuth between the following two features: *Viking 49/27-B 32°35.224'S 061°17.710'E* *Corund Cape Light 32°27.436'S 060°58.609'E*			
Results			
Confirm that the results are as follows: *True Distance 33193.567 m / 17.9231 NM* *Bearing from Viking 49/27-B to Corund Cape Light is 295.699 degrees* *Bearing from Corund Cape Light to Viking 49/27-B is 115.699 degrees*			

Test Reference	Accuracy7	**IHO Reference**	-
Test description			
Rhumb line distance and azimuth between two geographical positions b).			
Setup			
As for test Accuracy1			
Action			
Measure the distance and azimuth between the following two features: *Viking 49/27-B 32°35.224'S 061°17.710'E* *Castlerigg Light 32°23.280'S 060°58.496'E*			
Results			
Confirm that the results are as follows: *True Distance 37326.365 m / 20.1546 NM* *Bearing from Viking 49/27-B to Castlerigg Light is 306.258 degrees* *Bearing from Castlerigg Light to Viking 49/27-B is 126.258 degrees*			

Test Reference	Accuracy8	**IHO Reference**	-
Test description			
Rhumb line distance and azimuth between two geographical positions c).			
Setup			
As for test Accuracy1			
Action			
Measure the distance and azimuth between the following two features: *Corund Cape Light 32°27.447'S 060°58.599'E* *Worm Head Light 32°31.958'S 060°54.337'E*			
Results			
Confirm that the results are as follows: *True Distance 10680.859 m / 5.7672 NM* *Bearing from Corund Cape Light to Worm Head Light is 218.684 degrees* *Bearing from Worm Head Light to Corund Cape Light is 38.684 degrees*			

4.6.4 Geodesics

Test Reference	Accuracy9	**IHO Reference**	-
Test description			
Geodesic lines and circle, northern quadrant.			
Setup			
As for test Accuracy1			
Action			
Plot positions listed in sets 2-6 of the positions listed in section 4.6.6			
Results			
Confirm that the lines drawn pass through or sufficiently close to the listed positions and that the Geodesic circle corresponds to range rings at 2 000 000 m intervals.			

Test Reference	Accuracy10	**IHO Reference**	-
Test description			
Geodesic lines and circle, crossing the equator.			
Setup			
As for test Accuracy1			
Action			
Plot positions listed in sets 7-11 of the positions listed in section 4.6.6			
Results			
Confirm that the lines drawn pass through or sufficiently close to the listed positions and that the Geodesic circle corresponds to range rings at 2 000 000 m intervals.			

Test Reference	Accuracy11	**IHO Reference**	-
Test description			
Geodesic lines southern quadrant.			
Setup			
As for test Accuracy1			
Action			
Plot positions listed in sets 12-16 of the positions listed in section 4.6.6			
Results			
Confirm that the lines drawn pass through or sufficiently close to the listed positions and that the Geodesic circle corresponds to range rings at 2 000 000 m intervals.			

4.6.5 Rhumb Lines

Test Reference	Accuracy12	**IHO Reference**	-
Test description			
Rhumb lines, northern quadrant.			
Setup			
As for test Accuracy1			
Action			
Plot positions listed in sets 2-5 of the positions listed in section 4.6.7			
Results			
Confirm that the lines drawn pass through or sufficiently close to the listed positions.			

Test Reference	Accuracy13	**IHO Reference**	-
Test description			
Rhumb lines, crossing the equator.			
Setup			
As for test 4.6.1a)			
Action			
Plot positions listed in sets 6-9 of the positions listed in section 4.6.7			
Results			
Confirm that the lines drawn pass through or sufficiently close to the listed positions.			

Test Reference	Accuracy14	**IHO Reference**	-
Test description			
Rhumb lines, southern quadrant.			
Setup			
As for test Accuracy1			
Action			
Plot positions listed in sets 10-13 of the positions listed in section 4.6.7			
Results			
Confirm that the lines drawn pass through or sufficiently close to the listed positions.			

4.6.6 Plotting of Geodesics in ENC datasets

Test Reference	GeodesicPlotting	**IHO Reference**	(S-100 Part 9/S-98)
Test description			
This test is designed to verify the ECDIS is able to plot geodesic curves contained within S-101 ENCs.			
Setup			
*Load exchange set **GeodesicPlotting***			
Action			
Navigate to position XX, YY, NN.			
Results			
Verify the islet lies between the rhumb line segment (north) and geodesic line segment (south)			

4.6.7 Positions for use in Accuracy Tests - Geodesics

The following sections contain a series of latitudes and longitudes which define a number of geodesics. These points are intended to allow type approval authorities to test the ability of ECDIS to calculate geodesics correctly.

Conversion of metres (m) to nautical miles (NM) uses
1 NM = 1852 m.

Set 1 Micklefirth

Usage Band 4

Viking 49/27-B 32º35.224S 061º17.710E
Corund Cape Light 32º27.436S 060º58.609E
True Distance 33193.554 m / 17.9231 NM
Forward Bearing 295.614 degrees
Reverse Bearing 115.785 degrees

Viking 49/27-B 32º35.224S 061º17.710E
Castlerigg Light 32º23.280S 060º58.496E
True Distance 37326.351 m / 20.1546 NM
Forward Bearing 306.172 degrees
Reverse Bearing 126.344 degrees

Usage Band 5

Corund Cape Light 32º27.447S 060º58.599E
Worm Head Light 32º31.958S 060º54.337E
True Distance 10680.859 m / 5.7672 NM
Forward Bearing 218.665 degrees
Reverse Bearing 38.703 degrees

Long Geodesics - North West Quadrant.

Set 2 Long Diagonal (30ºN, 60ºW to 60ºN, 30ºW)

Point1	30º00.0000N	060º00.0000W
Point2	31º38.1452N	059º05.9571W
Point3	33º15.8706N	058º09.9924W
Point4	34º53.1348N	057º11.9156W
Point5	36º29.8923N	056º11.5178W
Point6	38º06.0926N	055º08.5692W
Point7	39º41.6796N	054º02.8166W
Point8	41º16.5909N	052º53.9805W
Point9	42º50.7564N	051º41.7515W
Point10	44º24.0976N	050º25.7868W
Point11	45º56.5257N	049º05.7067W
Point12	47º27.9409N	047º41.0895W
Point13	48º58.2294N	046º11.4681W
Point14	50º27.2626N	044º36.3244W
Point15	51º54.8937N	042º55.0855W

Point16	53º20.9554N	041º07.1195W
Point17	54º45.2565N	039º11.7330W
Point18	56º07.5789N	037º08.1699W
Point19	57º27.6730N	034º55.6135W
Point20	58º45.2547N	032º33.1935W
Point21	60º00.0000N	030º00.0000W

Set 3 Long Diagonal (30ºN, 30ºW to 60ºN, 60ºW)

Point1	30º00.0000N	030º00.0000W
Point2	31º38.1452N	030º54.0429W
Point3	33º15.8706N	031º50.0076W
Point4	34º53.1348N	032º48.0844W
Point5	36º29.8923N	033º48.4822W
Point6	38º06.0926N	034º51.4308W
Point7	39º41.6796N	035º57.1833W
Point8	41º16.5909N	037º06.0195W
Point9	42º50.7564N	038º18.2485W
Point10	44º24.0976N	039º34.2132W
Point11	45º56.5257N	040º54.2933W
Point12	47º27.9409N	042º18.9105W
Point13	48º58.2294N	043º48.5319W
Point14	50º27.2626N	045º23.6756W
Point15	51º54.8937N	047º04.9145W
Point16	53º20.9554N	048º52.8805W
Point17	54º45.2565N	050º48.2670W
Point18	56º07.5789N	052º51.8301W
Point19	57º27.6730N	055º04.3865W
Point20	58º45.2547N	057º26.8065W
Point21	60º00.0000N	060º00.0000W

Set 4 Long Horizontal (45ºN, 60ºW to 45ºN, 30ºW)

Point1	45º00.0000N	060º00.0000W
Point2	45º11.2519N	058º31.7916W
Point3	45º21.3608N	057º03.0317W
Point4	45º30.3133N	055º33.7738W
Point5	45º38.0973N	054º04.0740W
Point6	45º44.7022N	052º33.9908W
Point7	45º50.1188N	051º03.5849W
Point8	45º54.3397N	049º32.9185W
Point9	45º57.3588N	048º02.0555W
Point10	45º59.1720N	046º31.0608W
Point11	45º59.7767N	045º00.0000W
Point12	45º59.1720N	043º28.9392W
Point13	45º57.3588N	041º57.9446W
Point14	45º54.3397N	040º27.0815W
Point15	45º50.1188N	038º56.4152W
Point16	45º44.7022N	037º26.0092W
Point17	45º38.0973N	035º55.9260W
Point18	45º30.3133N	034º26.2263W
Point19	45º21.3608N	032º56.9684W
Point20	45º11.2519N	031º28.2085W
Point21	45º00.0000N	030º00.0000W

Set 5 Long Vertical (30ºN, 45ºW to 60ºN, 45ºW)

The geodesic runs along the 45ºW meridian.

Set 6 Circle (Centre 45ºN, 45ºW Radius 2 000 000 m Points every 15 degrees)

Point1	62º58.1482N	045º00.0000W
Point2	62º02.9175N	035º13.1324W
Point3	59º29.7703N	027º21.3716W
Point4	55º47.3417N	022º13.6842W
Point5	51º25.6105N	019º41.1668W
Point6	46º49.0062N	019º14.2861W
Point7	42º16.1548N	020º24.1958W
Point8	38º1.4970N	022º48.2871W
Point9	34º16.6609N	026º09.5368W
Point10	31º11.2085N	030º14.5458W
Point11	28º52.8672N	034º51.8044W
Point12	27º27.4359N	039º50.5197W
Point13	26º58.5455N	045º00.0000W
Point14	27º27.4359N	050º09.4803W
Point15	28º52.8672N	055º08.1956W
Point16	31º11.2085N	059º45.4542W
Point17	34º16.6609N	063º50.4632W
Point18	38º01.4970N	067º11.7129W
Point19	42º16.1548N	069º35.8042W
Point20	46º49.0062N	070º45.7139W
Point21	51º25.6105N	070º18.8332W
Point22	55º47.3417N	067º46.3158W
Point23	59º29.7703N	062º38.6284W
Point24	62º02.9175N	054º46.8676W
Point25	62º58.1482N	045º00.0000W

Long Geodesics (Crossing Equator).

Set 7 Long Diagonal (15ºN, 60ºW to 15ºS, 30ºW)

Point1	15º00.0000N	060º00.0000W
Point2	13º31.8194N	058º26.4185W
Point3	12º03.0524N	056º53.9818W
Point4	10º33.7708N	055º22.5552W
Point5	09º04.0440N	053º52.0065W
Point6	07º33.9393N	052º22.2057W
Point7	06º03.5224N	050º53.0251W
Point8	04º32.8574N	049º24.3384W
Point9	03º02.0073N	047º56.0210W
Point10	01º31.0343N	046º27.9492W
Point11	00º00.0000N	045º00.0000W
Point12	01º31.0343S	043º32.0508W
Point13	03º02.0073S	042º03.9789W
Point14	04º32.8574S	040º35.6615W
Point15	06º03.5224S	039º06.9749W
Point16	07º33.9393S	037º37.7942W
Point17	09º04.0440S	036º07.9935W
Point18	10º33.7708S	034º37.4447W
Point19	12º03.0524S	033º06.0182W
Point20	13º31.8194S	031º33.5815W
Point21	15º00.0000S	030º00.0000W

Set 8 Long Diagonal (15ºN, 30ºW to 15ºS, 60ºW)

Point1	15º00.0000N	030º00.0000W
Point2	13º31.8194N	031º33.5815W
Point3	12º03.0524N	033º06.0182W
Point4	10º33.7708N	034º37.4448W
Point5	09º04.0440N	036º07.9935W
Point6	07º33.9393N	037º37.7943W
Point7	06º03.5224N	039º06.9749W
Point8	04º32.8574N	040º35.6616W
Point9	03º02.0073N	042º03.9790W
Point10	01º31.0343N	043º32.0508W
Point11	00º00.0000N	045º00.0000W
Point12	01º31.0343S	046º27.9492W
Point13	03º02.0073S	047º56.0211W
Point14	04º32.8574S	049º24.3385W
Point15	06º03.5224S	050º53.0251W
Point16	07º33.9393S	052º22.2058W
Point17	09º04.0440S	053º52.0065W
Point18	10º33.7708S	055º22.5553W
Point19	12º03.0524S	056º53.9819W
Point20	13º31.8194S	058º26.4185W
Point21	15º00.0000S	060º00.0000W

Set 9 Long Horizontal (0ºN, 60ºW to 0ºN, 30ºW)

The geodesic runs along the Equator.

Set 10 Long Vertical (15ºS, 45ºW to 15ºN, 45ºW)

The geodesic runs along the 45ºW meridian.

Set 11 Circle (Centre 0ºN, 45ºW Radius 2 000 000 m Points every 15 degrees)

Point1	18º04.8887N	045º00.0000W
Point2	17º26.7433N	040º12.0936W
Point3	15º35.6306N	035º47.3375W
Point4	12º40.8191N	032º05.0570W
Point5	08º55.8234N	029º18.7826W
Point6	04º36.5608N	027º36.4877W
Point7	00º00.0000N	027º02.0217W
Point8	04º36.5608S	027º36.4877W
Point9	08º55.8234S	029º18.7826W
Point10	12º40.8191S	032º05.0570W
Point11	15º35.6306S	035º47.3375W
Point12	17º26.7433S	040º12.0936W
Point13	18º04.8887S	045º00.0000W
Point14	17º26.7433S	049º47.9064W
Point15	15º35.6306S	054º12.6625W
Point16	12º40.8191S	057º54.9430W
Point17	08º55.8234S	060º41.2174W
Point18	04º36.5608S	062º23.5123W
Point19	00º00.0000N	062º57.9783W
Point20	04º36.5608N	062º23.5123W
Point21	08º55.8234N	060º41.2174W
Point22	12º40.8191N	057º54.9430W

Point23	15º35.6306N	054º12.6625W
Point24	17º26.7433N	049º47.9064W
Point25	18º04.8887N	045º00.0000W

Long Geodesics - South West Quadrant.

Set 12 Long Diagonal (30ºS, 60ºW to 60ºS, 30ºW)

Point1	30º00.0000S	060º00.0000W
Point2	31º38.1452S	059º05.9571W
Point3	33º15.8706S	058º09.9924W
Point4	34º53.1348S	057º11.9156W
Point5	36º29.8923S	056º11.5178W
Point6	38º06.0926S	055º08.5692W
Point7	39º41.6796S	054º02.8166W
Point8	41º16.5909S	052º53.9805W
Point9	42º50.7564S	051º41.7515W
Point10	44º24.0976S	050º25.7868W
Point11	45º56.5257S	049º05.7067W
Point12	47º27.9409S	047º41.0895W
Point13	48º58.2294S	046º11.4681W
Point14	50º27.2626S	044º36.3244W
Point15	51º54.8937S	042º55.0855W
Point16	53º20.9554S	041º07.1195W
Point17	54º45.2565S	039º11.7330W
Point18	56º07.5789S	037º08.1699W
Point19	57º27.6730S	034º55.6135W
Point20	58º45.2547S	032º33.1935W
Point21	60º00.0000S	030º00.0000W

Set 13 Long Diagonal (30ºS, 30ºW to 60ºS, 60ºW)

Point1	30º00.0000S	030º00.0000W
Point2	31º38.1452S	030º54.0429W
Point3	33º15.8706S	031º50.0076W
Point4	34º53.1348S	032º48.0844W
Point5	36º29.8923S	033º48.4822W
Point6	38º06.0926S	034º51.4308W
Point7	39º41.6796S	035º57.1833W
Point8	41º16.5909S	037º06.0195W
Point9	42º50.7564S	038º18.2485W
Point10	44º24.0976S	039º34.2132W
Point11	45º56.5257S	040º54.2933W
Point12	47º27.9409S	042º18.9105W
Point13	48º58.2294S	043º48.5319W
Point14	50º27.2626S	045º23.6756W
Point15	51º54.8937S	047º04.9145W
Point16	53º20.9554S	048º52.8805W
Point17	54º45.2565S	050º48.2670W
Point18	56º7.5789S	052º51.8301W
Point19	57º27.6730S	055º04.3865W
Point20	58º45.2547S	057º26.8065W
Point21	60º00.0000S	060º00.0000W

Set 14 Long Horizontal (45ºS, 60ºW to 45ºS, 30ºW)

Point1	45º00.0000S	060º00.0000W
Point2	45º11.2519S	058º31.7916W
Point3	45º21.3608S	057º03.0317W
Point4	45º30.3133S	055º33.7738W
Point5	45º38.0973S	054º04.0740W
Point6	45º44.7022S	052º33.9908W
Point7	45º50.1188S	051º03.5849W
Point8	45º54.3397S	049º32.9185W
Point9	45º57.3588S	048º02.0555W
Point10	45º59.1720S	046º31.0608W
Point11	45º59.7767S	045º00.0000W
Point12	45º59.1720S	043º28.9392W
Point13	45º57.3588S	041º57.9446W
Point14	45º54.3397S	040º27.0815W
Point15	45º50.1188S	038º56.4152W
Point16	45º44.7022S	037º26.0092W
Point17	45º38.0973S	035º55.9260W
Point18	45º30.3133S	034º26.2263W
Point19	45º21.3608S	032º56.9684W
Point20	45º11.2519S	031º28.2085W
Point21	45º00.0000S	030º00.0000W

Set 15 Long Vertical (30ºS, 45ºW to 60ºS, 45ºW)

The geodesic runs along the 45ºW meridian.

Set 16 Circle (Centre 45ºS, 45ºW Radius 2 000 000 m Points every 15 degrees)

Point1	62º58.1482S	045º00.0000W
Point2	62º2.09175S	035º13.1324W
Point3	59º29.7703S	027º21.3716W
Point4	55º47.3417S	022º13.6842W
Point5	51º25.6105S	019º41.1668W
Point6	46º49.0062S	019º14.2861W
Point7	42º16.1548S	020º24.1958W
Point8	38º01.4970S	022º48.2871W
Point9	34º16.6609S	026º09.5368W
Point10	31º11.2085S	030º14.5458W
Point11	28º52.8672S	034º51.8044W
Point12	27º27.4359S	039º50.5197W
Point13	26º58.5455S	045º00.0000W
Point14	27º27.4359S	050º09.4803W
Point15	28º52.8672S	055º08.1956W
Point16	31º11.2085S	059º45.4542W
Point17	34º16.6609S	063º50.4632W
Point18	38º01.4970S	067º11.7129W
Point19	42º16.1548S	069º35.8042W
Point20	46º49.0062S	070º45.7139W
Point21	51º25.6105S	070º18.8332W
Point22	55º47.3417S	067º46.3158W
Point23	59º29.7703S	062º38.6284W
Point24	62º02.9175S	054º46.8676W
Point25	62º58.1482S	045º00.0000W

4.6.8 Positions for use in Accuracy Tests – Rhumb Lines

The following sections contain a series of latitudes and longitudes which define a number of rhumb lines. These points are intended to allow type approval authorities to test the ability of ECDIS to calculate rhumb lines correctly.

All calculations are based on the WGS-84 spheroid:

Semi-major axis	6378137.0000m
Semi-minor axis	6356752.3142m
Eccentricity squared	0.0066943800
Flattening	298.25722356

Conversion of metres (m) to nautical miles (NM) uses
1 NM = 1852 m.

Set 1 – not applicable

Long Rhumb Lines - North West Quadrant.

Set 2 Long Diagonal (30ºN, 30ºW to 60ºN, 60ºW)

Point1	30º00.0000N	030º00.0000W
Point2	31º30.2165N	031º11.4806W
Point3	33º00.4119N	032º24.1146W
Point4	34º30.5854N	033º37.9913W
Point5	36º00.7368N	034º53.2065W
Point6	37º30.8656N	036º09.8628W
Point7	39º00.9713N	037º28.0713W
Point8	40º31.0539N	038º47.9519W
Point9	42º01.1129N	040º09.6347W
Point10	43º31.1484N	041º33.2615W
Point11	45º01.1601N	042º58.9871W
Point12	46º31.1481N	044º26.9812W
Point13	48º01.1124N	045º57.4306W
Point14	49º31.0531N	047º30.5417W
Point15	51º00.9704N	049º06.5435W
Point16	52º30.8645N	050º45.6910W
Point17	54º00.7358N	052º28.2698W
Point18	55º30.5845N	054º14.6010W
Point19	57º00.4111N	056º05.0479W
Point20	58º30.2161N	058º00.0234W
Point21	60º00.0000N	060º00.0000W

Set 3 Long Diagonal (60ºN, 30ºW to 30ºN, 60ºW)

Point1	60º00.0000N	030º00.0000W
Point2	58º30.2161N	031º59.9767W
Point3	57º00.4111N	033º54.9521W
Point4	55º30.5845N	035º45.3990W
Point5	54º00.7358N	037º31.7302W
Point6	52º30.8645N	039º14.3090W
Point7	51º00.9704N	040º53.4565W
Point8	49º31.0531N	042º29.4583W
Point9	48º01.1124N	044º02.5694W
Point10	46º31.1481N	045º33.0188W
Point11	45º01.1601N	047º01.0129W
Point12	43º31.1484N	048º26.7385W

Point13	42º01.1129N	049º50.3653W
Point14	40º31.0539N	051º12.0481W
Point15	39º00.9713N	052º31.9287W
Point16	37º30.8656N	053º50.1372W
Point17	36º00.7368N	055º06.7935W
Point18	34º30.5854N	056º22.0087W
Point19	33º00.4119N	057º35.8854W
Point20	31º30.2165N	058º48.5194W
Point21	30º00.0000N	060º00.0000W

Set 4 Long Horizontal (45ºN, 60ºW to 45ºN, 30ºW)

The rhumb line runs along the 45ºN parallel.

Set 5 Long Vertical (30ºN, 45ºW to 60ºN, 45ºW)

The rhumb line runs along the 45ºW meridian.

Long Rhumb Lines (Crossing Equator).

Set 6 Long Diagonal (15ºN, 60ºW to 15ºS, 30ºW)

Point1	15º00.0000N	060º00.0000W
Point2	13º30.0344N	058º28.2185W
Point3	12º00.0581N	056º57.0084W
Point4	10º30.0722N	055º26.3012W
Point5	09º00.0778N	053º56.0303W
Point6	07º30.0761N	052º26.1306W
Point7	06º00.0683N	050º56.5384W
Point8	04º30.0555N	049º27.1908W
Point9	03º00.0391N	047º58.0260W
Point10	01º30.0202N	046º28.9826W
Point11	00º00.0000N	045º00.0000W
Point12	01º30.0202S	043º31.0173W
Point13	03º00.0391S	042º01.9740W
Point14	04º30.0555S	040º32.8092W
Point15	06º00.0683S	039º03.4616W
Point16	07º30.0761S	037º33.8694W
Point17	09º00.0778S	036º03.9697W
Point18	10º30.0722S	034º33.6988W
Point19	12º00.0581S	033º02.9916W
Point20	13º30.0344S	031º31.7815W
Point21	15º00.0000S	030º00.0000W

Set 7 Long Diagonal (15ºN, 30ºW to 15ºS, 60ºW)

Point1	15º00.0000N	030º00.0000W
Point2	13º30.0344N	031º31.7815W
Point3	12º00.0581N	033º02.9916W
Point4	10º30.0722N	034º33.6988W
Point5	09º00.0778N	036º03.9697W
Point6	07º30.0761N	037º33.8694W
Point7	06º00.0683N	039º03.4616W
Point8	04º30.0555N	040º32.8092W
Point9	03º00.0391N	042º01.9740W
Point10	01º30.0202N	043º31.0174W

Point11	00º00.0000N	045º00.0000W
Point12	01º30.0202S	046º28.9827W
Point13	03º00.0391S	047º58.0260W
Point14	04º30.0555S	049º27.1908W
Point15	06º00.0683S	050º56.5384W
Point16	07º30.0761S	052º26.1306W
Point17	09º00.0778S	053º56.0303W
Point18	10º30.0722S	055º26.3012W
Point19	12º00.0581S	056º57.0084W
Point20	13º30.0344S	058º28.2185W
Point21	15º00.0000S	060º00.0000W

Set 8 Long Horizontal (0ºN, 60ºW to 0ºN, 30ºW)

The rhumb line runs along the Equator.

Set 9 Long Vertical (15ºS, 45ºW to 15ºN, 45ºW)

The rhumb line runs along the 45ºW meridian.

Long Rhumb Lines - South West Quadrant.

Set 10 Long Diagonal (30ºS, 30ºW to 60ºS, 60ºW)

Point1	30º00.0000S	030º00.0000W
Point2	31º30.2165S	031º11.4806W
Point3	33º00.4119S	032º24.1146W
Point4	34º30.5854S	033º37.9913W
Point5	36º00.7368S	034º53.2065W
Point6	37º30.8656S	036º09.8628W
Point7	39º00.9713S	037º28.0713W
Point8	40º31.0539S	038º47.9519W
Point9	42º01.1129S	040º09.6347W
Point10	43º31.1484S	041º33.2615W
Point11	45º01.1601S	042º58.9871W
Point12	46º31.1481S	044º26.9812W
Point13	48º01.1124S	045º57.4306W
Point14	49º31.0531S	047º30.5417W
Point15	51º00.9704S	049º06.5435W
Point16	52º30.8645S	050º45.6910W
Point17	54º00.7358S	052º28.2698W
Point18	55º30.5845S	054º14.6010W
Point19	57º00.4111S	056º05.0479W
Point20	58º30.2161S	058º00.0234W
Point21	60º00.0000S	060º00.0000W

Set 11 Long Diagonal (60ºS, 30ºW to 30ºS, 60ºW)

Point1	60º00.0000S	030º00.0000W
Point2	58º30.2161S	031º59.9767W
Point3	57º00.4111S	033º54.9521W
Point4	55º30.5845S	035º45.3990W
Point5	54º00.7358S	037º31.7302W
Point6	52º30.8645S	039º14.3090W
Point7	51º00.9704S	040º53.4565W
Point8	49º31.0531S	042º29.4583W

Point9	48º01.1124S	044º02.5694W
Point10	46º31.1481S	045º33.0188W
Point11	45º01.1601S	047º01.0129W
Point12	43º31.1484S	048º26.7385W
Point13	42º01.1129S	049º50.3653W
Point14	40º31.0539S	051º12.0481W
Point15	39º00.9713S	052º31.9287W
Point16	37º30.8656S	053º50.1372W
Point17	36º00.7368S	055º06.7935W
Point18	34º30.5854S	056º22.0087W
Point19	33º00.4119S	057º35.8854W
Point20	31º30.2165S	058º48.5194W
Point21	30º00.0000S	060º00.0000W

Set 12 Long Horizontal (45ºS, 60ºW to 45ºS, 30ºW)

The rhumb line runs along the 45ºS parallel.

Set 13 Long Vertical (30ºS, 45ºW to 60ºS, 45ºW)

The rhumb line runs along the 45ºW meridian.

4.7 Symbols

4.7.1 Symbol Size

Test Reference	SymbolSize	**IHO Reference**	S-98 C-20.1
Test description			
Display of symbols in size shown in the IHO Presentation Library.			
Setup			
Load the exchange set ***PowerUp***			
Action			
Perform zoom-in and zoom-out operations in each Display Category.			
Results			
Confirm that the symbols do not decrease in size below that shown in the IHO Presentation Library.			

4.7.2 Display of ECDIS chart 1 symbols of correct size

Test Reference	ChartSymbols	**IHO Reference**	S-52 16.1
Test description			
Display of the check symbol of the correct size (in mm).			
Setup			
Load the exchange set ***Chart1***			
Action			
Observe the CHKSYM01 symbol within the Information about the chart display (A,B) section.			
Results			
Confirm that the height of the CHKSYM01 symbol is not less than 5.0mm and not greater than 5.5mm.			

4.7.3 Size in pixels of the check symbol CHKSYM01

Test Reference	CheckSym	**IHO Reference**	S-52 [3.1.5]
Test description			
Display of the check symbol of the correct size (in pixels).			
Setup			
As for test Chart1Symbols			
Action			
Observe the CHKSYM01 symbol within the Information about the chart display (A,B) section.			
Results			
Confirm that the number of pixels (lines) which comprise the vertical extent of the symbol CHKSYM01 is not less than 16. *This test may be conducted by calculation based on the properties of the EUT.*			

4.7.4 Display of text at the correct size

Test Reference	TextSize	**IHO Reference**	S-52 [3.1.5]
Test description			
Display of text within the chart display and pick report.			
Setup			
*Load the exchange set **PowerUp***			
Action			
Observe the chart display. *Pick a feature and observe the text within the pick report.* *Create a Mariner's note with text and observe its display.*			
Results			
Based on viewing distance specified in manufacturer manuals, confirm that for all text observed the height of upper-case characters is not less than 3.5 mm per 1 metre viewing distance			

4.7.5 Display redraw

Test Reference	Redraw	**IHO Reference**	S-52 [5.1]
Test description			
Display of text within the chart display and pick report.			
Setup			
*Load the exchange set **PowerUp*** • *Select North up true motion* • *Select Display Category Other* • *Select All Independent Mariner selectors* • *Simulate the own ship's movement from Micklefirth through the Mickelfirth channel and to the Mickleden TSS roundabout.*			
Action			
Monitor the display at a viewing scale of 1:20,000			
Results			
Confirm that the display redraws in less than 5 seconds for the duration of the own ship movement. *Select the display of the area north of the Lowesmore Oilfield and confirm that the display redraws in 5 seconds or informs the user and retains the previous display until ready.*			

4.8 Units and Legend

<table>
<tr><td>Test Reference</td><td>UnitsLegend</td><td>IHO Reference</td><td>S-52 [2.3.1f, 2.3.1g], 10.6.2</td></tr>
<tr><td colspan="4">Test description</td></tr>
<tr><td colspan="4">Display units and chart legend.</td></tr>
<tr><td colspan="4">Setup</td></tr>
<tr><td colspan="4">Load the exchange set PowerUp</td></tr>
<tr><td colspan="4">Action</td></tr>
<tr><td colspan="4">Select a position for display applicable chart legend</td></tr>
<tr><td colspan="4">Results</td></tr>
<tr><td colspan="4">As a minimum the information listed below must be presented clearly (the complete list needs not always to be shown). Examples from the dataset loaded are listed in bold text where appropriate.
<table>
<tr><td>ECDIS Legend</td><td>Values</td></tr>
<tr><td>Units for depth</td><td>m</td></tr>
<tr><td>Units for height</td><td>m</td></tr>
<tr><td colspan="2">Note: Units for depth and height: Although the ENC Product Specification, S-101 does not allow any other than metric depths and heights, these two elements shall be stated for clarity for the Mariner.</td></tr>
<tr><td>Scale of display</td><td>Selected by Mariner. (The default display scale is defined by the maximum display scale)
Compilation scale – 52 000</td></tr>
<tr><td>Data quality indicator</td><td>a. category of zone of confidence attribute of the Quality of Bathymetric Data feature for bathymetric data.
b. Quality of Non Bathymetric Data attribute (if available) for non-bathymetric data.</td></tr>
<tr><td colspan="2">Note: Due to the way quality is encoded in the ENC, both values (a. and b.) shall be used.</td></tr>
<tr><td>Sounding/vertical datum</td><td>Sounding datum – Lowest astronomical tide Vertical datum – Mean high water springs (VERDAT attributes of individual features shall not be used for the legend).</td></tr>
<tr><td>Horizontal datum</td><td>HDAT subfield of the DPSM field.
WGS 84</td></tr>
<tr><td>Value of safety depth</td><td>Selected by Mariner (default is 30 m).</td></tr>
<tr><td>Value of safety contour</td><td>Selected by Mariner (default is 30 m).</td></tr>
<tr><td colspan="2">Note: If the Mariner has selected a contour that is not available in the ENC and the ECDIS displays a default contour, both the contour selected and the contour displayed shall be quoted.</td></tr>
<tr><td>Magnetic variation</td><td>Value of Magnetic variation, RYRMGV and VALACM of the MAGVAR feature.Item shall be displayed as:

VALMAG RYRMGV (VALACM)

For example, 4°15W 1990 (8’E)</td></tr>
<tr><td>Date and number of latest update affecting chart cells currently in use.</td><td>ISDT and UPDN subfields of the DSID field of the last update cell update file (ER data set) applied. Issue Date – 20010409
Update Number - 0</td></tr>
</table>
In addition the following units shall be indicated:
- position;
- distance;
- speed.</td></tr>
</table>

4.9 Other Chart Related Functionality

4.9.1 ECDIS Chart 1

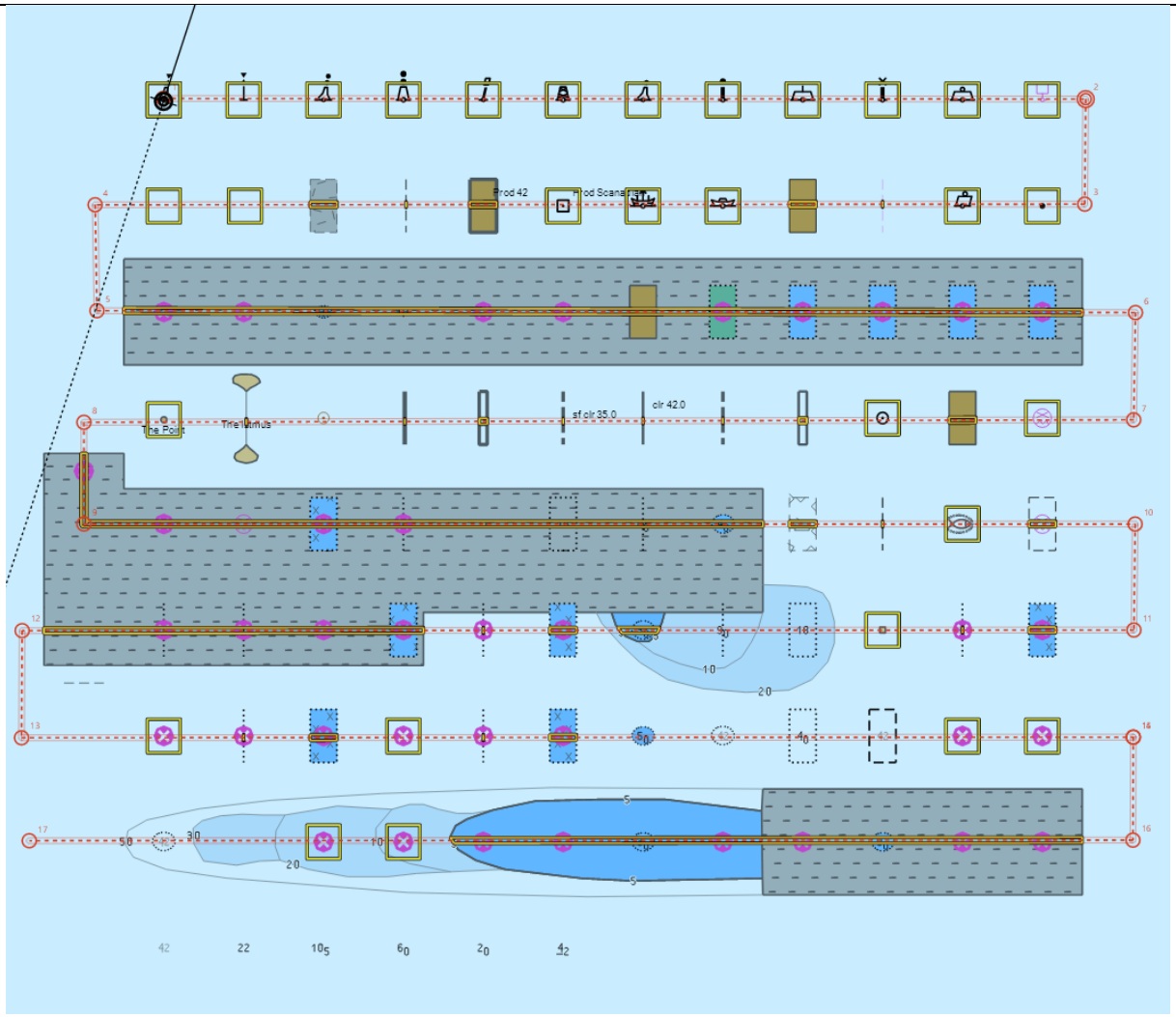
Test Reference	ChartOne	**IHO Reference**	S-52 18.2.2
Test description			
Display of ECDIS chart 1.			
Setup			
N/A			
Action			
Navigate to ECDIS chart 1. *Compare the displayed image with the plots provided in S-98 XXX-XXX. To ensure the same display the ECDIS under test must be configured per the instructions of the ECDIS Chart1 README.TXT;* • *Set Safety Contour value to 10 m* • *Set Shallow Contour value to 5 m* • *Set Deep Contour value to 30 m* • *Set Safety Depth value to 8 m* • *Select Display Category Other* • *Select all Text groups* • *Select Symbolized Boundaries* • *Select Simplified Point Symbols = false* • *Select Contour label* • *Select Four Shades* • *Select Unknown* *Screen plots are as displayed by compilation scale, that is 1:60 000 or 1:14 000. Screen plot number 1 is 1:60 000 and all others are 1:14 000.* *Two of the screen plots (numbers 11 and 13) use "Select Simplified Point Symbols" ~~instead of "Select Paper Chart Symbols~~". One screen plot (number 6) use "Select Accuracy".*			
Results			
Confirm that ECDIS chart 1 is displayed. *Confirm that the displayed image is consistent with the plots provided in S-98.*			

Test Reference	ChartOne2	**IHO Reference**	S-52 18.2.2
Test description			
Interrogation of ECDIS chart 1.			
Setup			
With ECDIS chart 1 displayed.			
Action			
Interrogate 3 symbols by cursor pick.			
Results			
Upon interrogation the description of the symbol as contained in the Presentation Library is presented.			

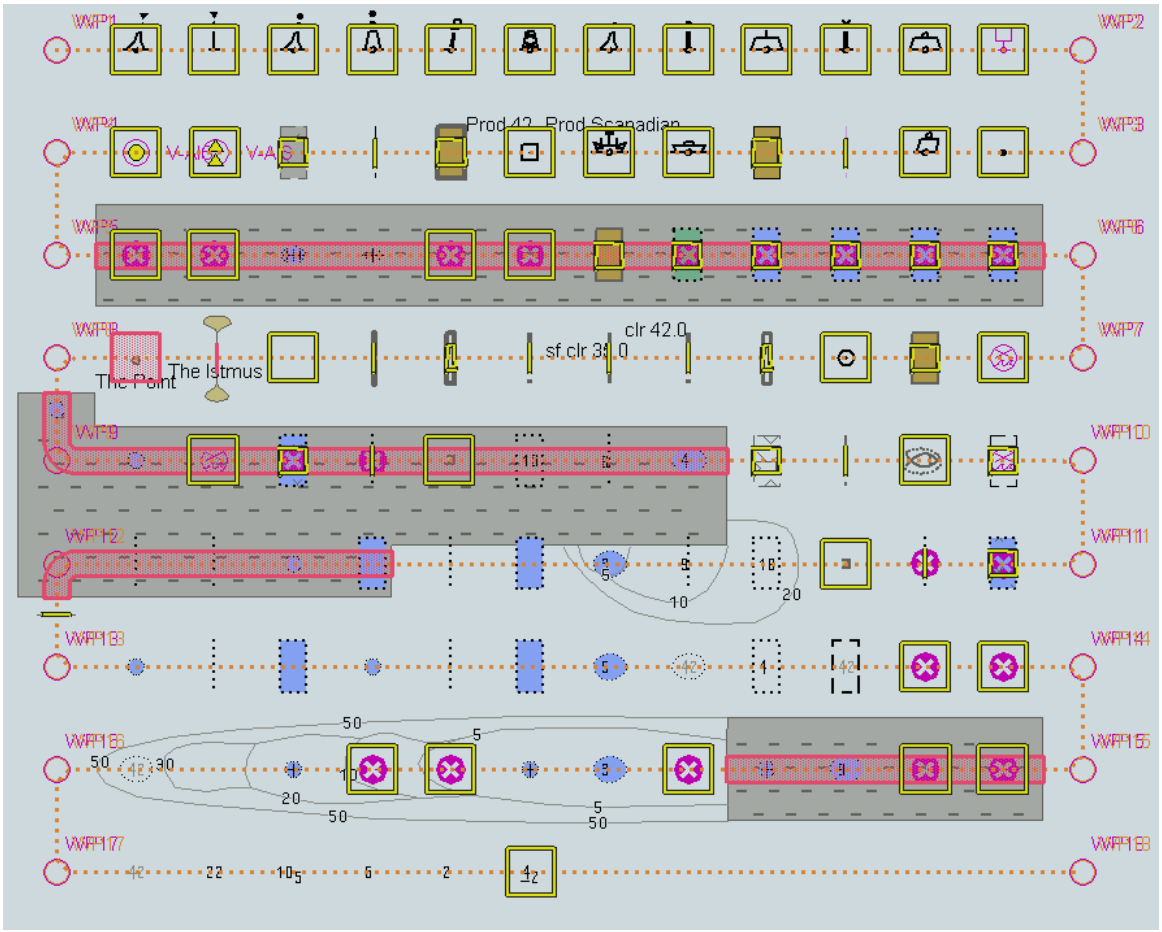
5 Detection and Notification of Navigational Hazards

5.1 Detection and Notification of Navigational Hazards - Basic test

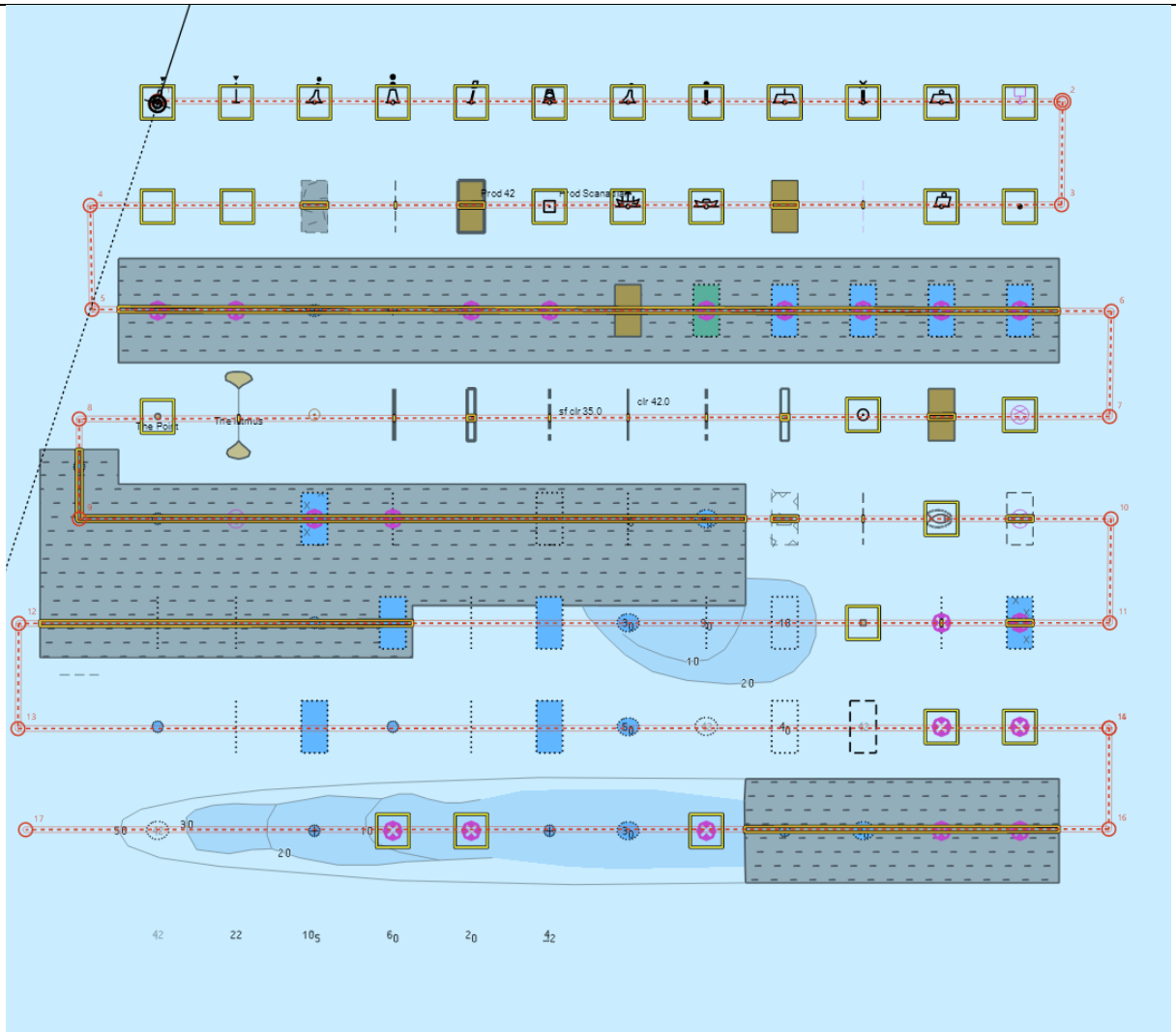
Test Reference	NavigationalHazards	**IHO Reference**	S-98 C-12.9.7
Test description			
The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route closer than a user-specified distance from any features satisfying the conditions for this test as listed in section 10.5.9 of IHO S-52 and included in the test dataset 101AA00NAVHZ.000. *This test is performed by loading the test cell 101AA00NAVHZ.000, manually creating a route connecting all way points between features marked as WP1 through WP18 and checking display against the corresponding graphical plot*			
Setup			
*Load dataset 101AA00NAVHZ.000 from exchange set **NavigationalHazards*** • *Select Display Category Other* • *Set the Safety Contour value to 0 m* • *Set the Safety Depth value to 30 m* • *Select Symbolized Boundaries* • *Select Paper chart symbols* • *Select all Text groups* • *Manually create a route connecting all way points between feature features marked WP1 through WP18* • *Set user-specified distance for indication navigational hazards as 0.1 NM*			
Action			
Check ENC symbols shown in the ECDIS against the corresponding graphical plot. *Repeat sequentially with a Safety Contour value of 0m, 2m, 4m, 5m, 6m, 8m, 9m, 10m, 11m, 16m, 21m, 31m, 42m, 50m, 51m.*			
Results			
The ENC in the ECDIS should match the corresponding graphical plot shown below. *Note: To increase the prominence of dangers in unsafe waters it is permitted to highlight features with an isolated danger mark when they are wholly located in this area.*			



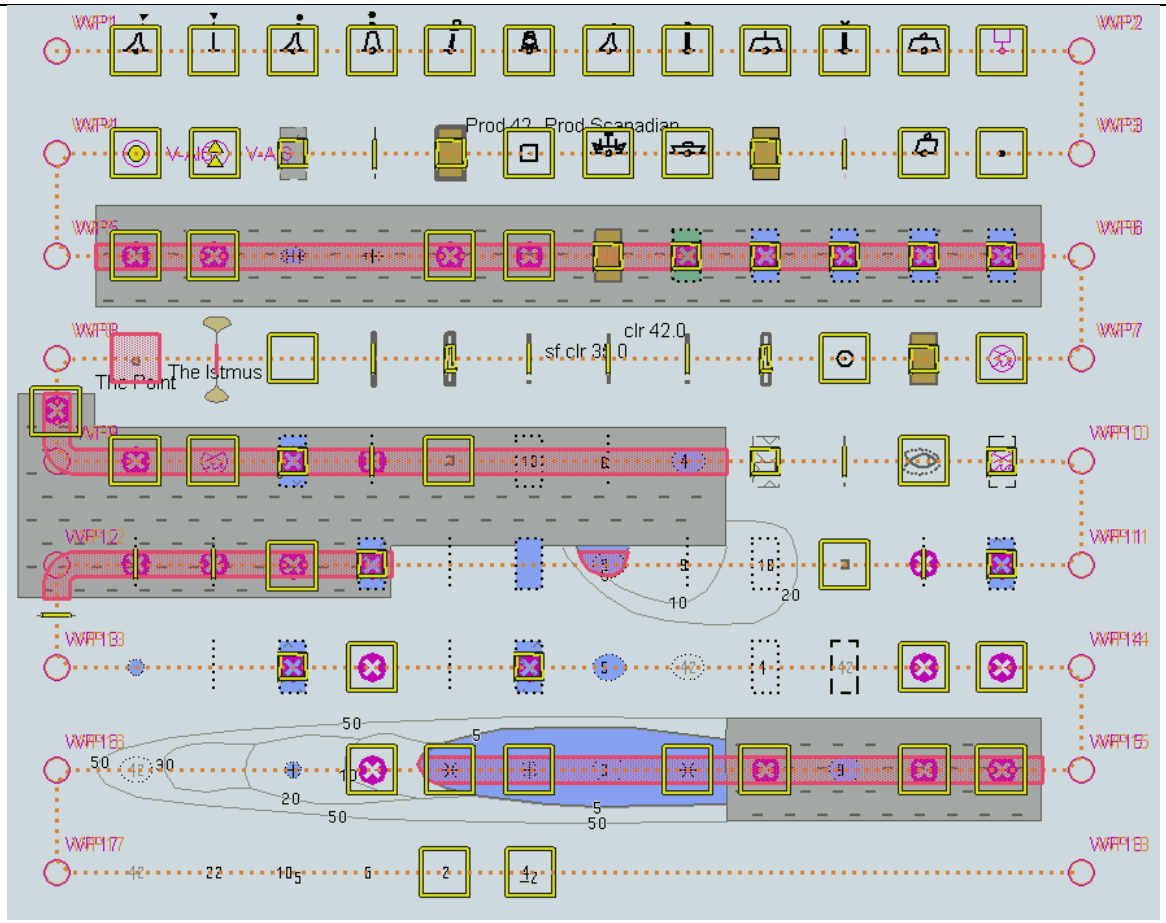
Safety Contour = 0 m, Alternative 1



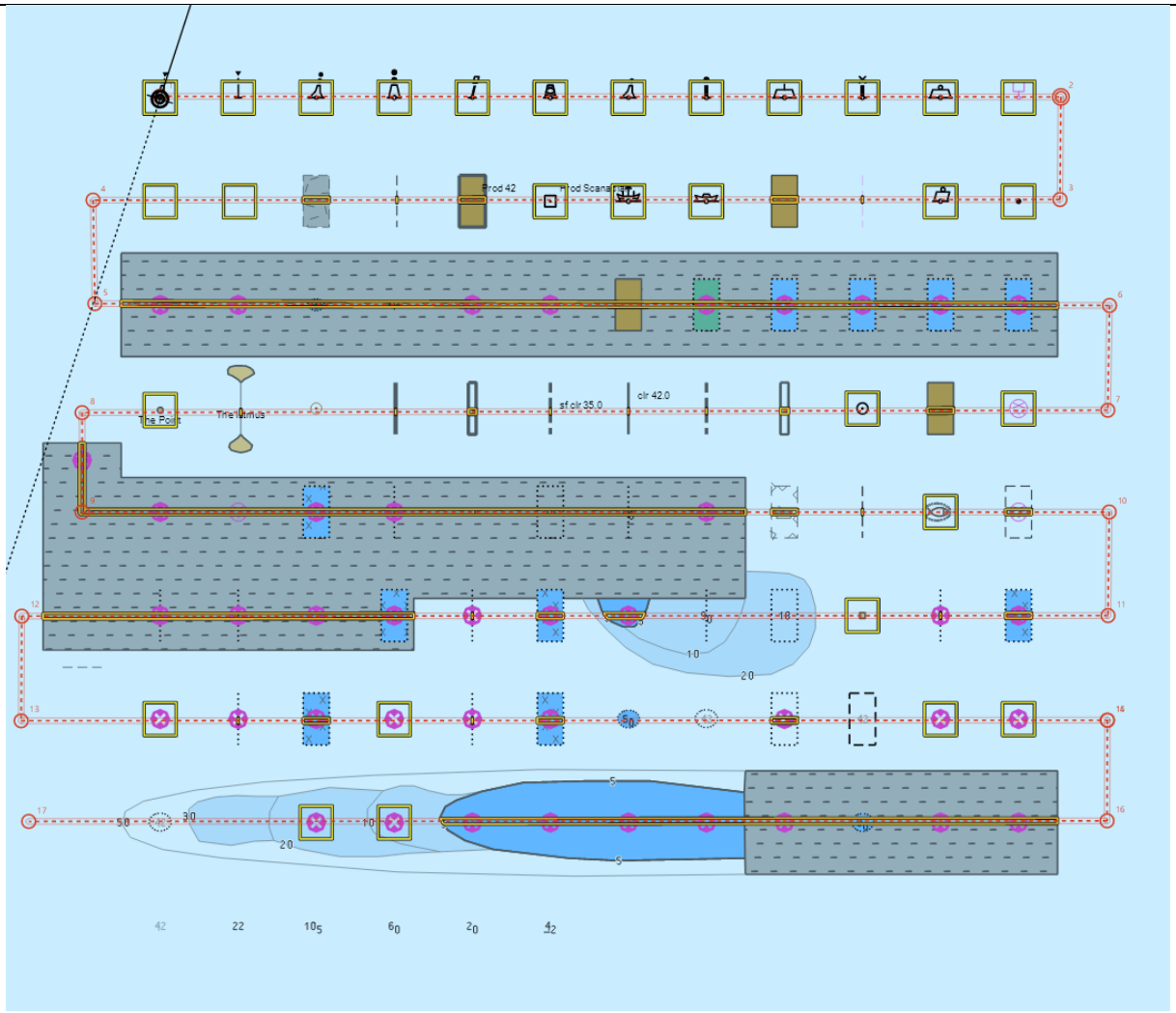
Safety Contour = 0 m, Alternative 2



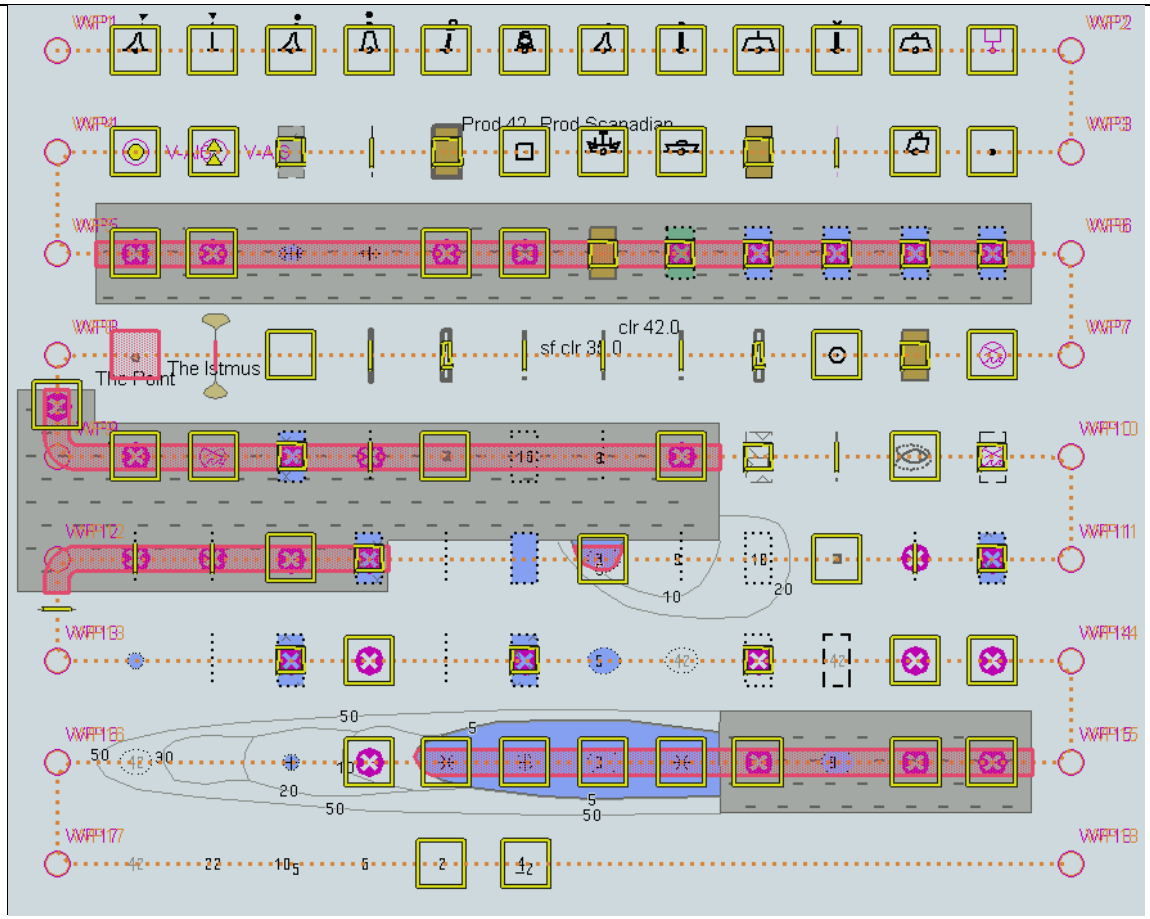
Safety Contour = 2 m, Alternative 1



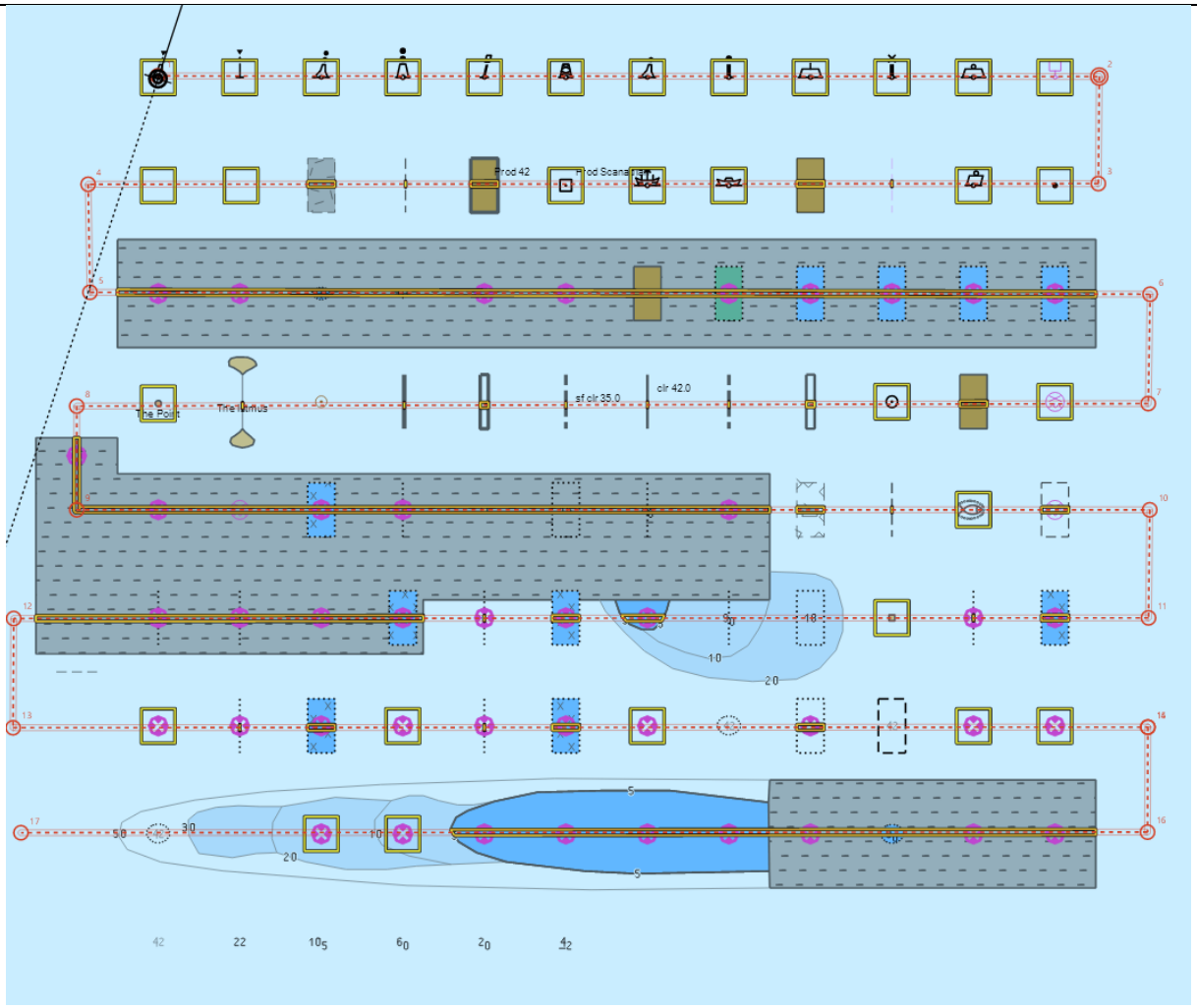
Safety Contour = 2 m, Alternative 2



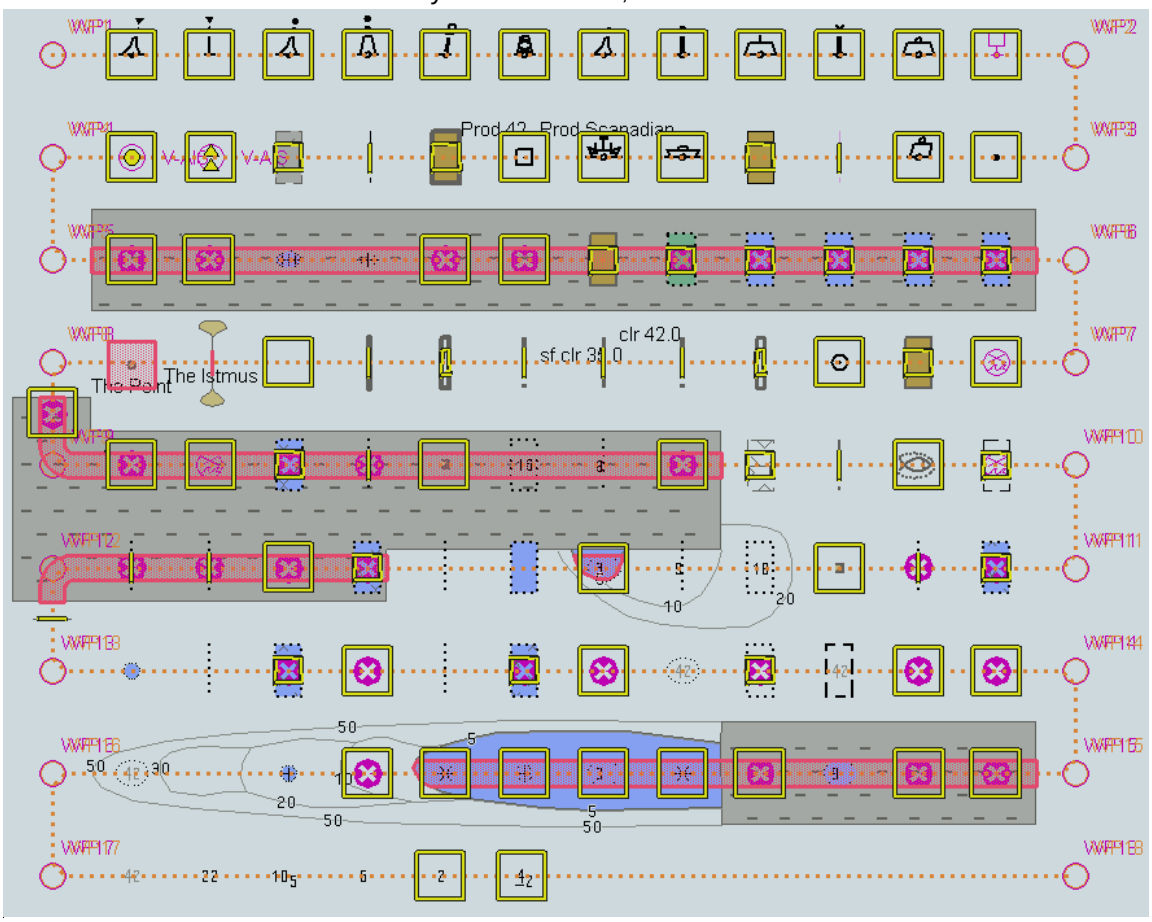
Safety Contour = 4 m, Alternative 1



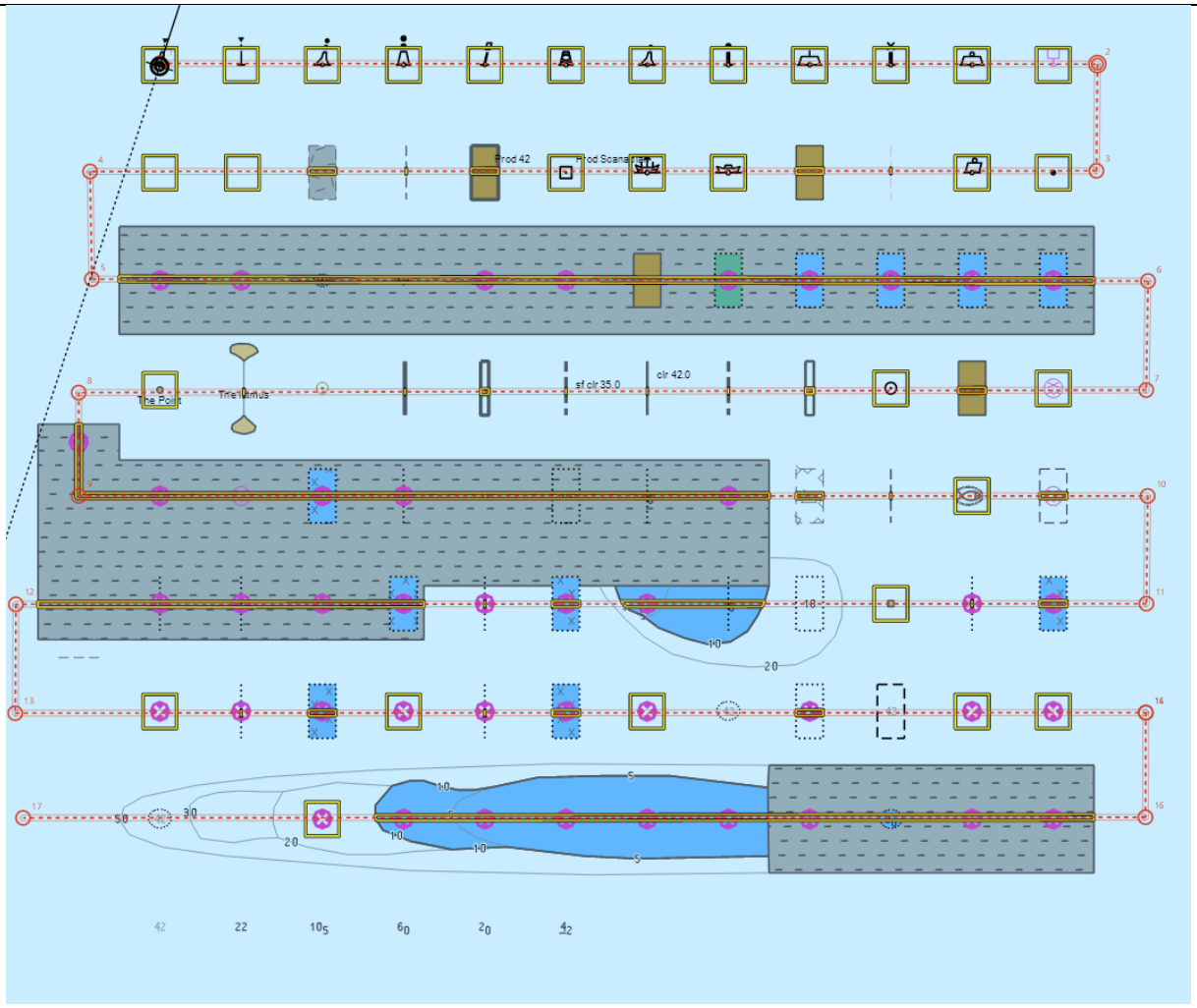
Safety Contour = 4 m, Alternative 2



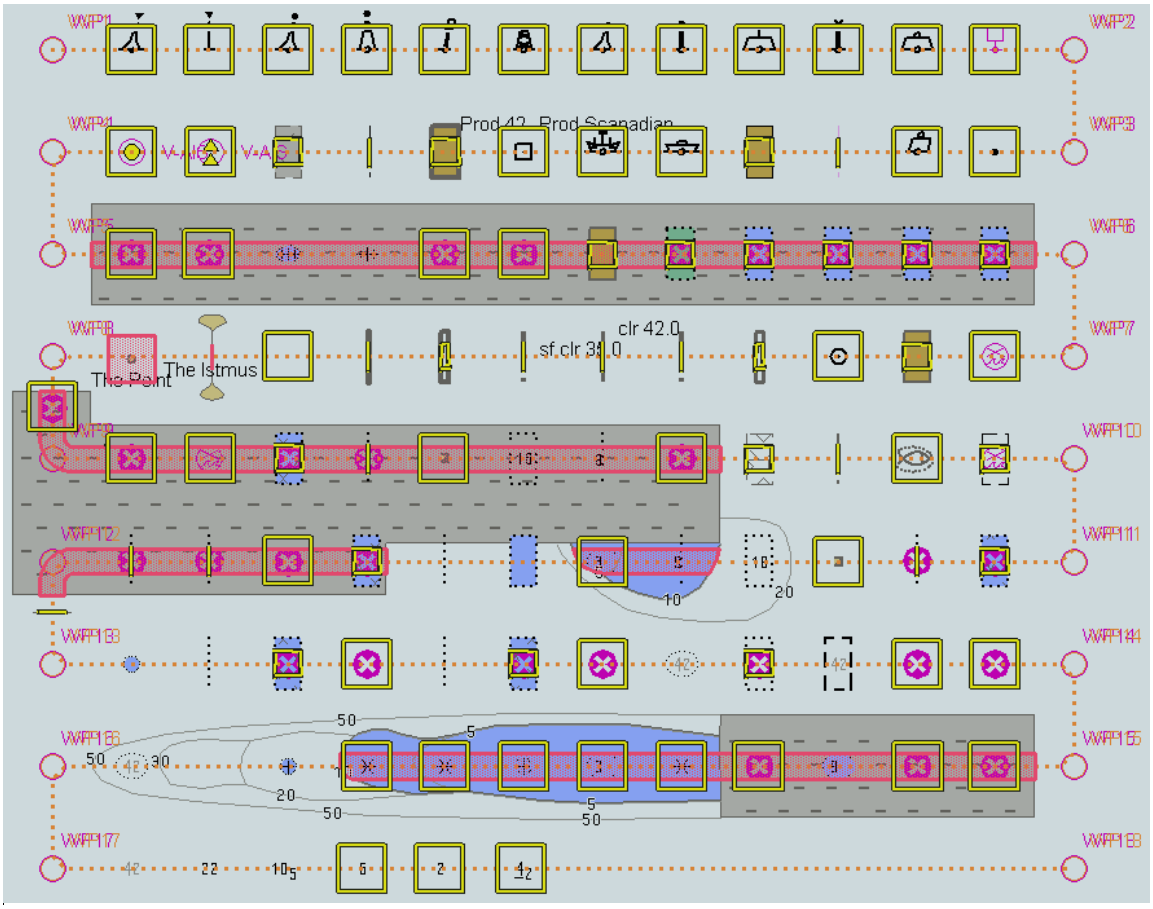
Safety Contour = 5 m, Alternative 1



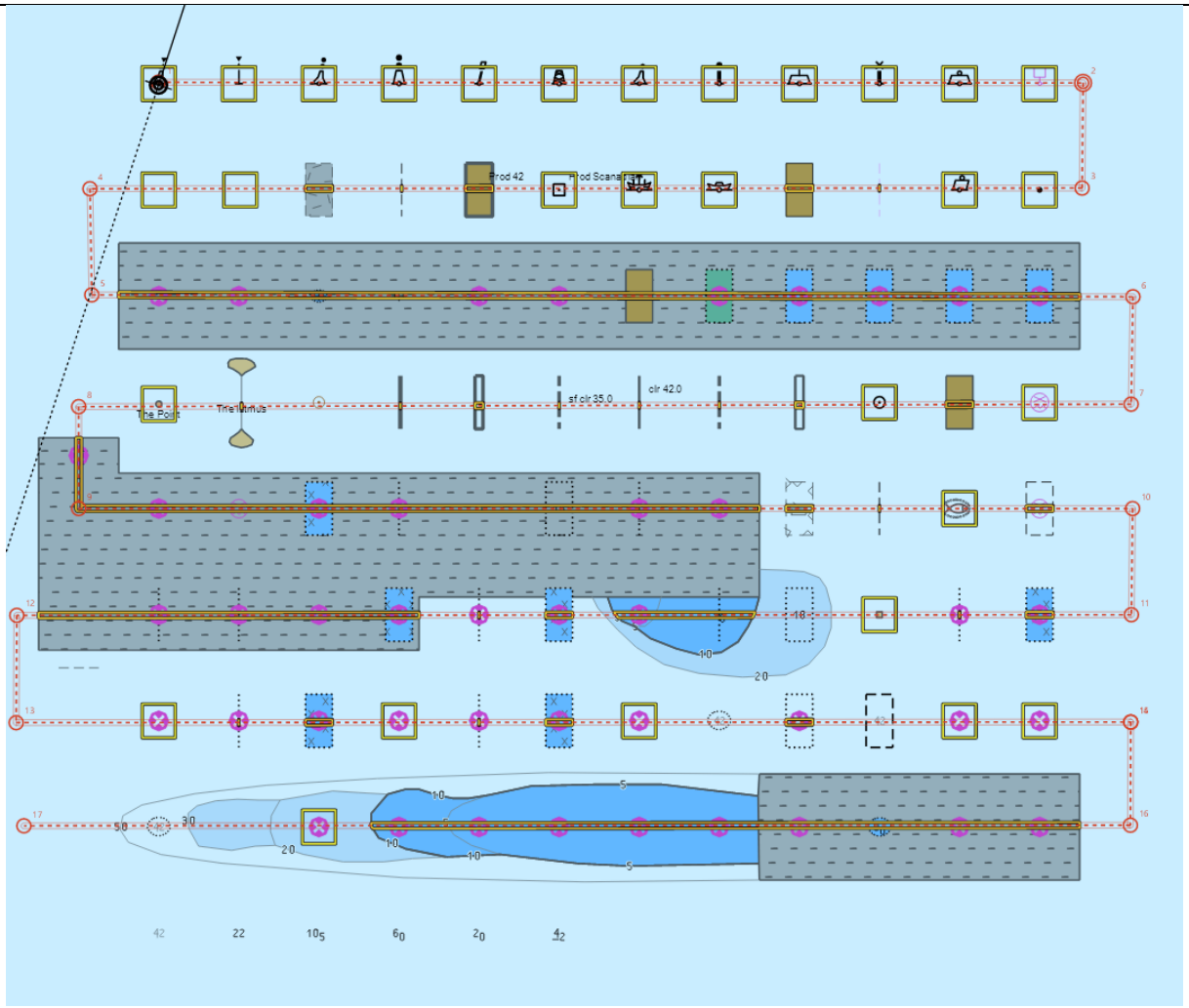
Safety Contour = 5 m, Alternative 2



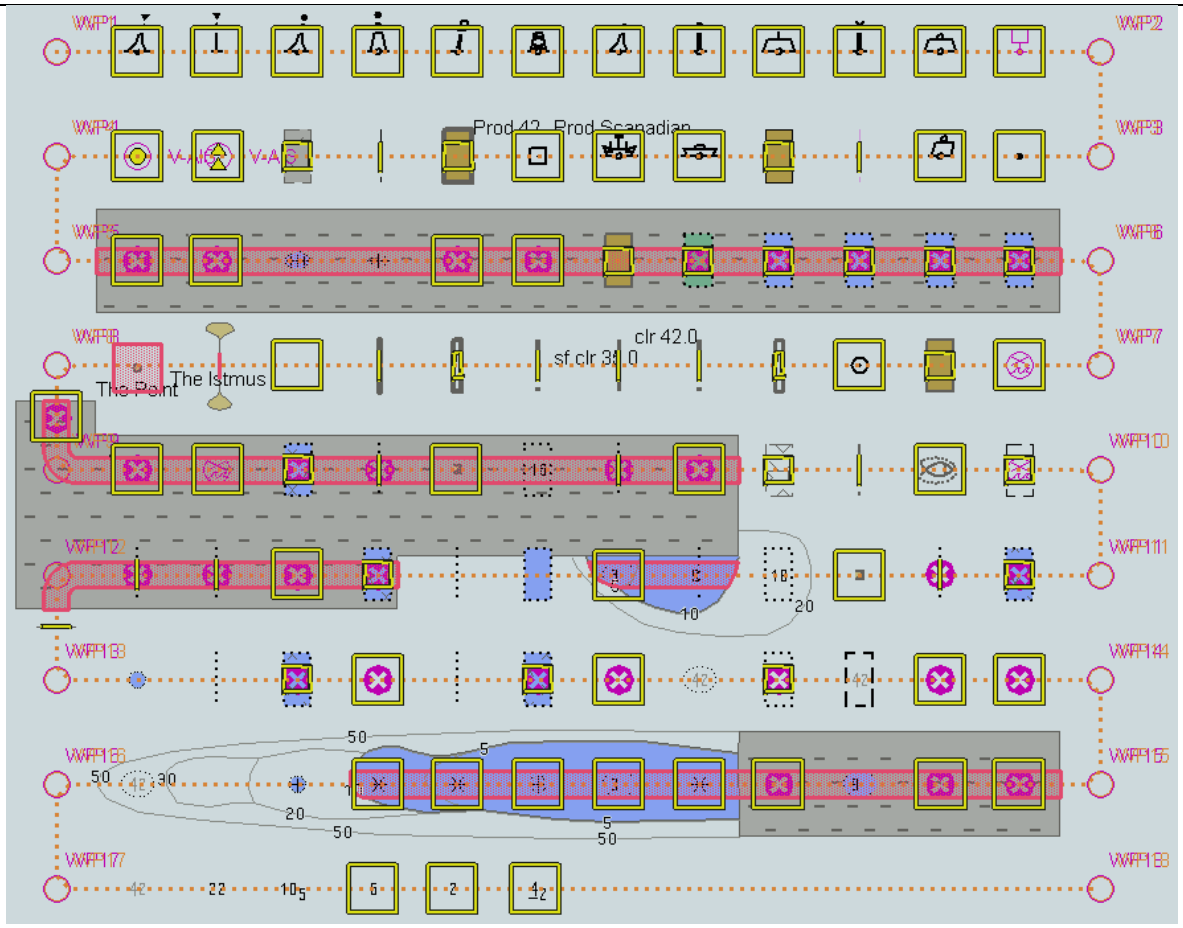
Safety Contour = 6 m, Alternative 1



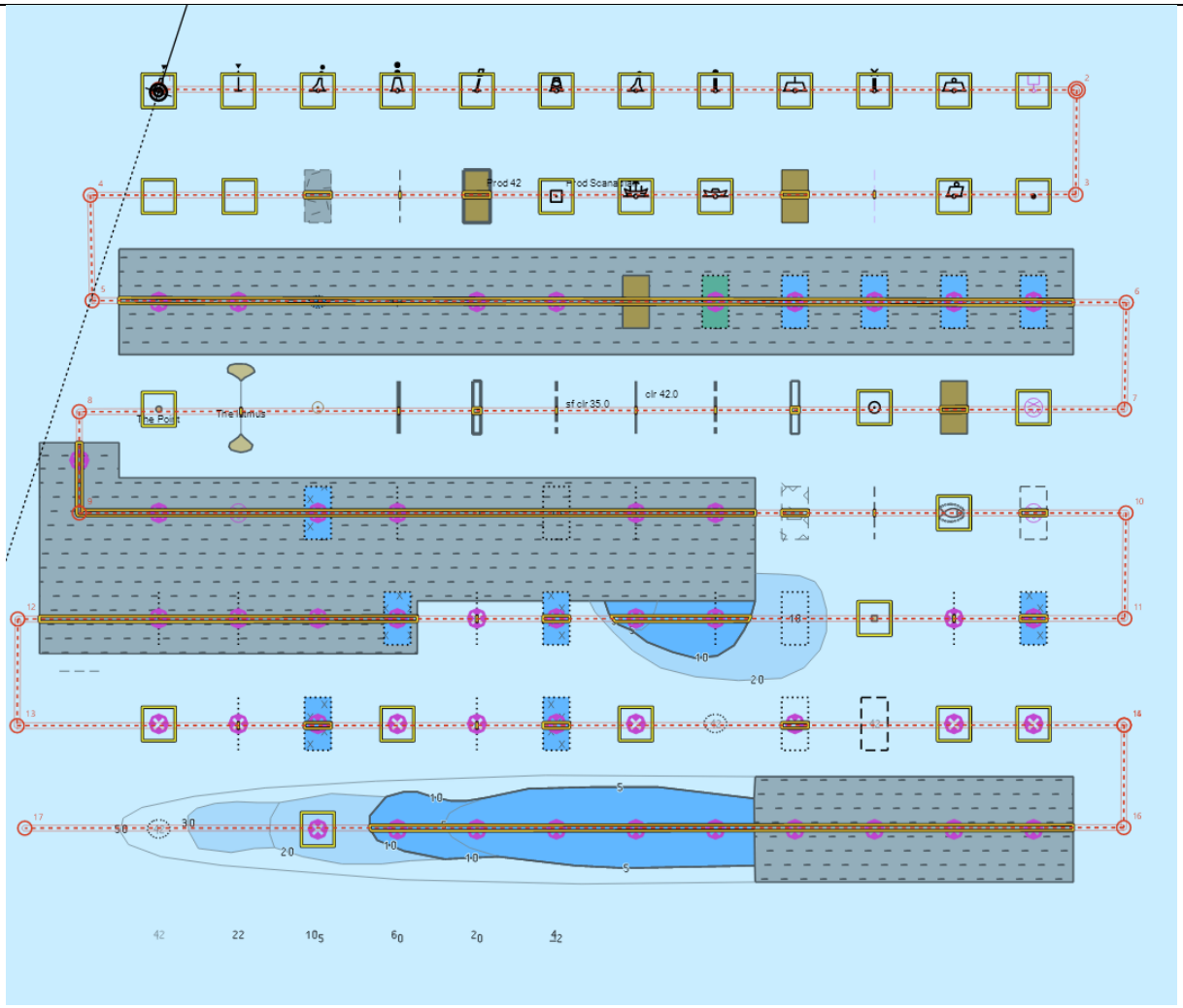
Safety Contour = 6 m, Alternative 2



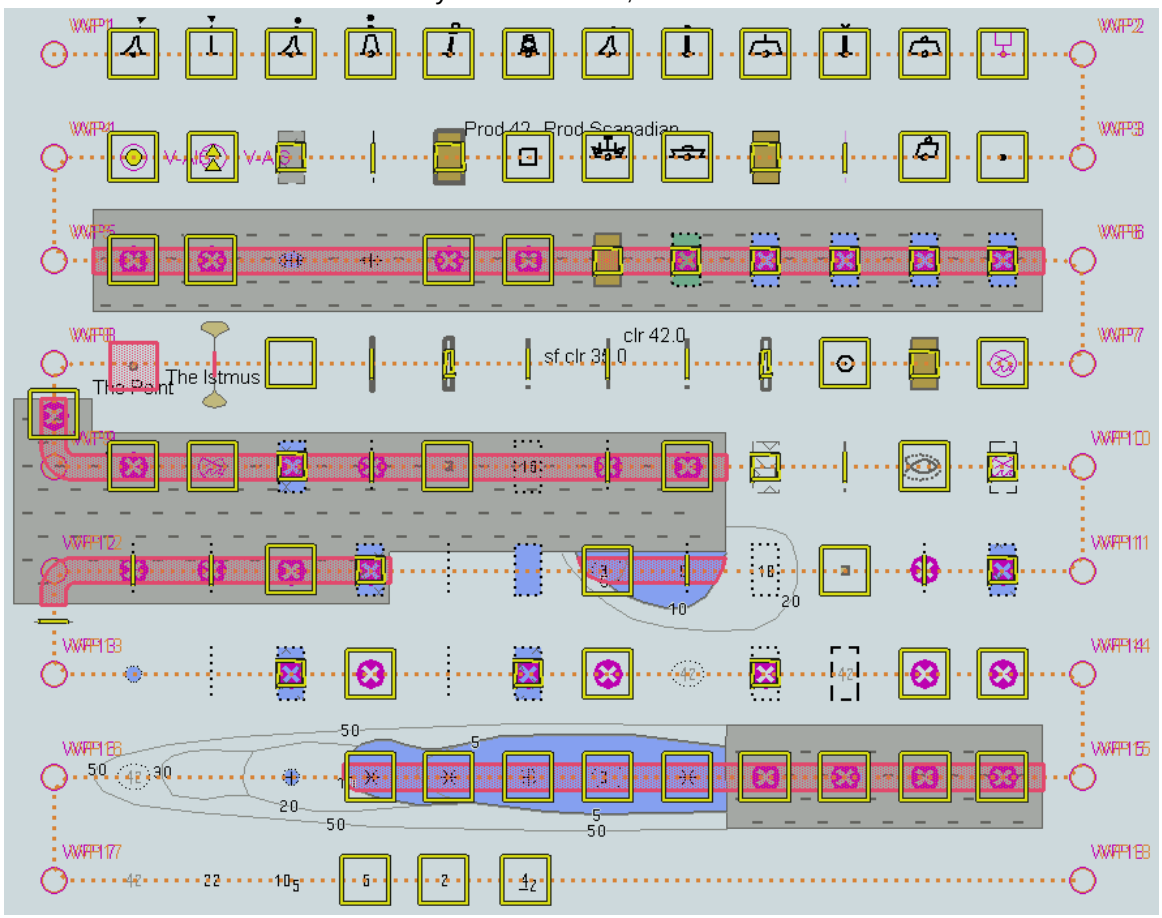
Safety Contour = 8 m, Alternative 1



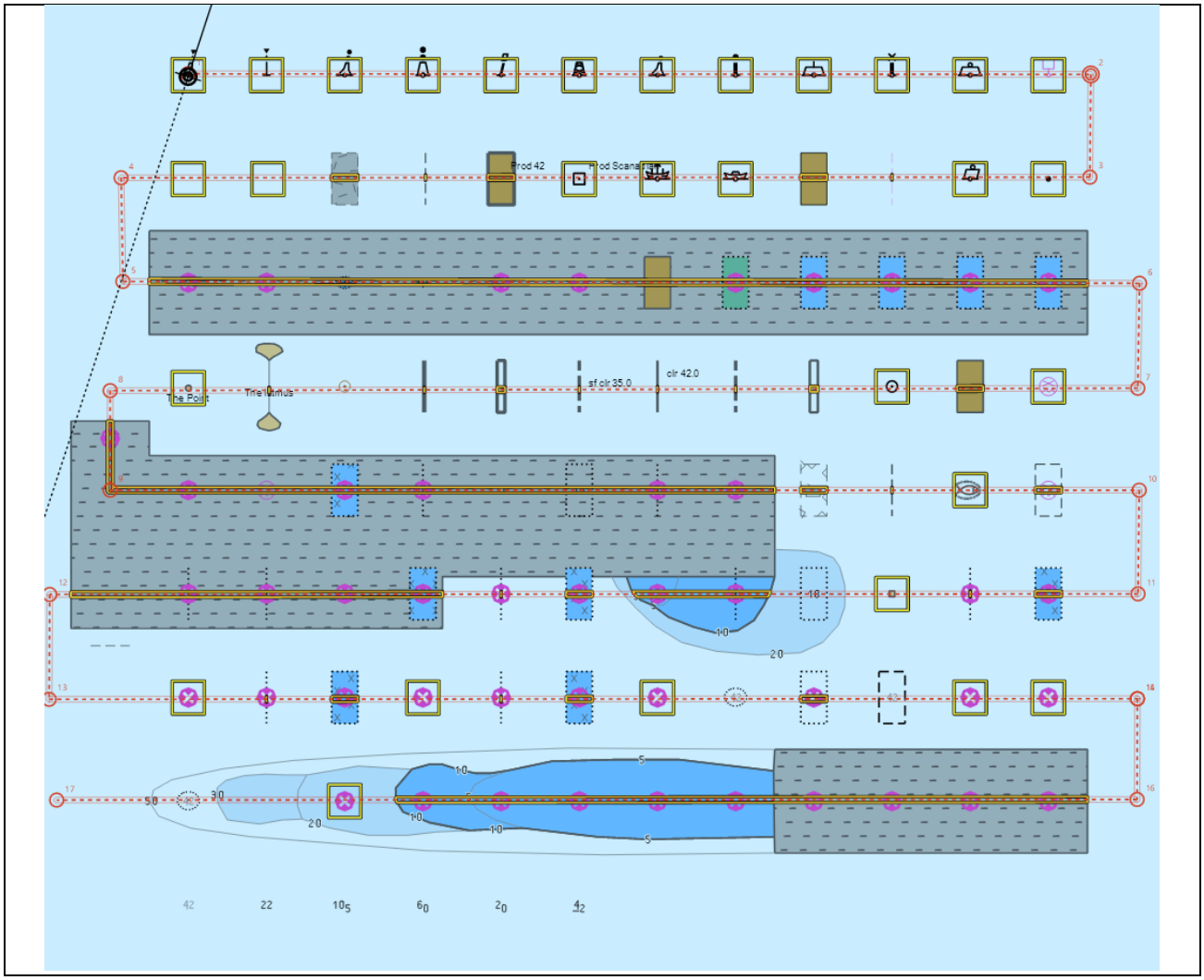
Safety Contour = 8 m, Alternative 2

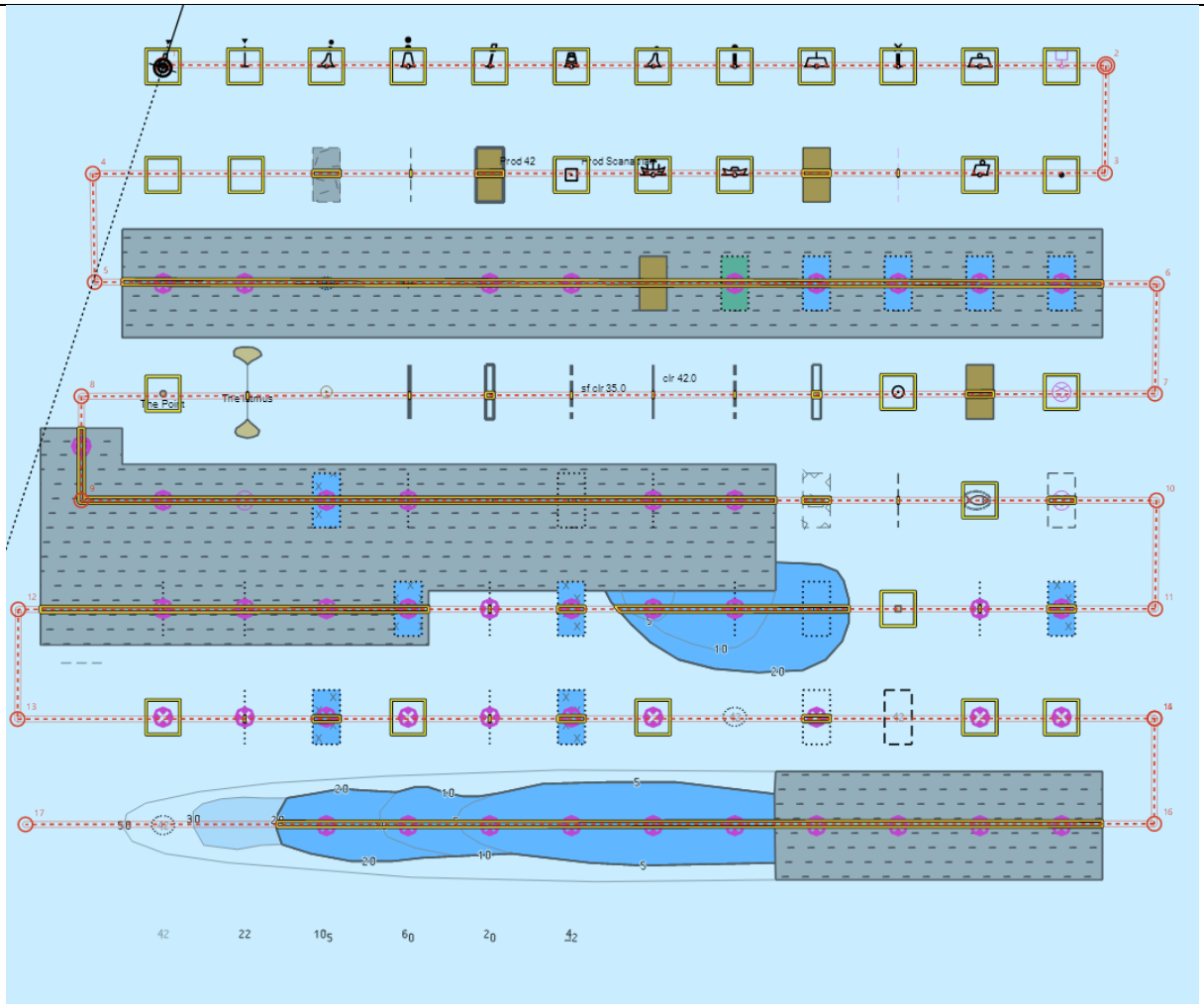


Safety Contour = 9 m, Alternative 1

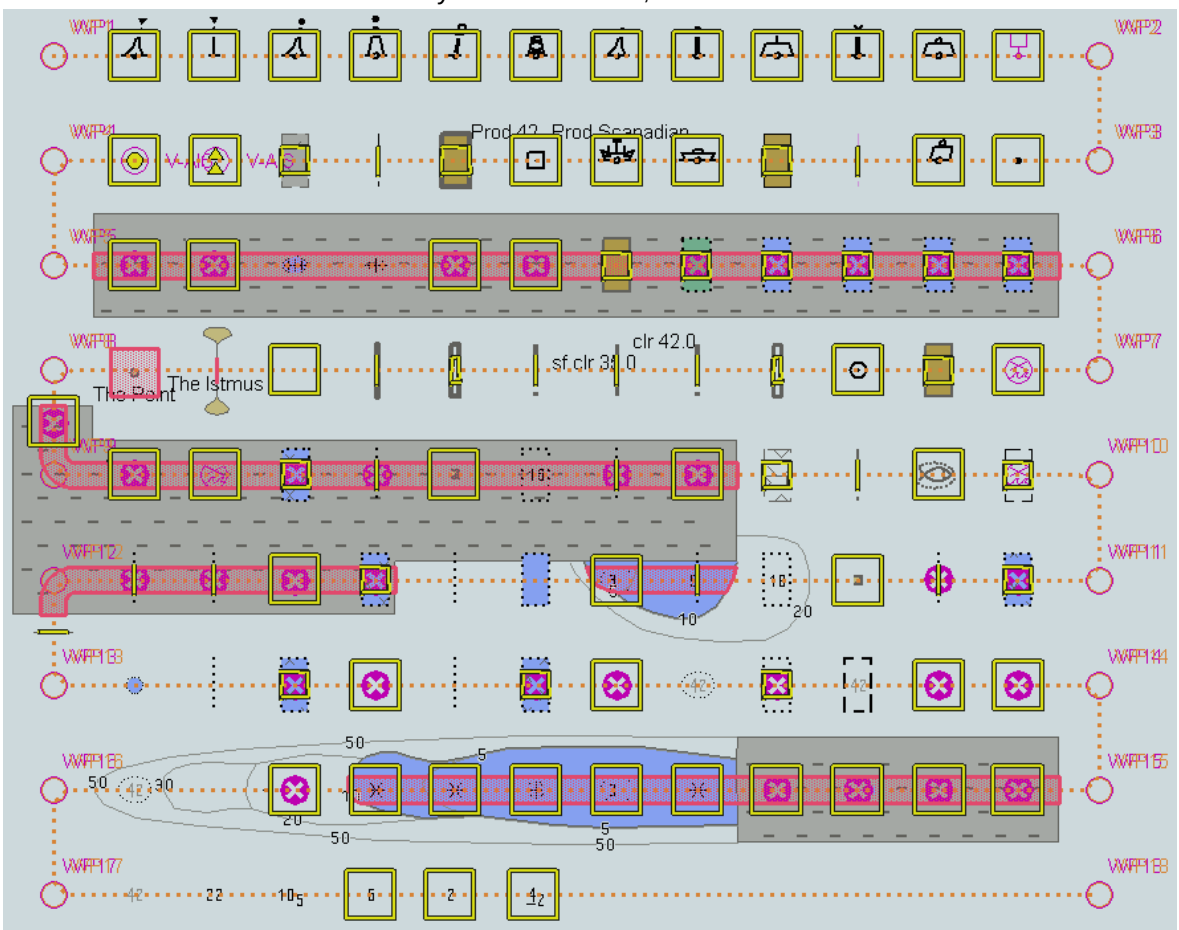


Safety Contour = 9 m, Alternative 2

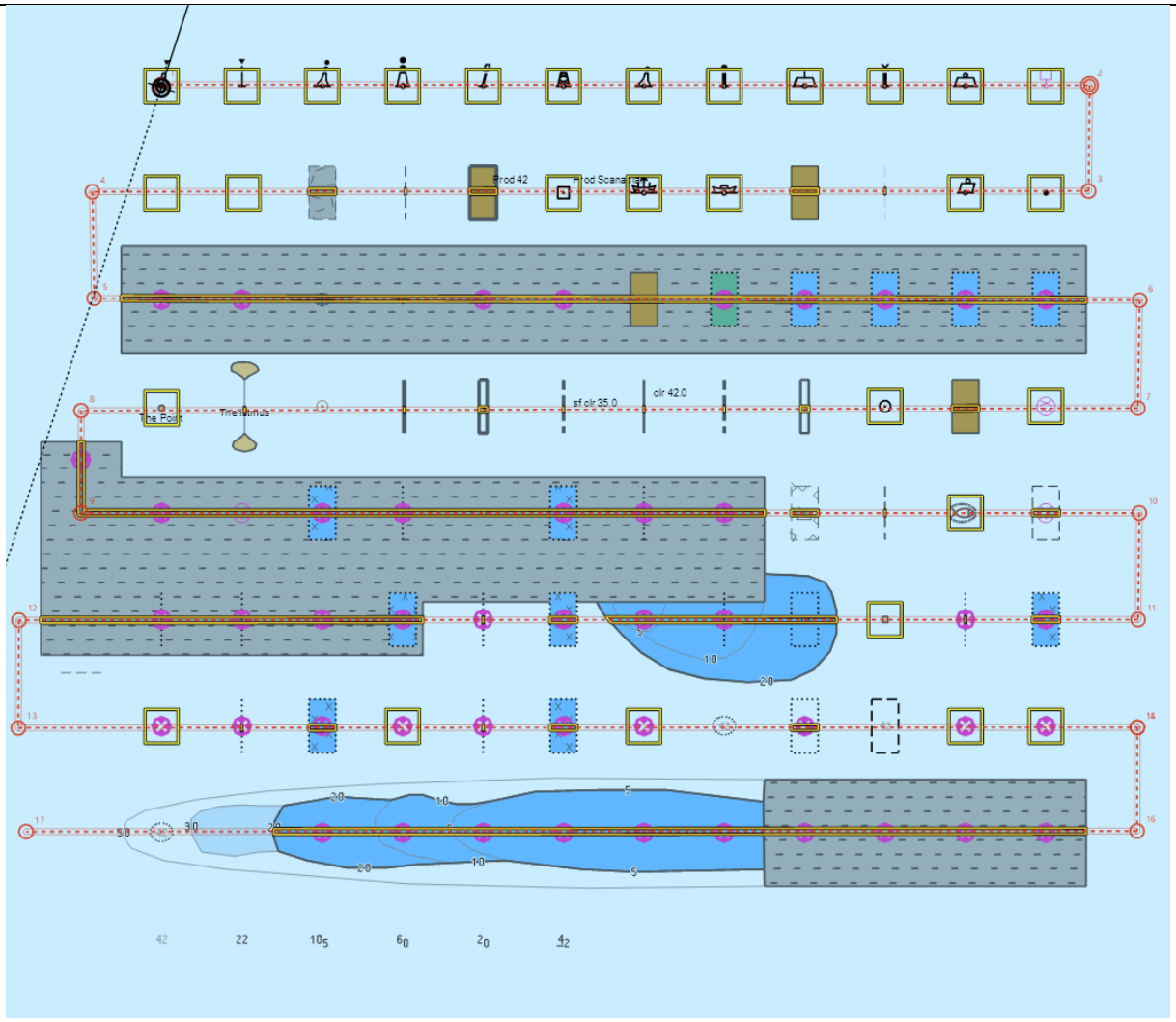

Prod 42
Prod Scanarial
The Point
The Minus
sf clr 35.0
clr 42.0



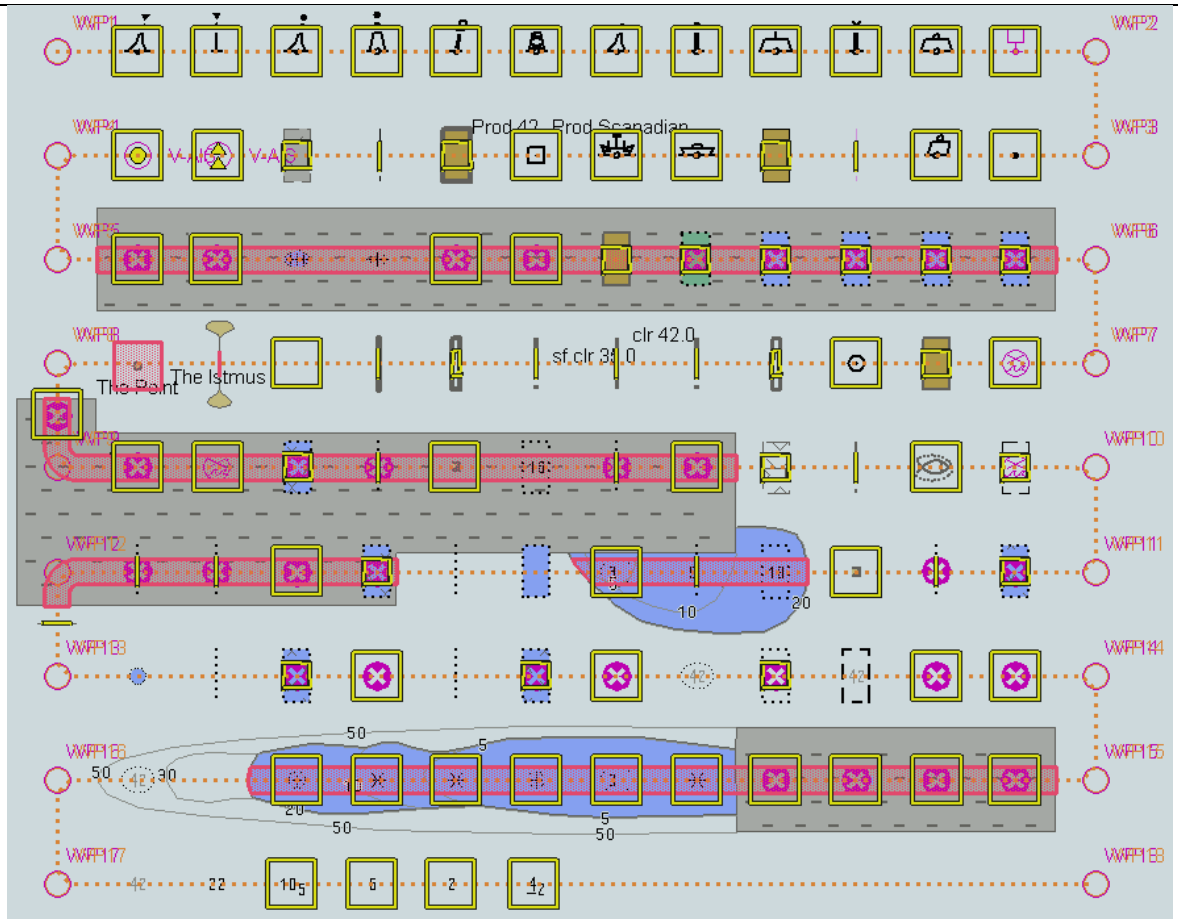
Safety Contour = 10 m, Alternative 1



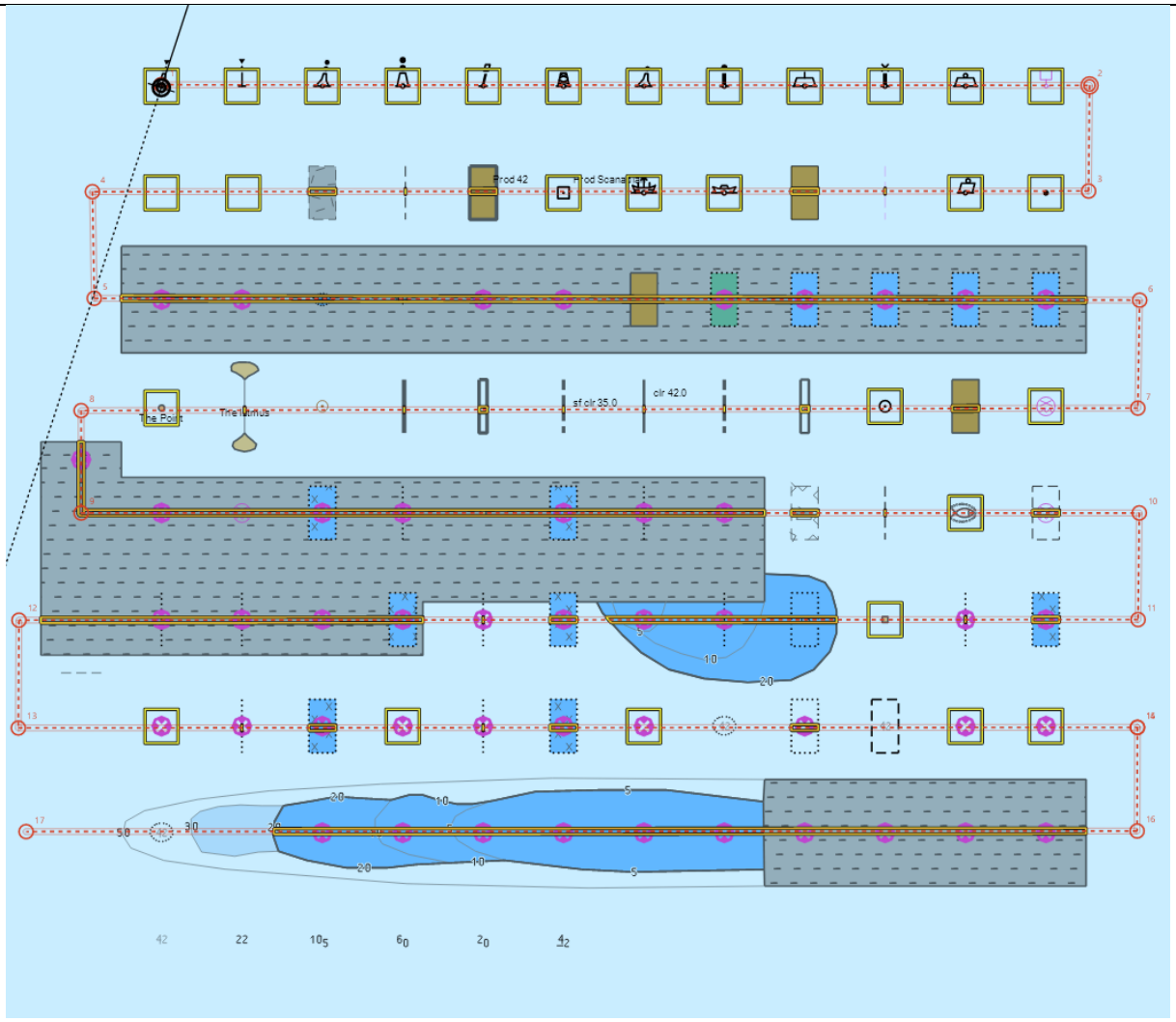
Safety Contour = 10 m, Alternative 2



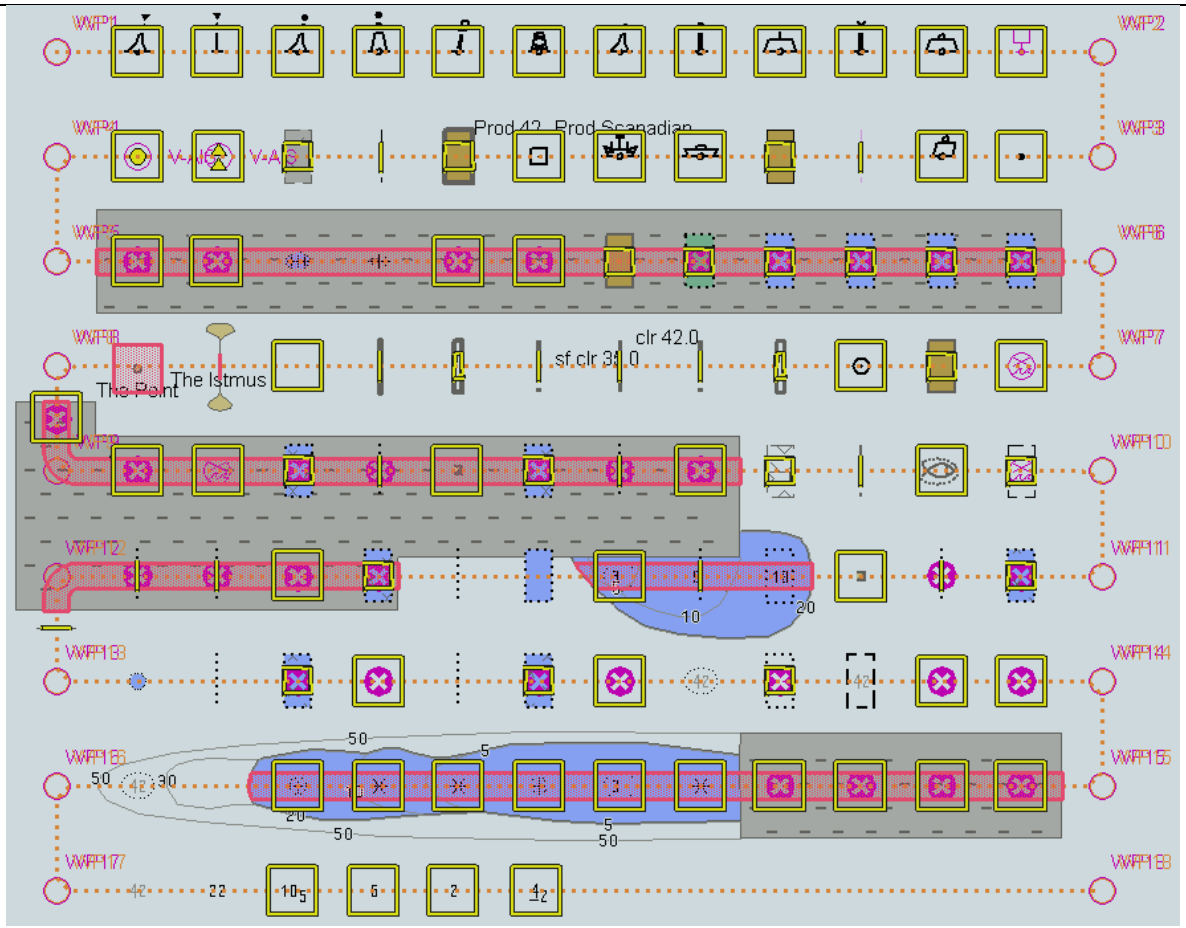
Safety Contour = 11 m, Alternative 1



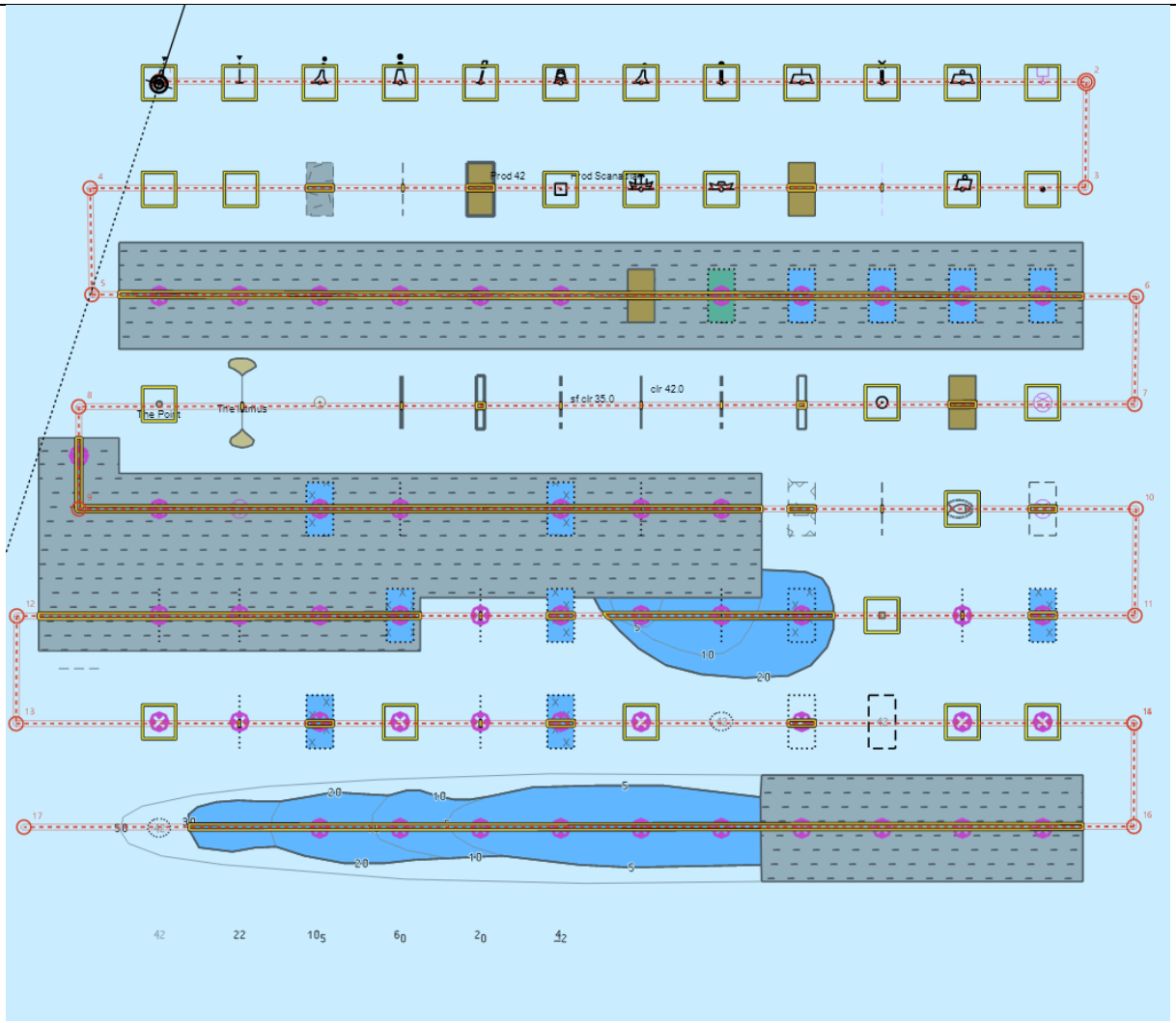
Safety Contour = 11 m, Alternative 2



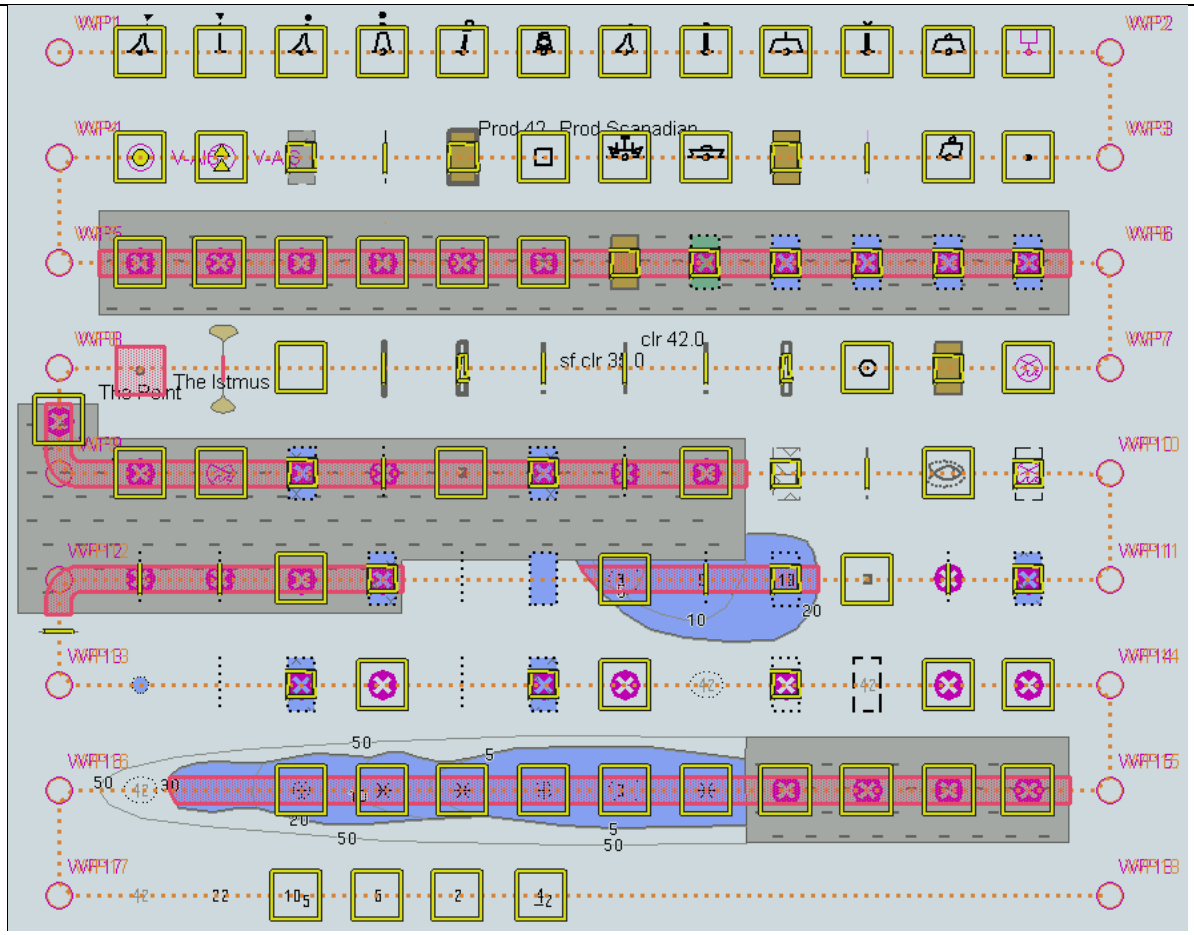
Safety Contour = 16 m, Alternative 1



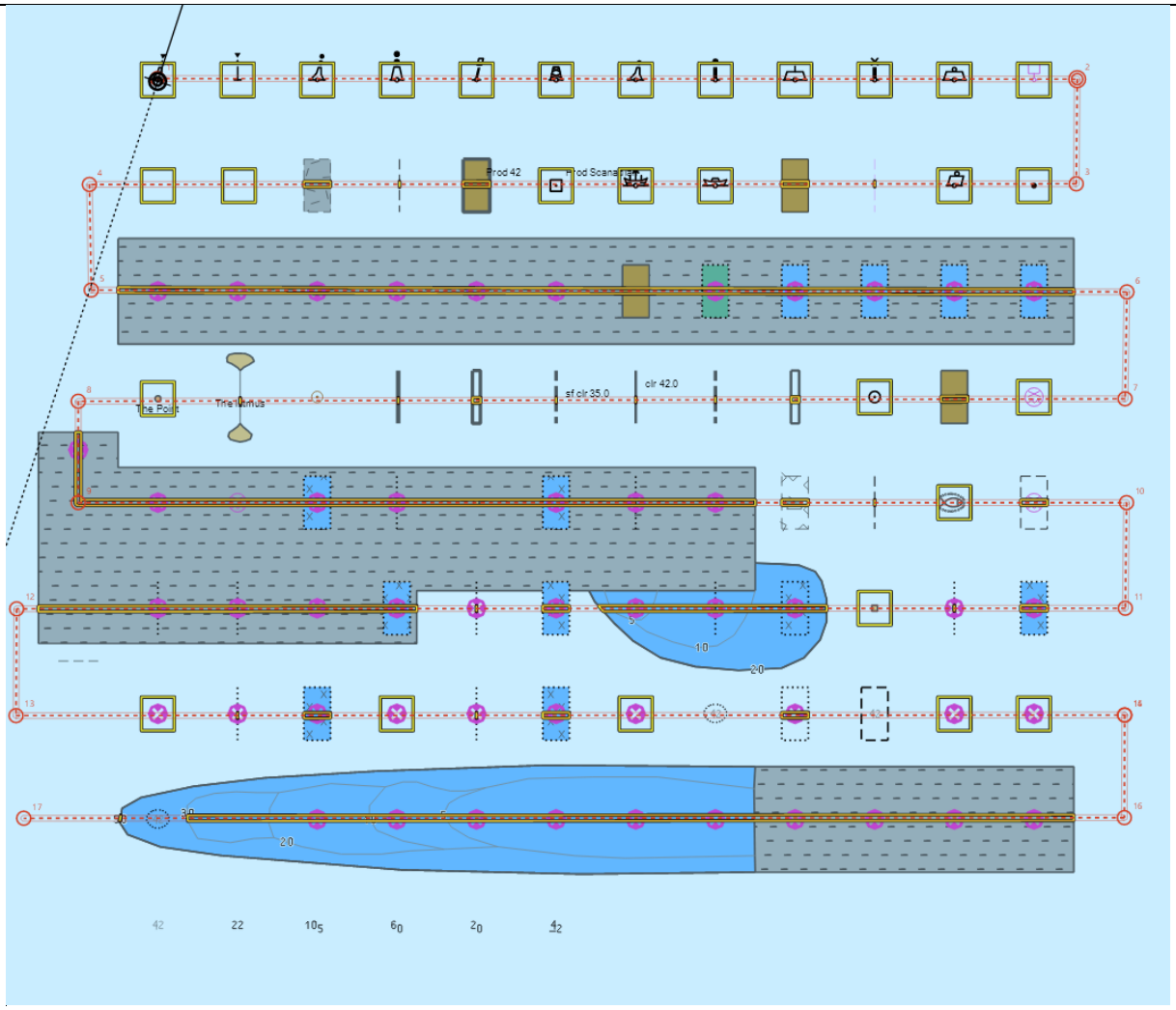
Safety Contour = 16 m, Alternative 2



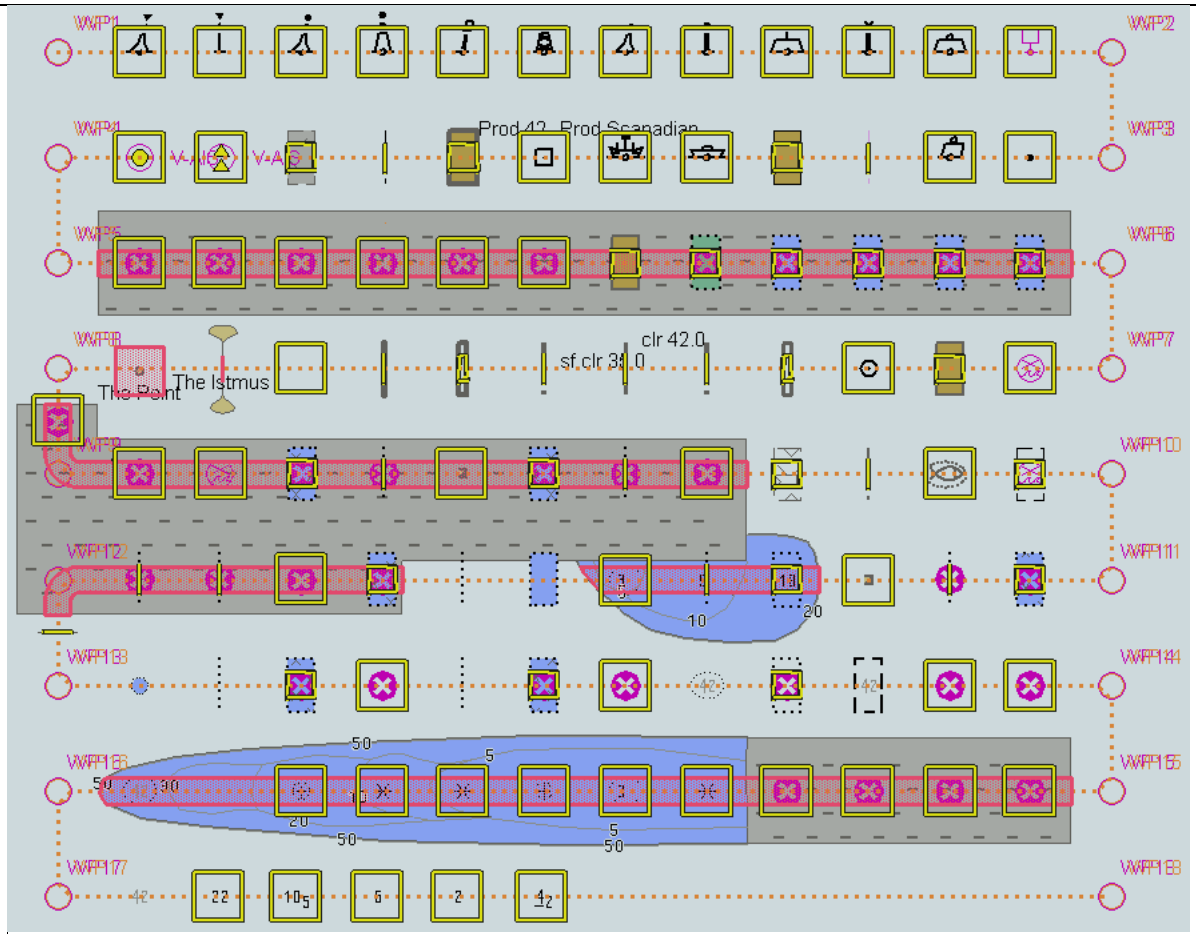
Safety Contour = 21 m, Alternative 1



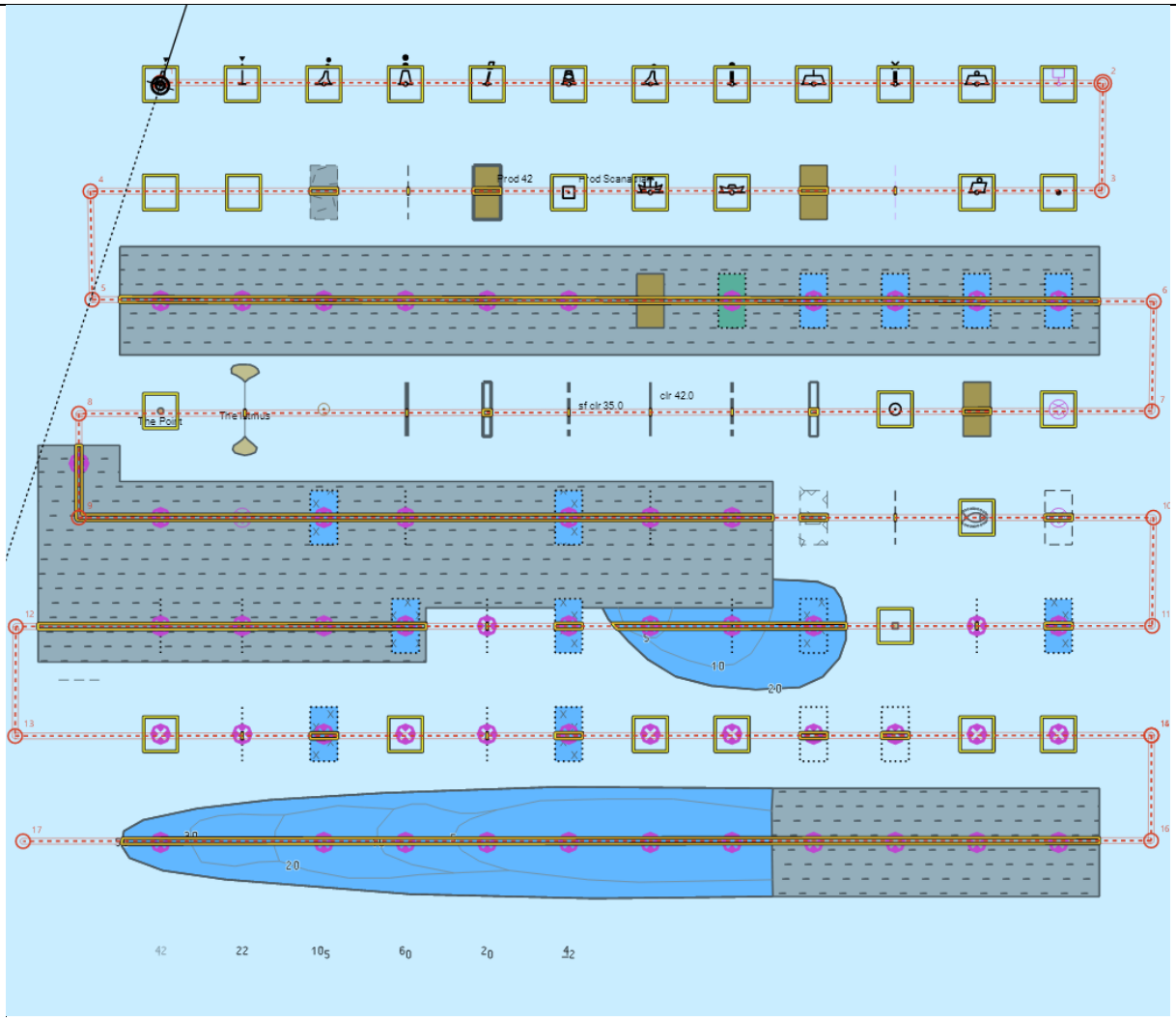
Safety Contour = 21 m, Alternative 2



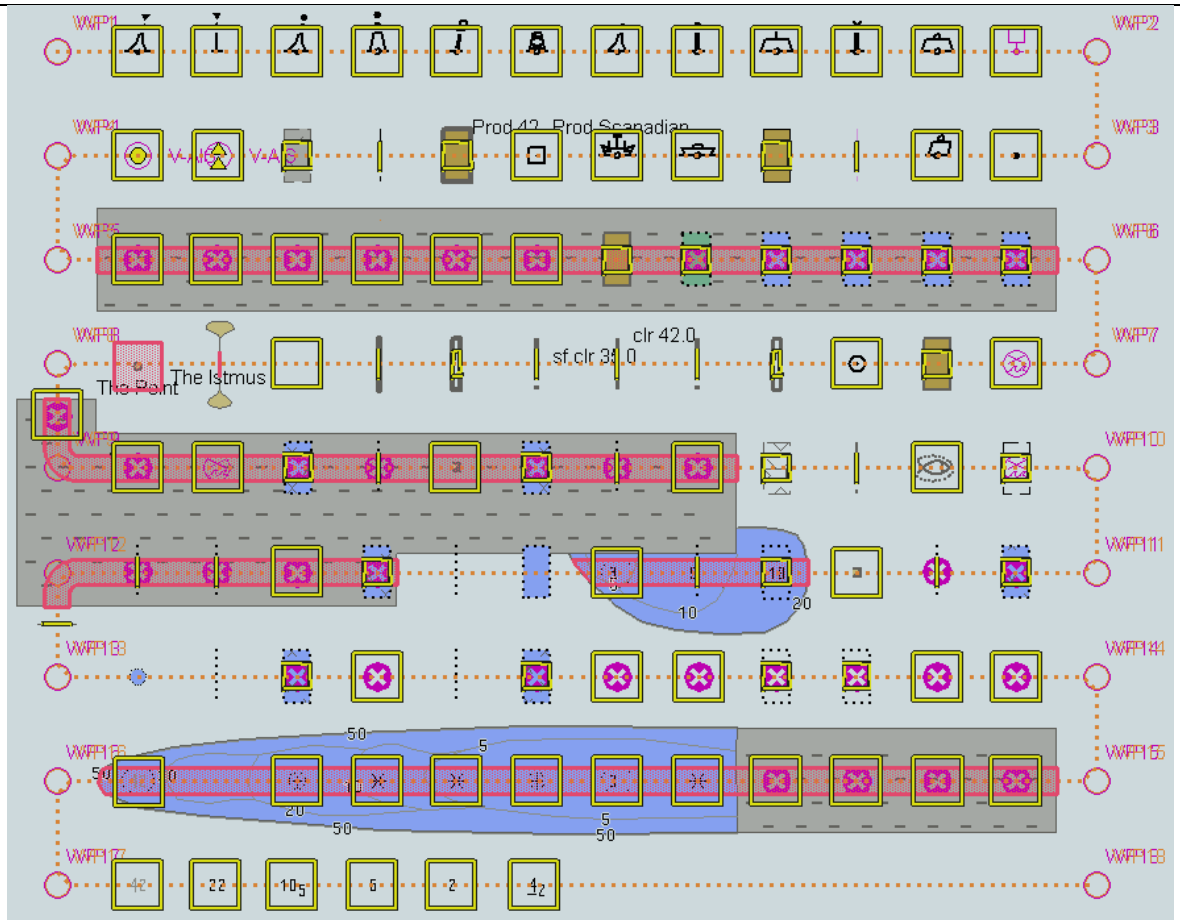
Safety Contour = 31 m, Alternative 1



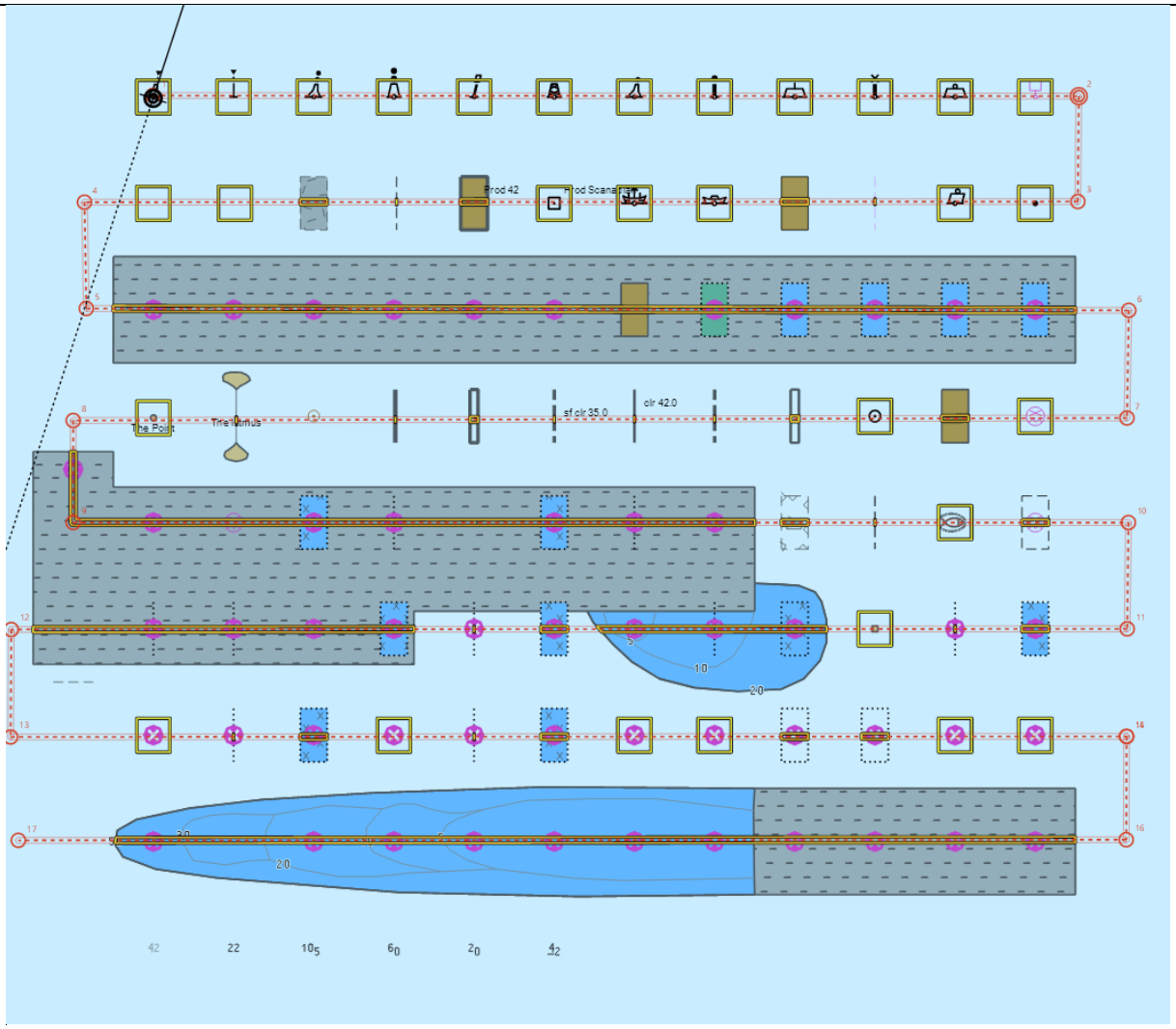
Safety Contour = 31 m, Alternative 2



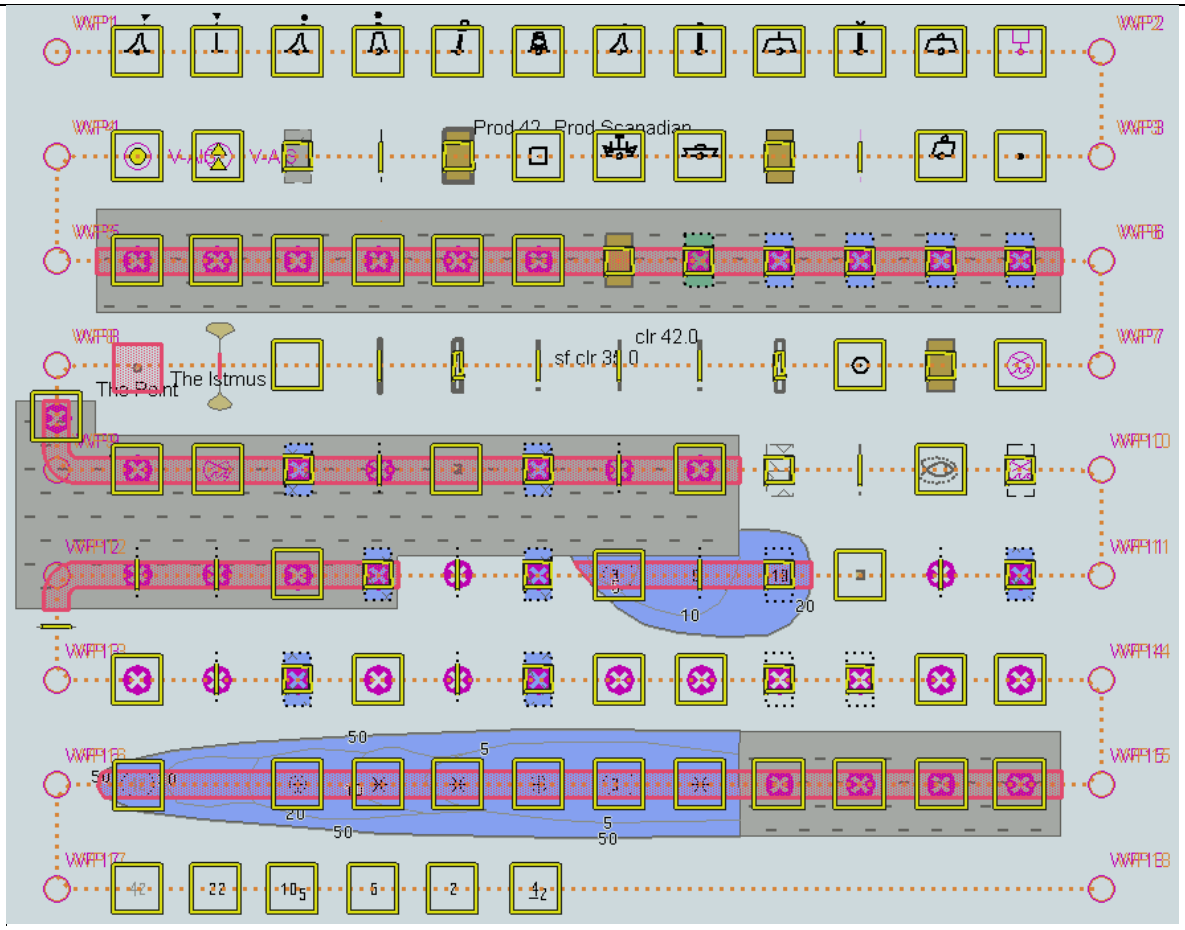
Safety Contour = 42 m, Alternative 1



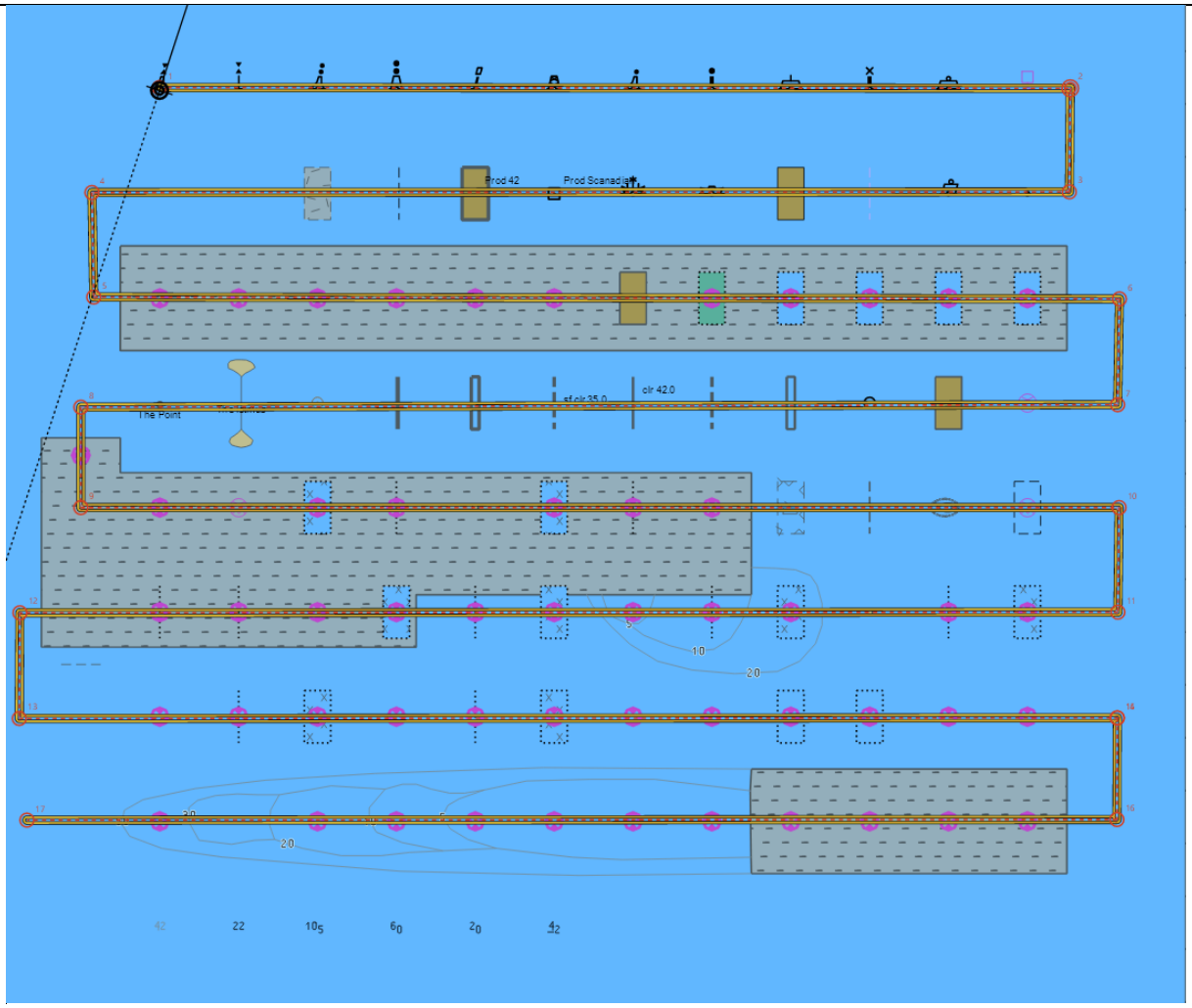
Safety Contour = 42 m, Alternative 2



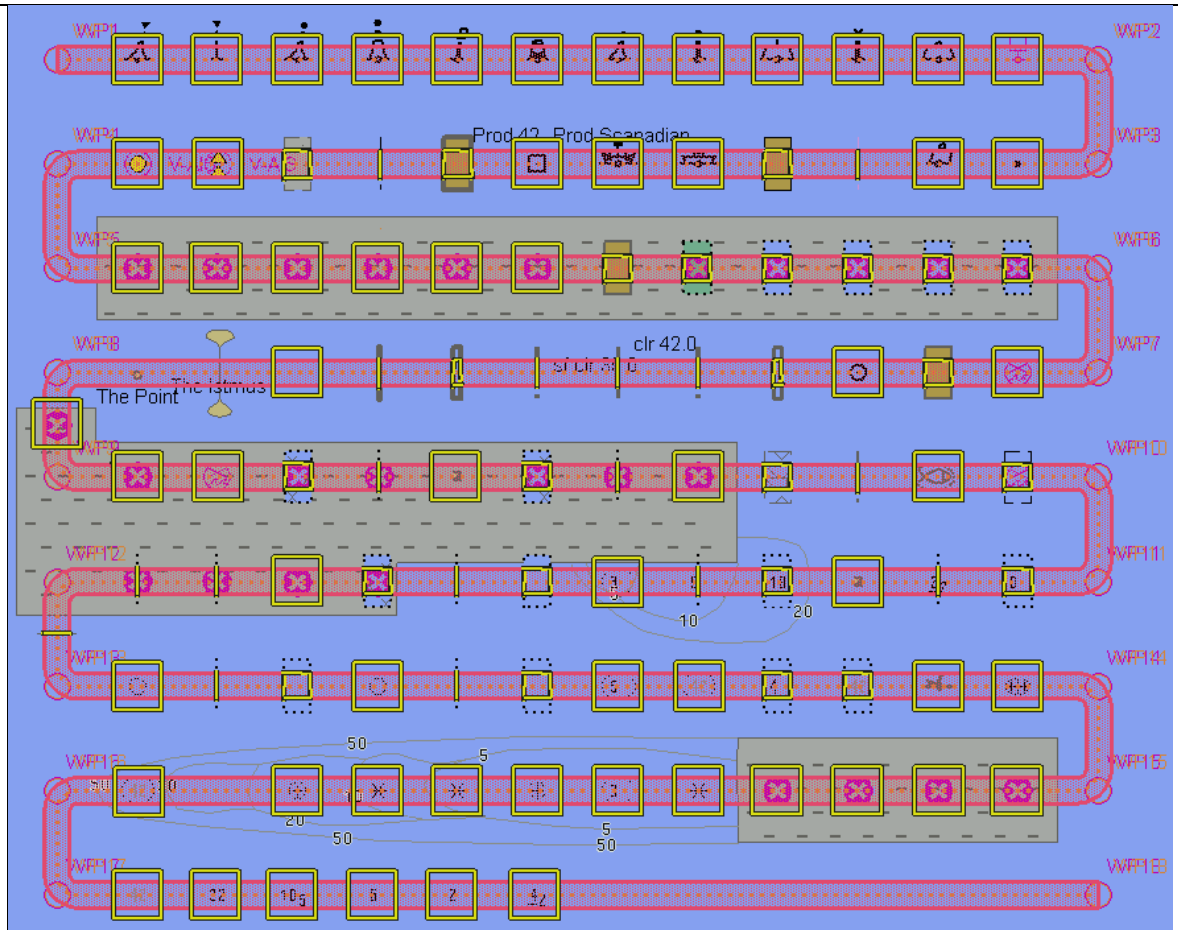
Safety Contour = 50 m, Alternative 1



Safety Contour = 50 m, Alternative 2



Safety Contour = 51 m, Alternative 1



Safety Contour = 51 m, Alternative 2

5.2 Detection and Notification of Navigational Hazards – Use of largest scale available

Test Reference	NavigationalHazardsLS	**IHO Reference**	S-98 C-12.9.7

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of navigational hazards.

This test is performed by loading the test datasets 101AA00OVRVU.000 and 101AA00NAVHZ.000, manually creating a route connecting all way points between features marked as WP1 through WP8 and checking display against the corresponding graphical plot.

Setup

*Load the exchange set **NavigationalHazards** and the exchange set **NavigationalHazardsOverview***

- *Select Display Category Other*
- *Set the Safety Contour value to 30 m*
- *Set the Safety Depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Paper chart symbols*
- *Select all Text groups*

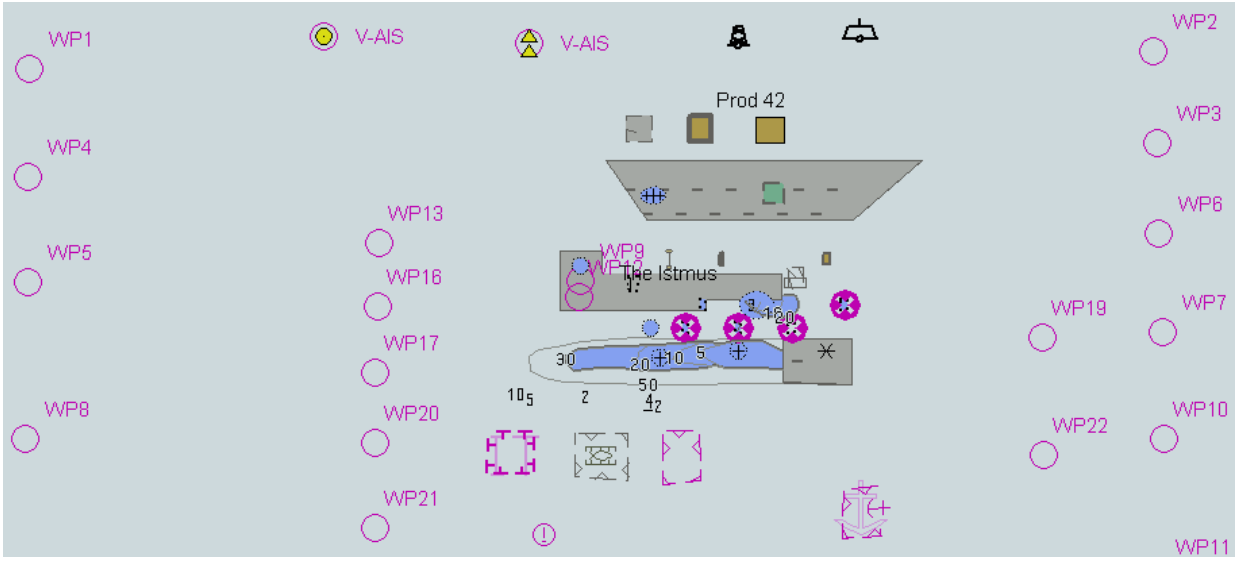
Action

Select position 39°57.000'N 104°49.000'W at maximum display scale (1:350 000) of 101AA00OVRVU.
1) View chart before route planning.
2) Manually create a route connecting all way points between features marked WP1 through WP8. Set user-specified distance for indication navigational hazards as 0.5 NM. Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

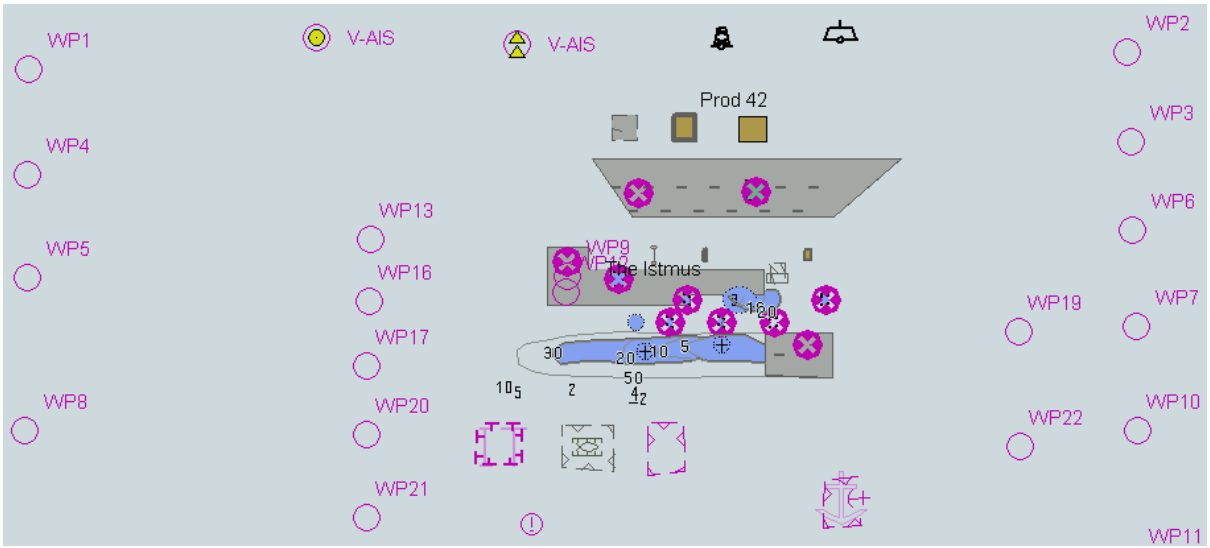
Results

The ENC in the ECDIS should match the corresponding graphical plot shown below.

1) Situation before route planning. Chart 101AA00OVRVU displayed as it is-



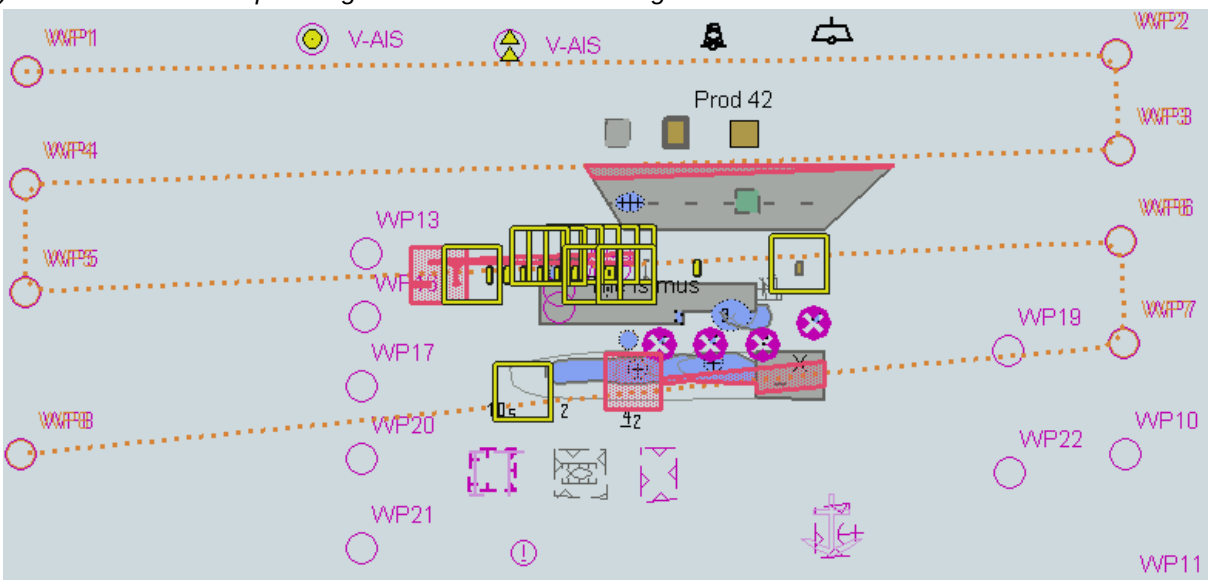
Alternative 1



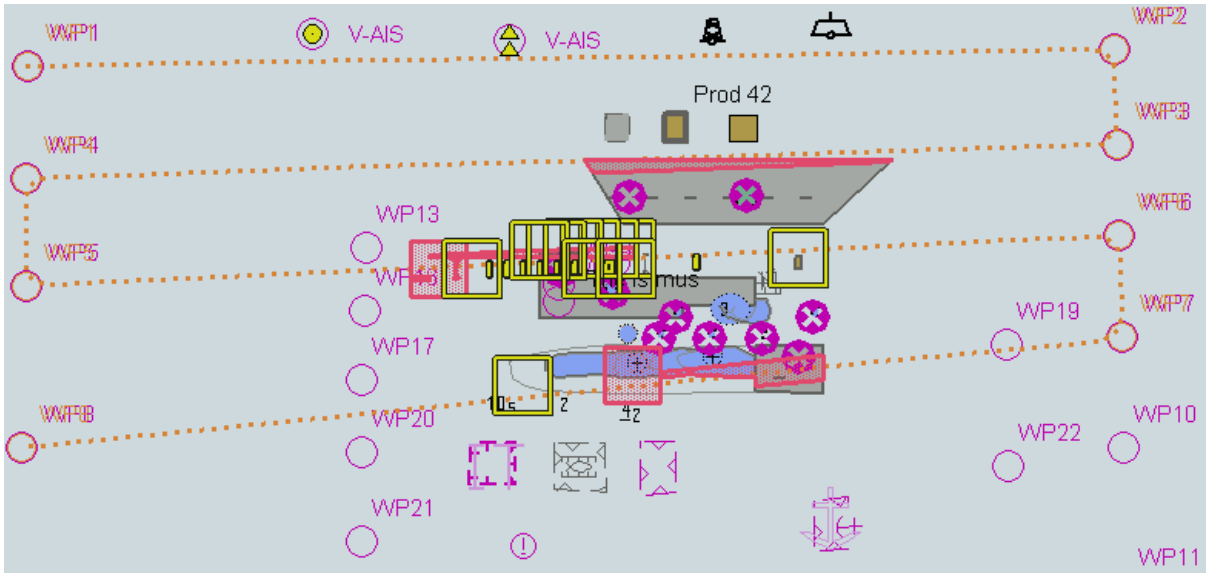
Alternative 2

tbd

2) Situation after route planning. Alerts indicated from largest scale available for each location



Alternative 1



Alternative 2

tbd

5.3 Detection and Notification of Navigational Hazards – Basic test Monitoring Mode

Test Reference	NavigationalHazardsMon	**IHO Reference**	S-98 C-12.9.7

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate indication if, continuing on its present course and speed, over a specified time or distance set by the Mariner, own ship will pass closer than a user-specified distance from any features satisfying the conditions for this test (as listed in section 10.5.9 of IHO S-52 and included in the test cell 101AA00NAVHZ.000) that is shallower than the Mariner's safety contour.

This test is performed by loading the test cell 101AA00NAVHZ.000, sailing with a simulated ship over the test area, setting the Safety Contour to the appropriate values (0m, 2m, 5m, 6m, 8m, 9m, 10m, 11m, 16m, 21m, 31m, 42m, 50m, 51m) and checking display against the graphical plots of test 5.1 (Route plan) corresponding to each set of Safety Contour settings.

Setup

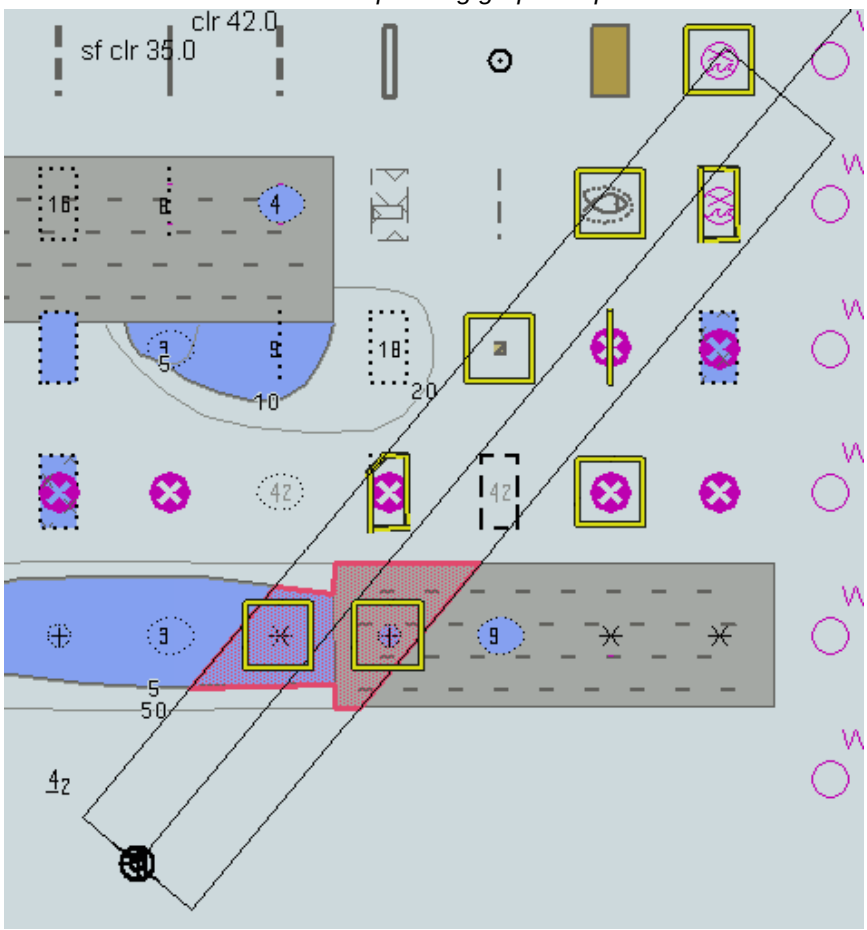
As for test 5.1
Select all Text groups

Action

Check ENC symbols shown in the ECDIS for each Safety Contour setting against the corresponding graphical plot.

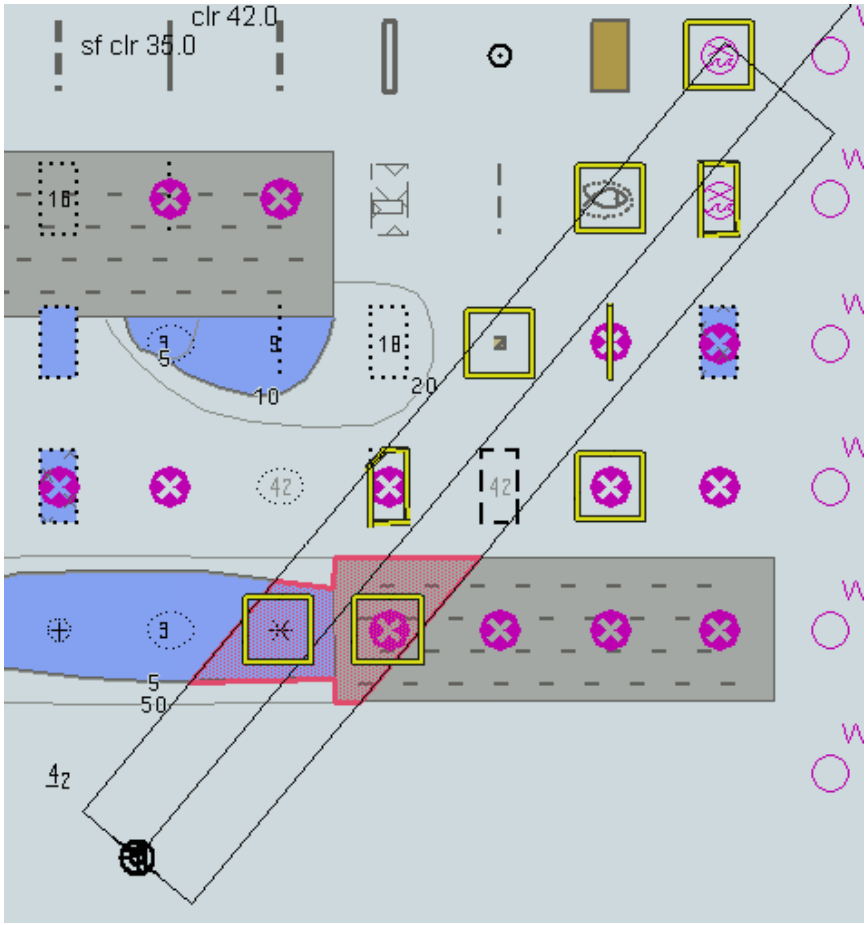
Results

The ENC in the ECDIS should match the corresponding graphical plot of test 5.1.



An example with Safety Contour = 10 m. Presentation alternative 1

tbd



tbd

An example with Safety Contour = 10 m. Presentation alternative 2

5.4 Detection and Notification of Navigational Hazards – Use of largest scale available – Monitoring Mode

Test Reference	NavigationalHazardsMonLS	**IHO Reference**	S-98 C-12.9.7

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of navigational hazards. This test is performed by loading the test cells 101AA00OVRVU.000 and 101AA00NAVHZ.000, manually creating a route connecting all way points between features marked as WP1 through WP8 and checking display against the corresponding graphical plot.

Setup

*Load the exchange set **NavigationalHazards***
*Load the exchange set **NavigationalHazardsOverview***

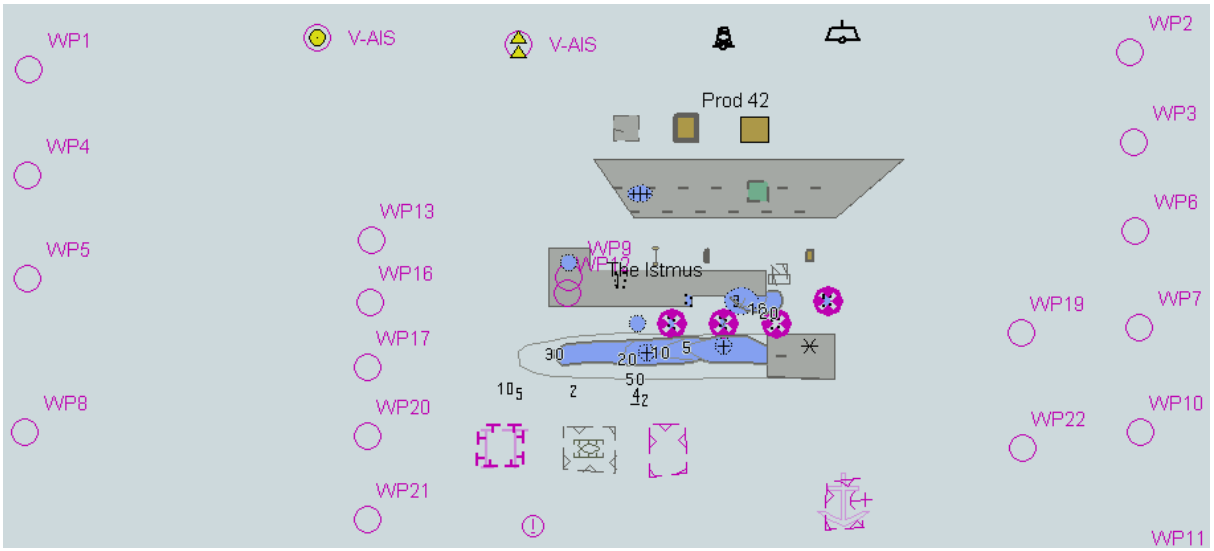
- *Select Display Category Other*
- *Set the Safety Contour value to 30 m*
- *Set the Safety Depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Paper chart symbols*
- *Select all Text groups*

Action

Select position 39°57.000'N 104°49.000'W at the maximum display scale (1:350 000) of 101AA00OVRVU.
Set simulated own ship for 39°49.587'N 104°54.930'W with heading set for 10.0°
Select size of own ship check area as 1.0 NM width and 8.0 NM length.

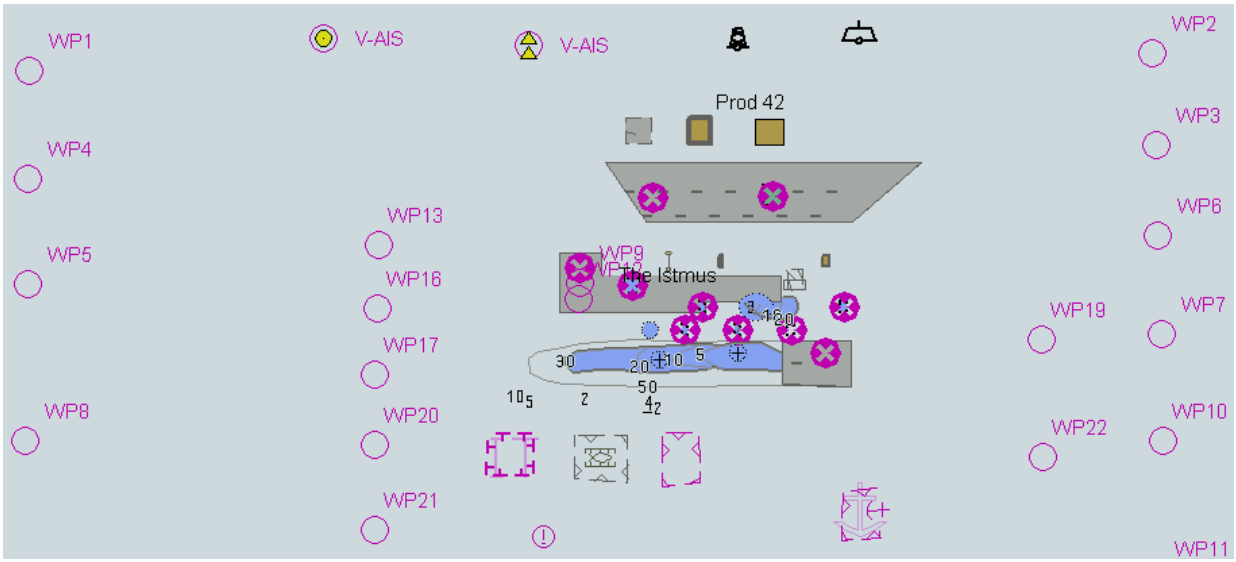
Results

The ENC in the ECDIS should match the corresponding graphical plot shown below.



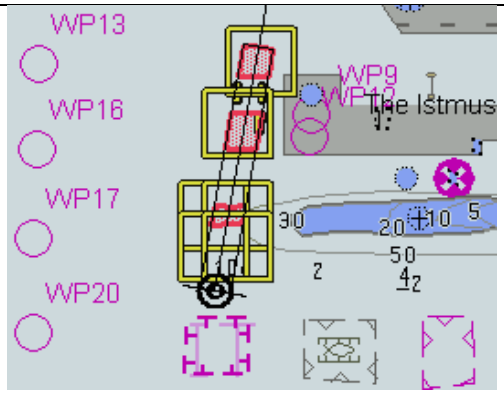
tbd

1) Situation before route monitoring. Chart 101AA00OVRVU displayed as it is. Presentation alternative 1



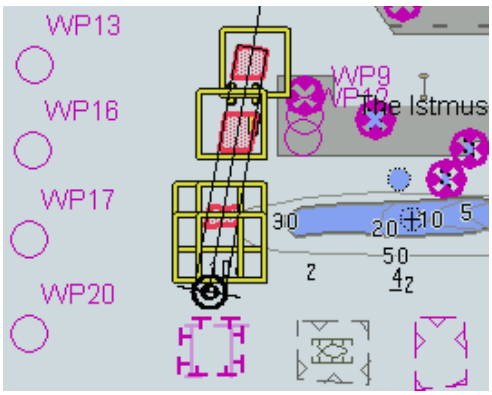
tbd

Situation before route monitoring. Chart 101AA00OVRVU displayed as it is. Presentation alternative 2



tbd

2) Situation during route monitoring. Alerts indicated from largest scale available for each location Presentation alternative 1



tbd

Situation during route monitoring. Alerts indicated from largest scale available for each location. Presentation alternative 2

Note: The parameters and shapes of the ship's check area are examples

6 Detection of Areas for which Special Conditions Exist

6.1 Detection of Areas for which Special Conditions Exist - Basic test

Test Reference	SpecialConditions	**IHO Reference**	S-98 C-12.9.7

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route closer than a user-specified distance from the boundary of a prohibited area or a geographic area for which special conditions exist. The features satisfying the conditions for this test are listed in section S-98 XXX-XXX and are included in the test cell 101AA00ARSPC.000.

This test is performed by loading the test cell 101AA00ARSPC.000, manually creating a route connecting all way points between features marked as WP1 through WP4 and checking display against the corresponding graphical plot.

Setup

*Load the exchange set **SpecialConditions***

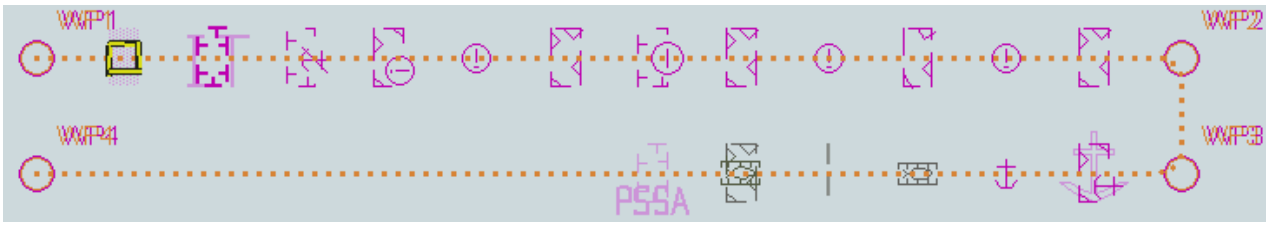
- *Select Display Category Other*
- *Set the Safety Contour value to 0 m*
- *Set the Safety Depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Paper chart symbols*
- *Manually create a route connecting all way points between features marked WP1 through WP4*
- *Set user-specified distance for indication of areas with special condition as 0.1 NM*

Action

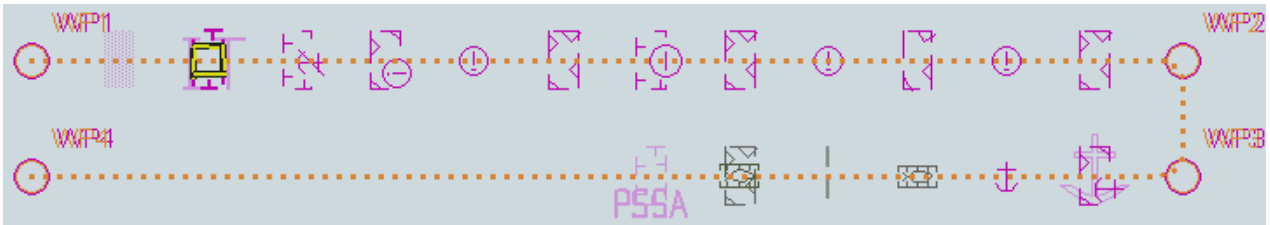
Check ENC symbols shown in the ECDIS against the corresponding graphical plot. selecting one by one each special condition for the test

Results

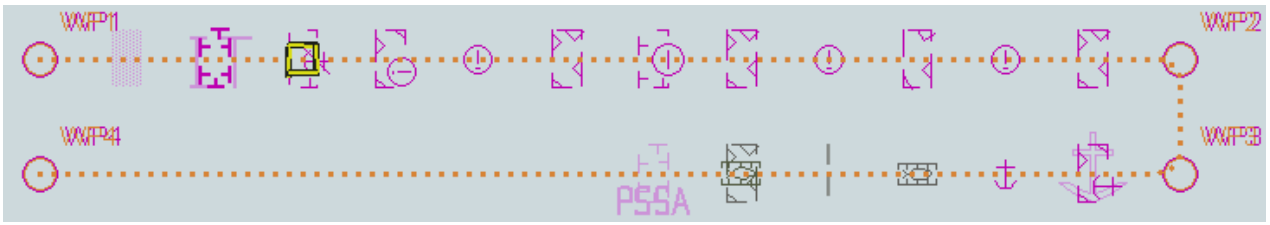
The ENC in the ECDIS should match the corresponding graphical plot shown below.



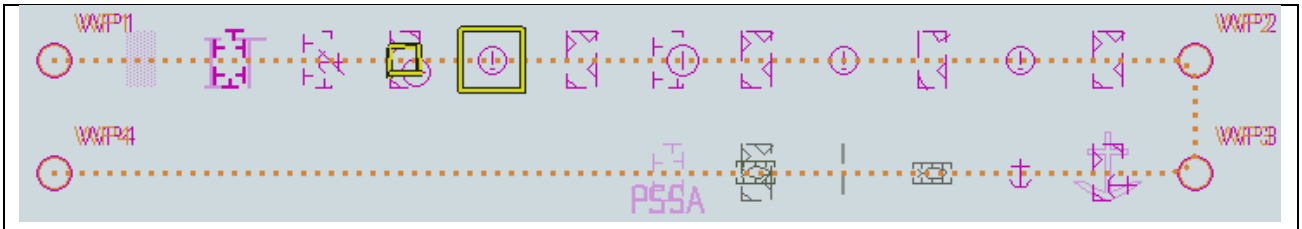
Selected: Traffic separation zone



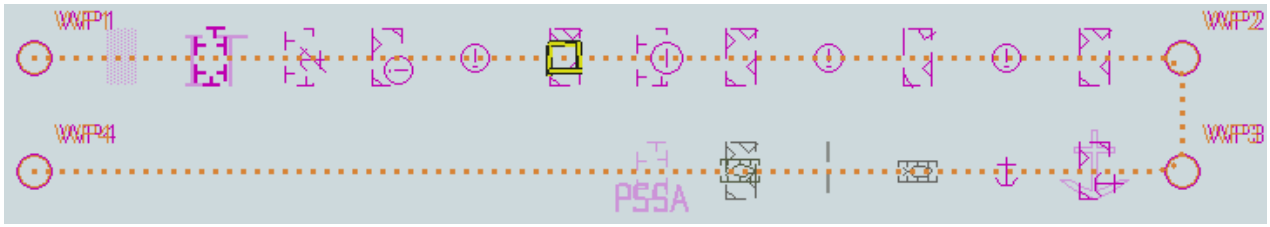
Selected: Inshore traffic zone



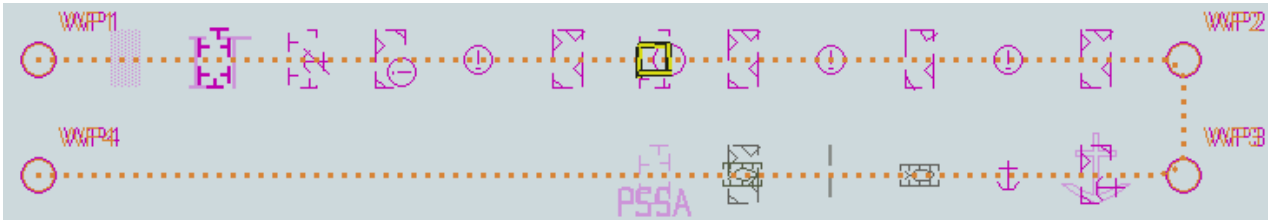
Selected: Restricted area



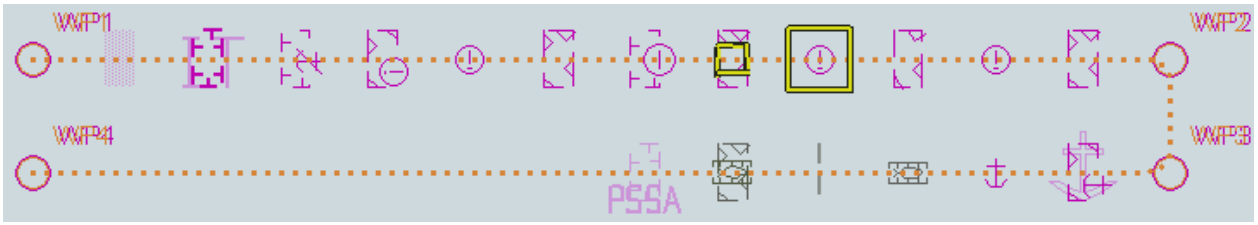
Selected: Caution area



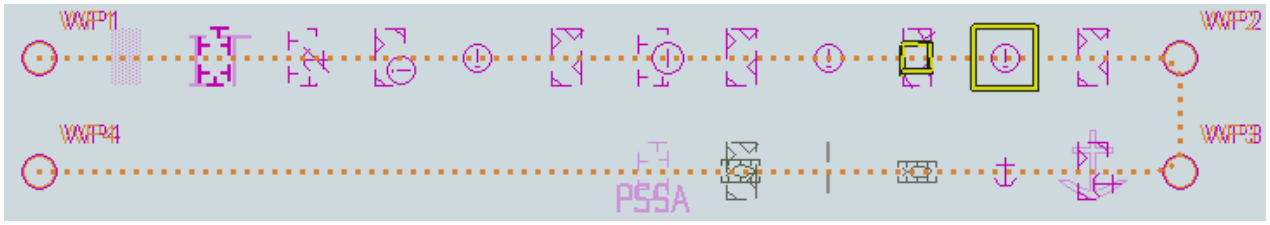
Selected: Offshore production area



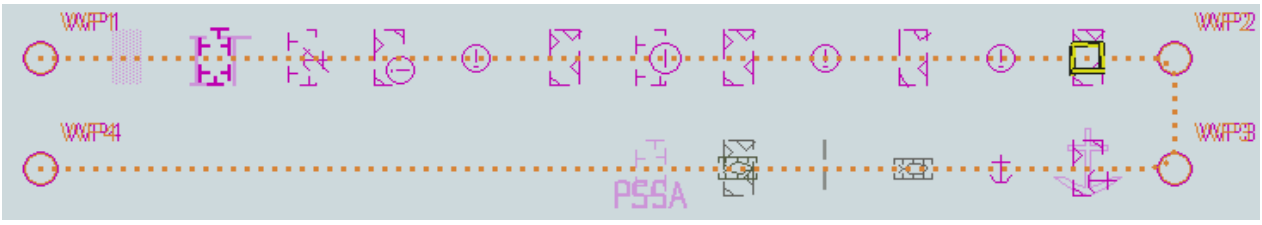
Selected: Area to be avoided



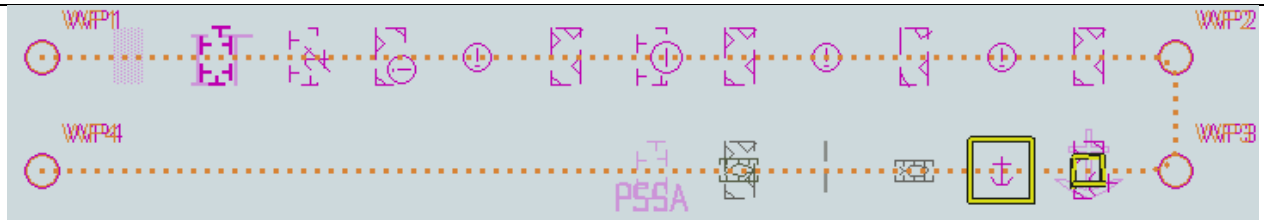
Selected: Military practice area



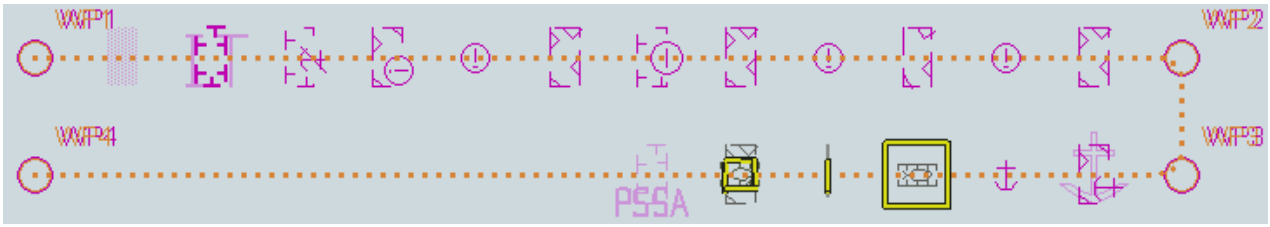
Selected: Seaplane landing area



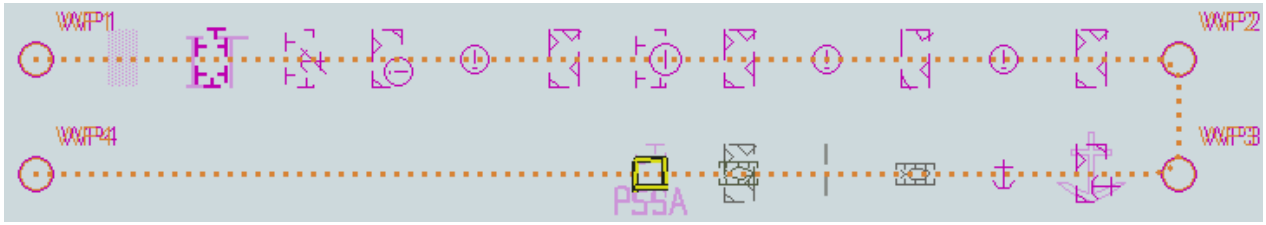
Selected: Submarine transit lane



Selected: Anchorage area



Selected: Marine farm/aquaculture

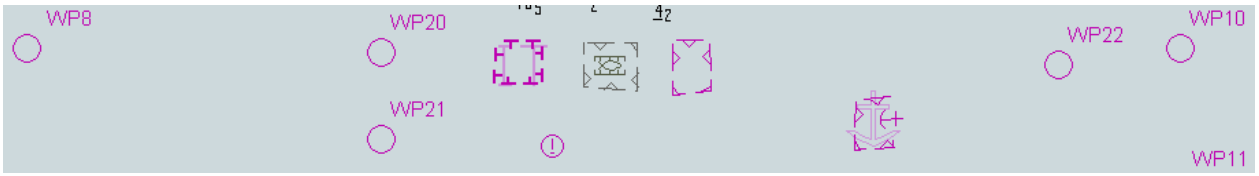
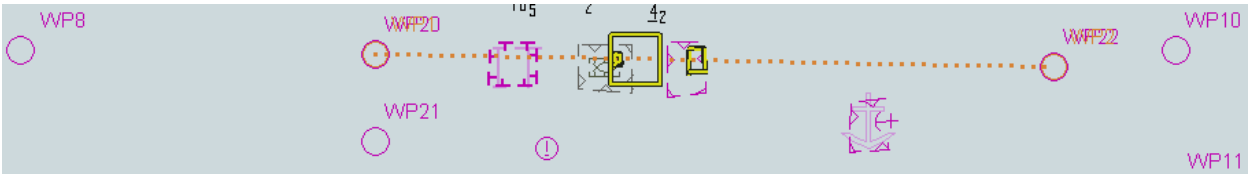


Selected: PSSA (Particularly Sensitive Sea Area)

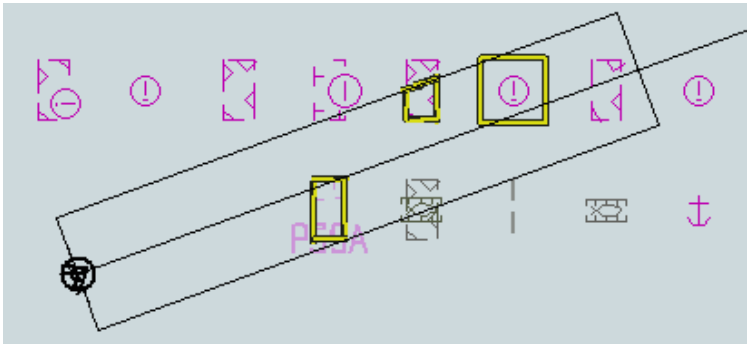
tbd

6.2 Detection of Areas for which Special Conditions Exist - Use of largest scale available

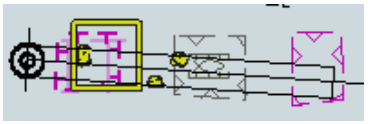
Test Reference	SpecialConditionsLS	**IHO Reference**	S-98 C-12.9.8
Test description			
The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of areas with special condition. *This test is performed by loading the test cells 101AA00OVRVU.000 and 101AA00ARSPC.000, manually creating a route connecting way points between features marked as WP20 and WP22 and checking display against the corresponding graphical plot.*			
Setup			
As for test SpecialConditions and in addition load the exchange set ***NavigationalHazardsOverview*** • *Select Display Category Other* • *Set the Safety Contour value to 0 m* • *Set the Safety Depth value to 30 m* • *Select Symbolized Boundaries* • *Select Simplified point symbols* • *Select all Text groups*			

Action
Select position 39°45'•000N 104°49'•000W at compilation scale (1:350 000) of 101AA00OVRVU. *1) View chart before route planning.* *2) Manually create a route connecting two way points between features marked WP20 and WP22. Set user-specified distance for indication of areas with special conditions as 0.5 NM. Check ENC symbols shown in the ECDIS against the corresponding graphical plot.*
Results
The ENC in the ECDIS should match the corresponding graphical plot shown below.    *1) Situation before route planning. Chart 101AA00OVRVU displayed as it is*    *2) Situation after route planning. Alerts indicated from largest scale available for each location. An example with Seaplane landing area and Marine farm/culture area as selected.* **tbd**

6.3 Detection of Areas for which Special Conditions Exist - Monitoring Mode

Test Reference	SpecialConditionsMon	**IHO Reference**	S-98 C-12.9.8
Test description			
The purpose of this test is to verify by observation that ECDIS provides an appropriate alarm or indication, as selected by the Mariner, if, within a specified time set by the Mariner, own ship will cross the boundary of a prohibited area or area for which special conditions exist. The features satisfying the conditions for this test are listed in the Alerts and Indications section of the portrayal catalogue and are included in the test cell 101AA00ARSPC.000. *This test is performed by loading the test cell 101AA00ARSPC.000, sailing with a simulated ship over the test area, selecting one by one each special condition for the test and checking display against the graphical plots of test 6.1 (Route plan) corresponding to each set of Safety Contour settings.*			
Setup			
As for test SpecialConditions			
Action			
Check ENC symbols shown in the ECDIS for each special condition against the corresponding graphical plot.			
Results			
The ENC in the ECDIS should match the corresponding graphical plot of test 6.1.  *An example with PSSA and Military practice area as selected.* **tbd**			

6.4 Detection of Areas for which Special Conditions Exist - Use of largest scale available – Monitoring Mode

Test Reference	SpecialConditionsMonLS	**IHO Reference**	S-98 C-12.9.8
Test description			
The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of areas with special condition. *This test is performed by loading the test cells 101AA00OVRVU.000 and 101AA00ARSPC.000, sailing with a simulated ship over the test area, selecting one by one each special condition for the test and checking display against the graphical plots of tests 6.1 and 6.2 (Route plan) corresponding to each special condition settings.*			
Setup			
As for test SpecialConditionsLS			
Action			
Select position 39°45'•000N 104°49'•000W at compilation scale (1:350 000) of 101AA00OVRVU. Heading approximately 100°. *Set vessel position to 39°47.877'N 104°57.590'W, heading 94.3°.* *Check ENC symbols shown in the ECDIS for each special condition against the corresponding graphical plot.*			
Results			
The ENC in the ECDIS should match the corresponding graphical plot of test 6.1 and 6.2.  *An example with Caution area, Military practice area and PSSA as selected* **tbd**			

7 Detection and Notification of the Safety Contour

7.1 Detection and Notification of the Safety Contour - Basic test

Test Reference	SafetyContour	**IHO Reference**	S-98 C-12.9.7

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route across an own ship's safety contour. The features satisfying the conditions for this test are listed in the alerts and indications catalogue in the S-101 Portrayal Catalogue and are included in the test dataset 101AA00SAFCO.000.

This test is performed by loading the test cell 101AA00SAFCO.000, manually creating a route connecting all way points between features marked as WP1 through WP4 and checking display against the corresponding graphical plot.

Setup

*Load the exchange set **SafetyContour***

- *Select Display Category Other*
- *Set the Safety Contour value to 0 m*
- *Set the Safety Depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Paper chart symbols*
- *Select all Text groups*
- *Select Contour label*
- *Manually create a route connecting all way points between features marked WP1 through WP4*
- *Set user-specified distance for detecting of Safety Contour as 0.1 NM*

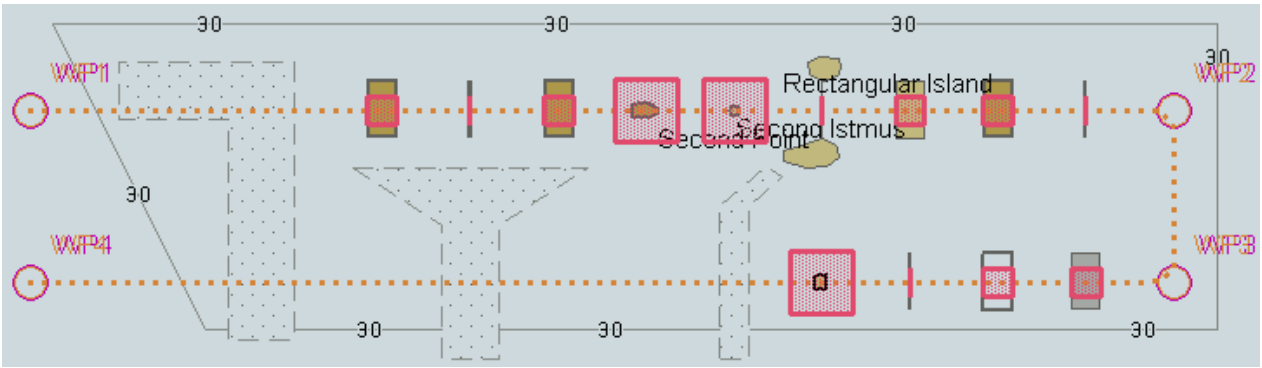
Action

Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

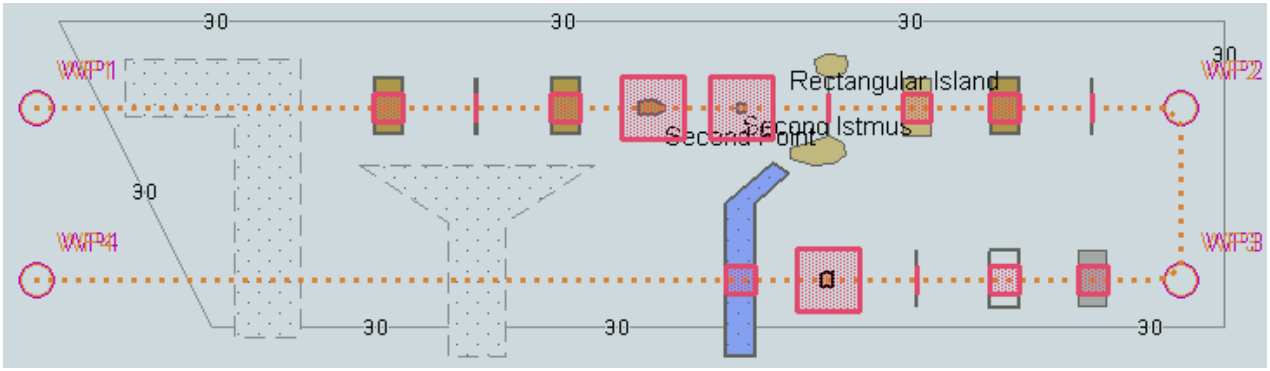
Repeat sequentially for Safety Contour value 0m, 6m, 11m, 13m, 43m.

Results

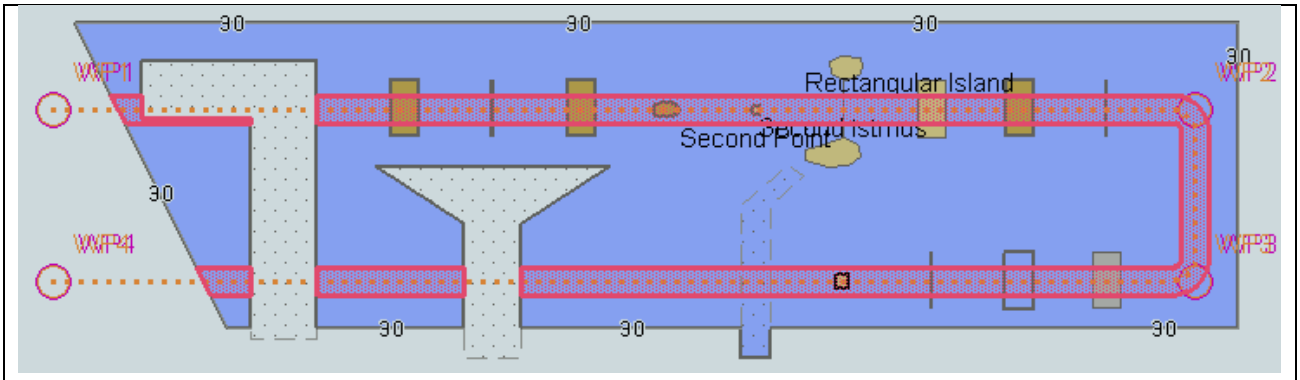
The ENC in the ECDIS should match the corresponding graphical plot shown below.
Note: To increase the prominence of dangers in unsafe waters it is permitted to highlight features with an isolated danger mark when they are wholly located in this area.



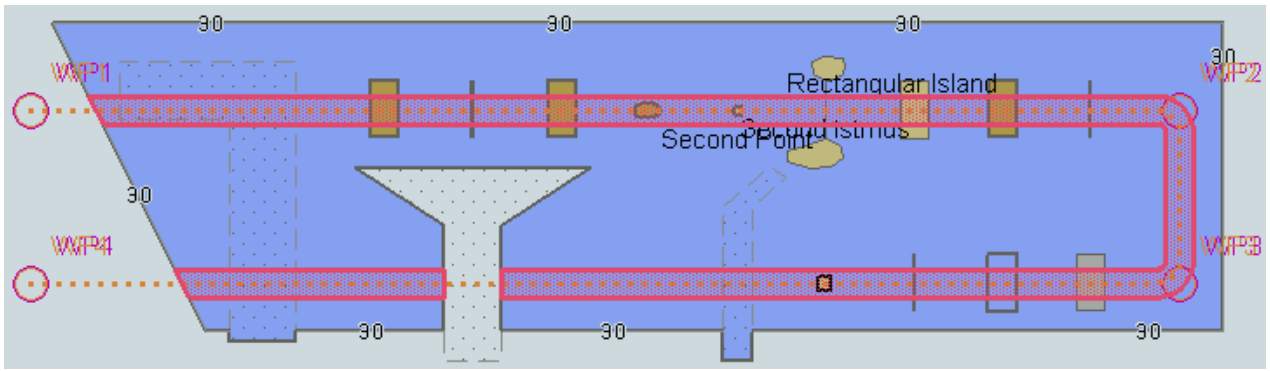
Safety Contour = 0 m



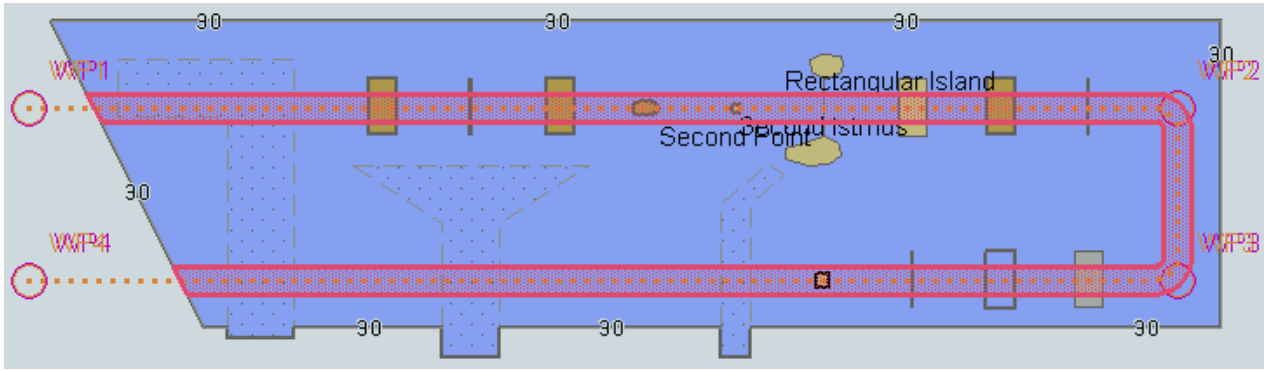
Safety Contour = 6 m



Safety Contour = 11 m



Safety Contour = 13 m



Safety Contour = 43 m

tbd

7.2 Detection and Notification of the Safety Contour – Use of largest scale available

Test Reference	SafetyContourLS	IHO Reference	S-98 C-12.9.7

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detecting that the route crosses an own ship's safety contour.

This test is performed by loading the test cells 101AA00OVRVU.000 and 101AA00ARSPC.000, manually creating a route connecting way points between features marked as WP11, WP24, WP25 and WP26 and checking display against the corresponding graphical plot.

Setup

As for test 7.1 and in addition load the exchange set ***NavigationalHazardsOverview***

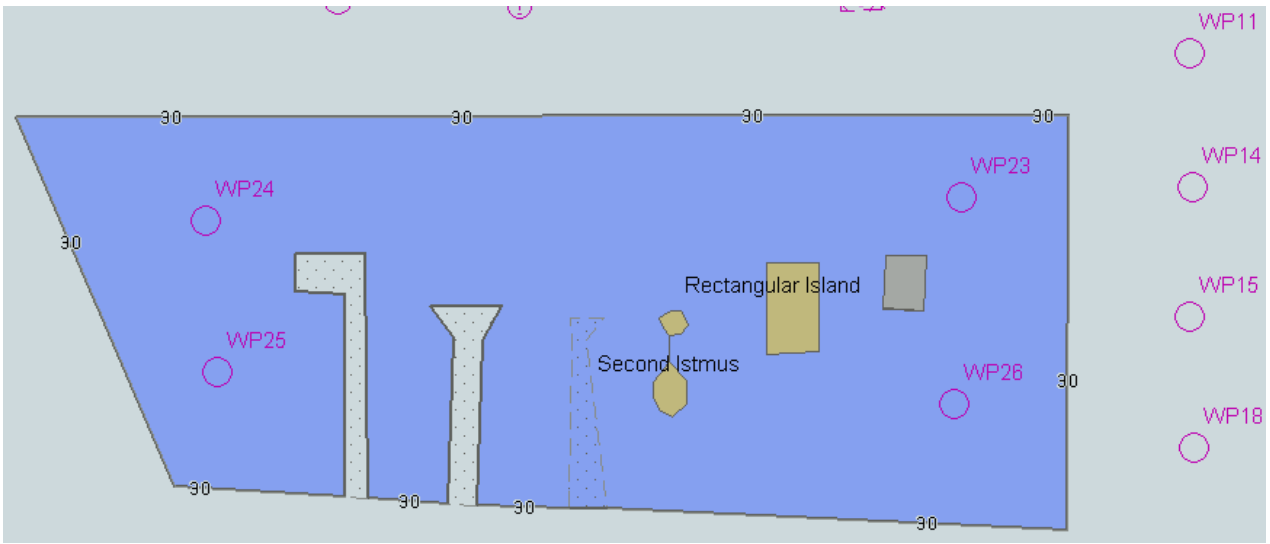
- *Select Display Category Other*
- *Set the Safety Contour value to 11 m*
- *Set the Safety Depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Simplified Point Symbols = false*
- *Select Contour label*

Action

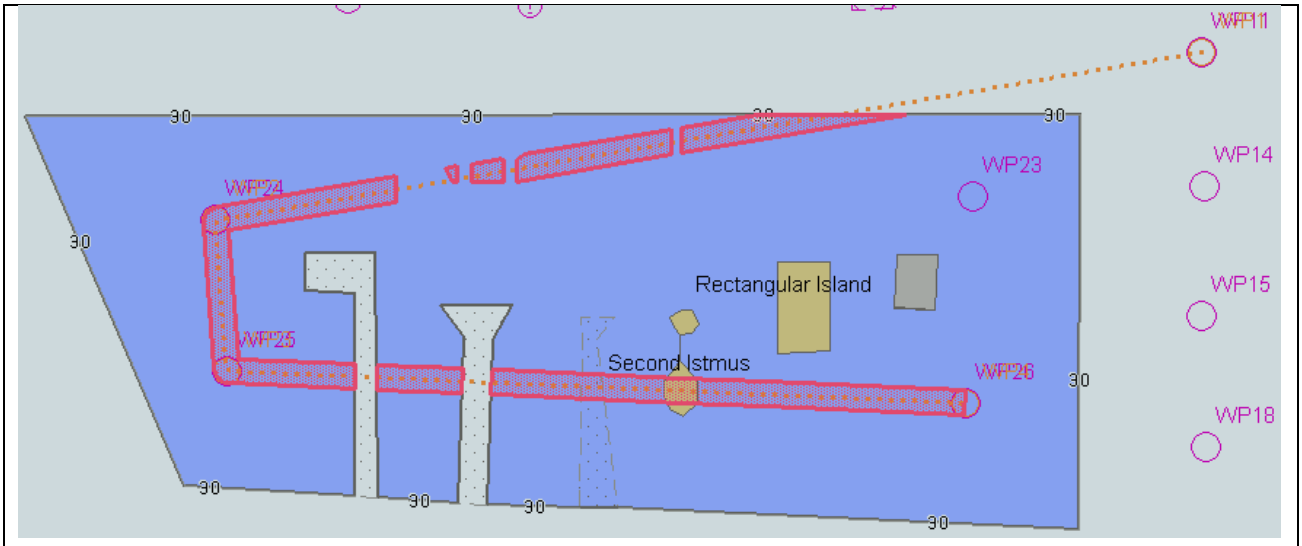
Select position 39°27'•000N 104°49'•000W at maximum display scale (1:350 000) of 101AA00OVRVU.
1) View chart before route planning.
2) Manually create a route connecting way points between features marked WP11, WP24, WP25 and WP26. Set user-specified distance for indication navigational hazards as 0.5 NM. Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

Results

The ENC in the ECDIS should match the corresponding graphical plot shown below.



1) Situation before route planning. Chart 101AA00OVRVU displayed as it is
2) **tbd**



2) Situation after route planning. Alerts indicated from largest scale available for each location. An example with Safety Contour = 11 m.

7.2.1 Detection and Notification of Safety Contour – Water Level Adjustment.

Test Reference	SafetyContourWLA	**IHO Reference**	(S-100 Part 9/ S-98 C-12.9.7
Test description			
The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route across an own ship's safety contour whilst operating with Water Level Adjustment enabled in areas of S-101, S-102 and S-104 coverage.			
Setup			
As for test SafetyContour with the additional settings: - Set User Selected Safety Contour = 11.4m - Select Water Level Adjustment = true - Set system date = 2022-14-11			
Action			
Check ENC symbols shown in the ECDIS against the corresponding graphical plot.			
Results			
Verify correct existence of user selected safety contour in areas without either S-102 or S-104 coverage, areas with only S-102 coverage and areas with both S-102 and S-104 coverage. *Areas should be delimited and permanent indications of WLA mode shown as per test WaterLevelAdjustment.*			

Detection and Notification of the Safety Contour - Basic test – Monitoring Mode

Test Reference	SafetyContourMon	**IHO Reference**	S-98 C-12.9.7

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate alarm if the ship, within a specified time set by the Mariner, is going to cross own ship's safety contour. The features satisfying the conditions for this test are listed in section S-98 XXX-XXX and are included in the test cell 101AA00SAFCO.000.

This test is performed by loading the test cell 101AA00SAFCO.000, sailing with a simulated ship over the test area, setting the Safety Contour to the appropriate values (0m, 6m, 11m, 13m, 43m) and checking display against the graphical plots of test 7.1 (Route plan) corresponding to each set of Safety Contour settings.

Setup

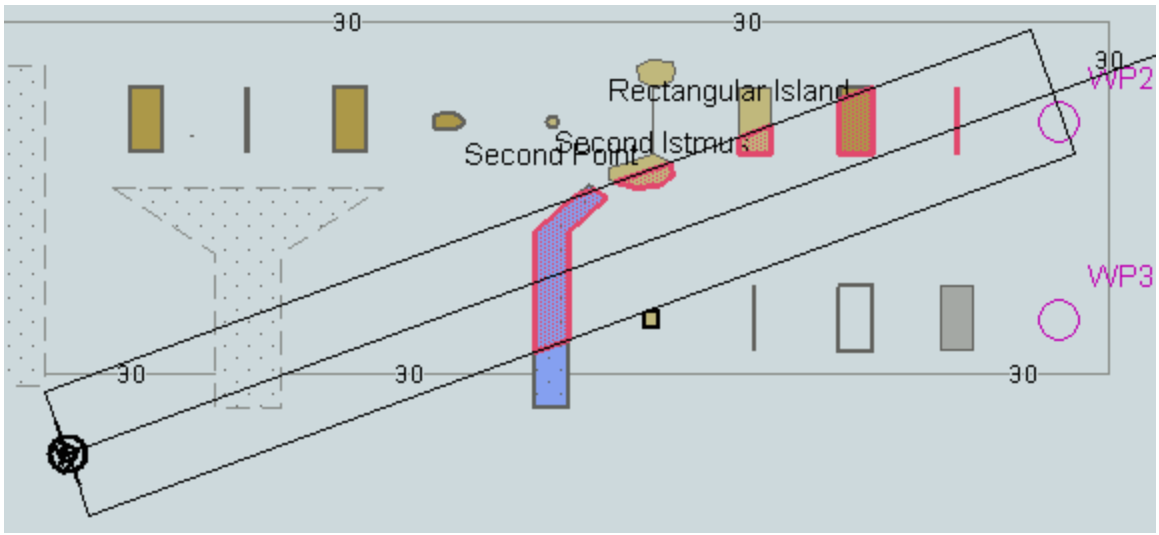
As for test SafetyContour
Select all Text groups
Select Contour label

Action

Set vessel position to 39°36.516'N 104°55.737'W, heading 70.3°. Check ENC symbols shown in the ECDIS for each Safety Contour setting against the corresponding graphical plot.

Results

The ENC in the ECDIS should match the corresponding graphical plot of test 7.1



An example with Safety Contour = 6 m.
tbd

7.3 Detection and Notification of the Safety Contour – Use of largest scale available – Monitoring Mode

Test Reference	SafetyContourMonLS	**IHO Reference**	S-98 C-12.9.7

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for providing an appropriate alarm if the ship, within a specified time set by the Mariner, is going to cross own ship's safety contour. The features satisfying the conditions for this test are listed in section S-98 XXX-XXX and are included in the test cell 101AA00SAFCO.000.

This test is performed by loading the test cells 101AA00OVRVU.000 and 101AA00SAFCO.000, sailing with a simulated ship over the test area, setting the Safety Contour to the appropriate values (0m, 6m, 11m, 13m, 43m) and checking display against the graphical plots of tests 7.1 and 7.2 (Route plan) corresponding to each set of Safety Contour settings.

Setup

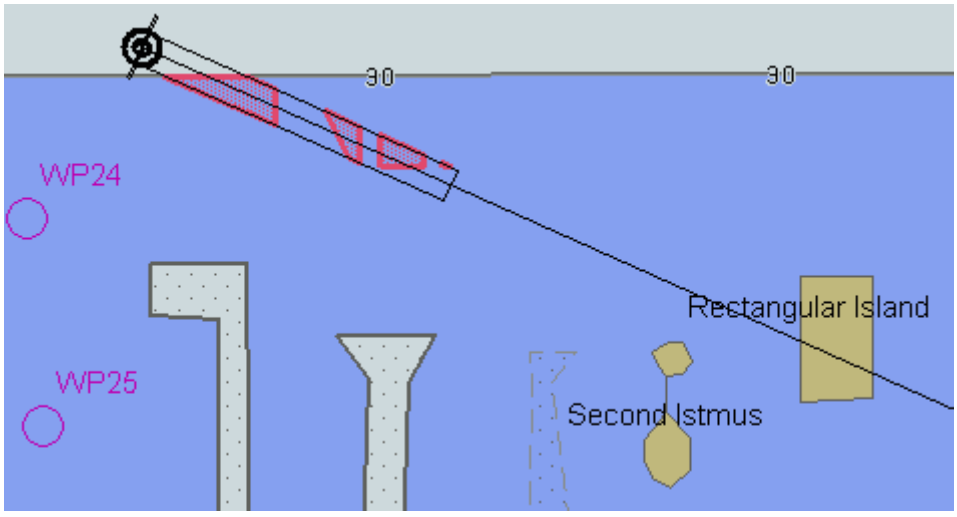
As for test SafetyContourLS

Action

Set vessel position to 39°40.522'N 105°05.654'W, heading 112°. Check ENC symbols shown in the ECDIS for each Safety Contour setting against the corresponding graphical plot.

Results

The ENC in the ECDIS should match the corresponding graphical plot of test 7.1 and 7.2.



An example with Safety Contour = 11 m.
tbd

8 S-57 Testing

8.1 Introduction

During the transition period to full S-100 operation on all ECDIS parallel operation of S-57 and S-100 services will take place servicing users who still maintain the S-57 legacy format. During this period ECDIS systems will require compatibility with both S-100 and S-57 formats of ENC data. The next section in this manual deals with testing of the so-called “Duel Fuel mode” of operation of such ECDIS where S-57 and S-101 data are used simultaneously. The next section deals specifically with those test scenarios using both S-57 and S-101 at the same time.

In order to maintain minimum levels of safety and conformance with IMO documentation compatibility with S-57 data must be maintained by systems under test. Therefore, during this period, and by reference from this manual there is a continued requirement for EUT to be tested for correct operation under S-5 and S-63, supported by this manual and IHO test datasets.

This manual, therefore, references the existing IHO S-64 guidance for testing the operation of type approved ECDIS available at:

https://iho.int/iho_pubs/standard/S-64/S-64_Edition_3.0.2/index.htm

8.2 Notes on specific tests.

Whilst testing under the existing S-57 is still a requirement during the transition period a number of caveats should be made prior to the execution of the S-64 test suites.

1. It may not be necessary to do all the tests if certain generic functionality has already been tested as part of the S-100 elements of testing done. The following sections should be considered complete if successfully executed in an S-100 mode of operation:
    -
2. Skin of the Earth tests relate to anomalies detected in an S-57 mode and do not apply in the S-100 test suite.
3. S-100 replaces many user settings with “Context Parameters”. Where the S-57/S-64 tests refer to certain user controls and parameters the following table can be used to identify the names of suitable alternatives and the instructions in the S-64 manual should be considered with the equivalent names in mind. The intention is to enable ECDIS manufacturers to build more closely integrated user interface systems dealing with both S-57 and S-101 simultaneously..

Name of S-64 Parameter	Name of S-100 ECDIS Context Parameter
Paper Chart Symbols	Plain Symbols = true
Others….	

9 Dual Fuel Mode testing

9.1 Introduction

As referenced in the previous section of this manual a transition period from S-57 to S-100

9.2 Data Scheming for Dual Fuel testing

In order to simplify the arrangement of test data for Dual Fuel testing, some original S-57 datasets (from IHO S-64) have been used alongside S-101 versions to create the reference test datasets. The arrangement of data coverage, therefore is largely unchanged and is illustrated in the diagrams below.

A notable exception is the data scheming for the tests for navigational hazards, safety contour detection and areas where special conditions exist. These have been created alongside the original S-57 datasets, allowing exhaustive tests to be run across both types of chart format using single routes. All data is arranged in exchange sets to allow for straightforward test setup and execution.

9.3 Chart Loading and Update

9.3.1 Initial Loading of charts in Dual fuel mode.

Test Reference	DualFuelSimple	**IHO Reference**	S-98 Annex C C.18.1
Test description			
Initial import of a dual fuel exchange set.			
Setup			
*Load exchange set **DualFuelSimple***			
Action			
Ensure exchange set is loaded. Inspect contents of System Database.			
Results			
The System Database should contain the following entries.			

ENC	Edition (EDTN)	Update number (UPDN)	Issue Date (ISDT)
101AA00X0000.000	1	0	20190409
101AA00X01NE.000	1	0	20210406
GB5X01NW.000	1	0	20210406

9.3.2 Update of combined exchange set.

Test Reference	DualFuelSimpleUpdate	**IHO Reference**	S-98 Annex C C.18.1

Test description

This tests verifies the ECDIS is able to load updates to Dual Fuel datasets from a combined update exchange set.

Setup

*As per previous test **DualFuelSimple***

Action

*Load exchange set **DualFuelSimpleUpdate***

Results

SENC contents should show:

ENC	Edition (EDTN)	Update number (UPDN)	Update Application Date (UADT)	Issue Date (ISDT)
GB5X01NW.000	1	1	20190409	20190409
101AA00X01NE.000	1	1	20210406	20210406

9.3.3 Verification of correct loading

Test Reference	DualFuelPreference	**IHO Reference**	S-98 Annex C C.18.1

Test description

This test verifies that when an exchange set contains both S-57 and S-101 versions of a dataset, it loads the S-101 version by default in accordance with S-98 XXX-XXX.

Setup

*Load Exchange set **DualFuelPreference***

Action

Ensure ECDIS has installed the exchange set.

Results

Verify the System Database shows the following datasets installed:

ENC	Edition (EDTN)	Update number (UPDN)	Update Application Date (UADT)	Issue Date (ISDT)
GB5X01NW.000	1	0	20190409	20190409
101AA00X01NE.000	1	0	20210406	20210406

ECDIS loads the S-101 cell by preference according to S-98 XXX-XXX

9.3.4 Verification of correct loading by update.

Test Reference	DualFuelUpdate	**IHO Reference**	S-98 Annex C C.18.1

Test description

This test verifies that when loading a dual Fuel exchange set, then loading an update where a cell is replaced by its S-101 edition results in the S-101 version being loaded during the update.

The S-128 carries the equivalence information.

Setup

1. *Load Exchange set **DualFuelInitial***

Action

Ensure ECDIS has installed the exchange set

1. *Inspect the System Database recording which datasets are installed*
2. *Load Exchange set **DualFuelUpdate***
3. *Inspect the System Database recording which datasets are installed.*

Results

Verify the System Database shows the following datasets installed at (1) as :

ENC	Edition (EDTN)	Update number (UPDN)	Issue Date (ISDT)
101AA00X0000.000	1	0	20190409
101AA00X01NE.000	1	0	20210406
GB5X01NW.000	1	0	20210406
GB5X01SE.000	1	0	20210406
GB5X02SE.000	1	0	20210406

After installation of the update exchange set (2) the System Database should show the following datasets installed:

ENC	Edition (EDTN)	Update number (UPDN)	Issue Date (ISDT)
101AA00X0000.000	1	0	20190409
101AA00X01NE.000	1	0	20210406
GB5X01NW.000	1	0	20210406
GB5X01SE.000	1	0	20210406
101AA00X03SE.000	1	0	20210422

9.4 Chart Display

9.4.1 Dual Fuel Mode Display

Test Reference	DualFuelDisplay	**IHO Reference**	S-98 Annex C C.18.1
Test description			
Loading a dual fuel exchange set should result in the display of a permanent message to the user and delimited borders between datasets of different types when both are portrayed on screen.			
Setup			
*Load Exchange set **DualFuelInitial***			
Action			
1. *Centre display on location (60.9963,-32.4806)* 2. *Set Display scale to 45,000* 3. *Set Display scale to 22,000*			
Results			
Ensure ECDIS has installed the exchange set *Verify:* (2) image of S-101 only small scale (101AA00X0000.000). (3) i*mage of S-101/S-57 side by side portrayal* *Additionally verify at (3)* - *The display of an appropriate message to the user that the display is showing older format data as per S-98 Annex C Section C-18.1* - *The portrayal of an appropriate boundary between the older format data and newer format (S-57 and S-101) according to S-98 Annex C C-18.1* *Verify the following display:* ***[IMAGE: S-102/S-104 and S-124 over S-101 as part of side-by-side portrayal]***			

9.5 Functions associated with chart display

Others?

9.5.1 Dual Fuel feature information

Test Reference	DualFuelFeatureInformation	**IHO Reference**	(S-100 Part 9/ S-98 C-18.3

Test description

Cursor picking in an area of DF should result in a unified display of information..

Setup

As per test DualFuelUpdate

Action

1. Set position to (60.9277,-32.4966)
2. Set display scale = 45,000
3. Interrogate features in display

Results

Verify the information available to the user contains information from both S-57 and S-101 sources. The pick report information should contain the following information.

- *DRGARE (S-57) from GB5X01NW.000*
- *DredgedArea (S-101) from 101AA00X01NW.000*

9.6 Detection and Notification of Navigational Hazards

9.6.1 Detection and Notification of Navigational Hazards – basic test

Test Reference	*NavigationalHazardsDF*	**IHO Reference**	(S-100 Part 9/ S-98 C-18.3

Test description

The purpose of this test is to verify by observation that ECDIS operating in Dual Fuel mode provides an appropriate indication when the Mariner plans a route closer than a user-specified distance from any features satisfying the conditions for this test as listed in section XXX-XXX of IHO S-98 and included in the test datasets AA5NAVHZ.000 and 101AA00NAVHZ.000.

This test is performed by loading the dual fuel exchange set NavigationalHazards, WP1 through WP36 and checking the display against the corresponding graphical plot.

Setup

*Load the exchange set **NavigationalHazardsDF***

- *Select Display Category Other*
- *Set the Safety Contour value to 0 m*
- *Set the Safety Depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Simplified Point Symbols = false*
- *Select all Text groups*
- *Manually create a route connecting all way points between features marked WP1 through WP36*

Set user-specified distance for indication navigational hazards as 0.1 NM

Action

Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

Repeat sequentially with a Safety Contour value of 0m, 2m, 4m, 5m, 6m, 8m, 9m, 10m, 11m, 16m, 21m, 31m, 42m, 50m, 51m.

Results

The ENC in the ECDIS should match the corresponding graphical plot shown below.

9.6.2 Dual Fuel Detection and Notification of Navigational Hazards – Use of largest scale available.

Test Reference	*NavigationalHazardsDFLS*	**IHO Reference**	(S-100 Part 9/ S-98 C-18.3

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of navigational hazards.

This test is performed by loading dual fuel exchange sets, manually creating a route connecting all way points between marked features and checking display against a corresponding graphical plot. The same test is run twice with different overview exchange sets comprising the smaller scale data.

Setup

*(A) Load the exchange set **NavigationalHazardsDF** and the exchange set **NavigationalHazardsOverviewDF1***

- *Select Display Category Other*
- *Set the Safety Contour value to 30 m*
- *Set the Safety Depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Simplfied point symbols = false*
- *Select all Text groups*

*(B) Repeat test using exchange sets **NavigationalHazardsDF** and **NavigationalHazardsOverviewDF2***

Action

For each of (1) and (2)

Select position 39°57.000'N 104°49.000'W at maximum display scale (1:350 000) of 101AA00OVRVU.
1) View chart before route planning.
2) Manually create a route connecting all way points between features marked WP1 through WP8. Set user-specified distance for indication navigational hazards as 0.5 NM. Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

Results

The ENC in the ECDIS should match the corresponding graphical plot shown below.

A) Situation before route planning. Chart 101AA00OVRVU displayed as it is-

B) Situation before route planning. Chart AA5OVRVU displayed as it is-

9.6.3 Detection and Notification of Navigational Hazards – monitoring mode

Test Reference	NavigationalHazardsDFMon	**IHO Reference**	(S-100 Part 9 S-98 C-18.3

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate indication if, continuing on its present course and speed, over a specified time or distance set by the Mariner, own ship will pass closer than a user-specified distance from any features satisfying the conditions for this test (as listed in IHO S-98 XXX-XXX and included in the test cells AA5NAVHZ.000 and 101AA00NAVHZ.000) that is shallower than the Mariner's safety contour.

*This test is performed by loading the exchange set **NavigationalHazardsDF**, sailing with a simulated ship over the test area, setting the Safety Contour to the appropriate values (0m, 2m, 5m, 6m, 8m, 9m, 10m, 11m, 16m, 21m, 31m, 42m, 50m, 51m) and checking display against the graphical plots of test NavigationalHazardsDF (Route plan) corresponding to each set of Safety Contour settings..*

Setup

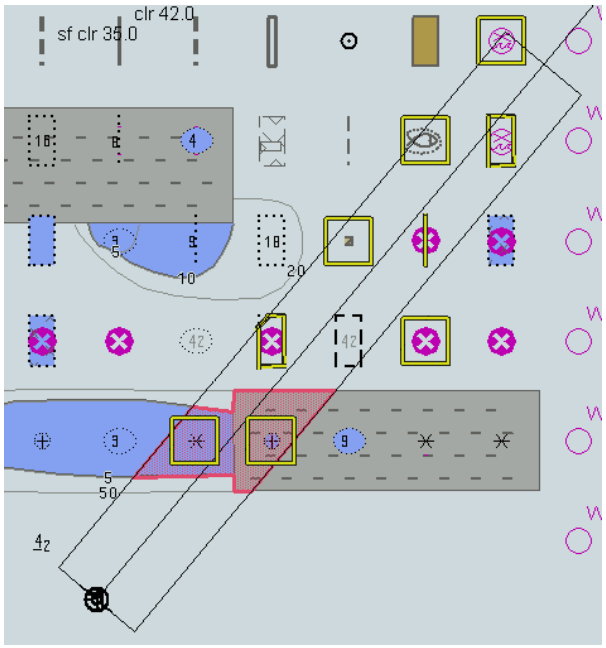
As for test NavigationalHazardsDF
Select all Text groups

Action

Check ENC symbols shown in the ECDIS for each Safety Contour setting against the corresponding graphical plot

Results

The ENC in the ECDIS should match the corresponding graphical plot of test NavigationalHazardsDF.



tbd

9.6.4 Detection and Notification of Navigational Hazards – use of largest scale available – monitoring mode

Test Reference	NavigationalHazardsDFMonLS	IHO Reference	(S-100 Part 9/ S-98 C-18.3

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of navigational hazards in dual fuel mode. This test is performed by loading the exchange sets NavigationalHazardsOverviewDF1 and NavigationalHazardsDF, manually creating a route connecting all way points between features marked as WP1 through WP8 and checking the display against a corresponding graphical plot.

Setup

*(A) Load the exchange set **NavigationalHazardsDF***
*Load the exchange set **NavigationalHazardsOverviewDF1***

- *Select Display Category Other*
- *Set the Safety Contour value to 30 m*
- *Set the Safety Depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Paper chart symbols*

Select all Text groups

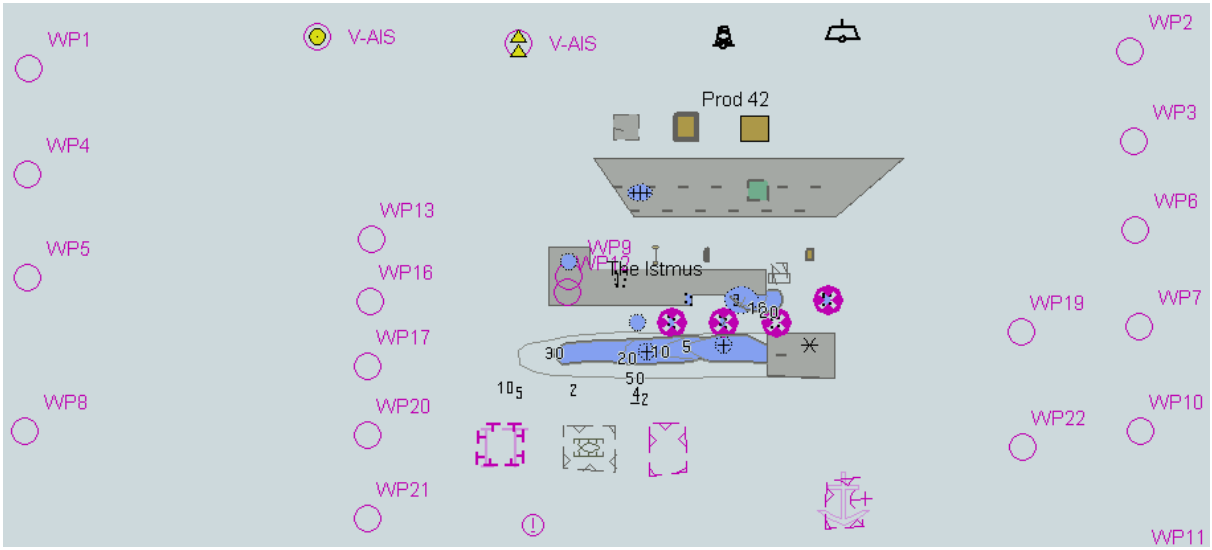
*(B) The test should then be repeated using the exchange sets **NavigationalHazardsDF** and **NavigationalHazardsOverviewDF2***

Action

Select position 39°57.000'N 104°49.000'W at the maximum display scale (1:350 000) of 101AA00OVRVU (or AA5OVRVU).
Set simulated own ship for 39°49.587'N 104°54.930'W with heading set for 10.0°
Select size of own ship check area as 1.0 NM width and 8.0 NM length.

Results

The ENC in the ECDIS should match the corresponding graphical plots shown below (A).



tbd

9.7 Detection of Areas for which Special Conditions Exist

9.7.1 Detection and Notification of Areas for which special conditions exist – basic test

Test Reference	SpecialConditionsDF	**IHO Reference**	(S-100 Part 9/ S-98 C-18.3

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route closer than a user-specified distance from the boundary of a prohibited area or a geographic area for which special conditions exist whilst operating in Dual Fuel mode. The features satisfying the conditions for this test are listed in the alerts and indications catalogue within the S-101 Portrayal Catalogue and are included in the test cells AA5ARSPC.000 and 101AA00ARSPC.000.

*This test is performed by loading the exchange set **SpecialConditionsDF**, manually creating a route connecting all waypoints between features marked as WP1 through WP4 and checking the display against the corresponding graphical plot*

Setup

*Load the exchange set **SpecialConditionsDF***

- *Select Display Category Other*
- *Set the Safety Contour value to 0 m*
- *Set the Safety Depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Paper chart symbols*
- *Manually create a route connecting all way points between features marked WP1 through WP4*

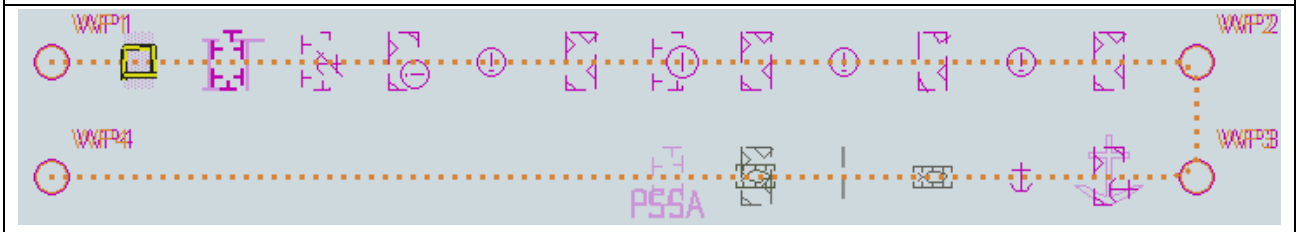
Set user-specified distance for indication of areas with special condition as 0.1 NM

Action

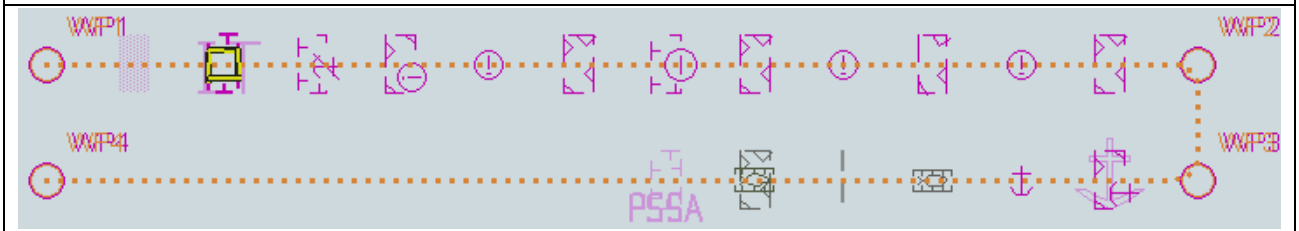
Check ENC symbols shown in the ECDIS against the corresponding graphical plot. selecting one by one each special condition for the test

Results

The ENC in the ECDIS should match the corresponding graphical plot shown below.



Selected: Traffic separation zone



tbd

9.7.2 Detection and Notification of Areas for which special conditions exist – use of largest scale

available

Test Reference	SpecialConditionsDFLS	**IHO Reference**	(S-100 Part 9/ S-98 C-18.3

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of areas with special conditions whilst operating in Dual Fuel mode.

This test is performed by loading test exchange sets, manually creating a route connecting way points between features marked as WP20 and WP22 and checking the display against a corresponding graphical plot.

Setup

(A) As for test SpecialConditionsDF and in addition load the exchange set ***NavigationalHazardsOverviewDF1***

- *Select Display Category Other*
- *Set the Safety Contour value to 0 m*
- *Set the Safety Depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Simplified point symbols*

Select all Text groups

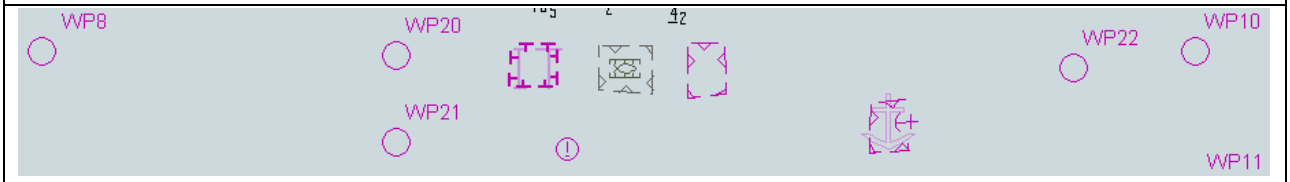
(B) Repeat test using exchange sets ***SpecialConditionsDF*** *and* ***NavigationalHazardsOverviewDF2***

Action

Select position 39°45'•000N 104°49'•000W at compilation scale (1:350 000) of 101AA00OVRVU (or AA2OVRVU).
1) View chart before route planning.
2) Manually create a route connecting two way points between features marked WP20 and WP22. Set user-specified distance for indication of areas with special conditions as 0.5 NM. Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

Results

The ENCs in the ECDIS should match the corresponding graphical plot shown below.



tbd

1) Situation before route planning. Chart 101AA00OVRVU displayed as it is

9.7.3 Detection and Notification of Areas for which special conditions exist – monitoring mode

Test Reference	SpecialConditionsMonDF	**IHO Reference**	(S-100 Part 9 S-98 C-18.3

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate alarm or indication, as selected by the Mariner, if, within a specified time set by the Mariner, own ship will cross the boundary of a prohibited area or area for which special conditions exist whilst operating in Dual Fuel mode.

The features satisfying the conditions for this test are listed in listed in the alerts and indications catalogue within the S-101 Portrayal Catalogue and are included in the test cells AA5ARSPC.000 and 101AA00ARSPC.000.

*This test is performed by loading the exchange set **SpecialConditionsDF**, sailing with a simulated ship over the test area, selecting one by one each special condition for the test and checking display against the graphical plots of test SpecialConditions (Route plan) corresponding to each set of Safety Contour settings..*

Setup

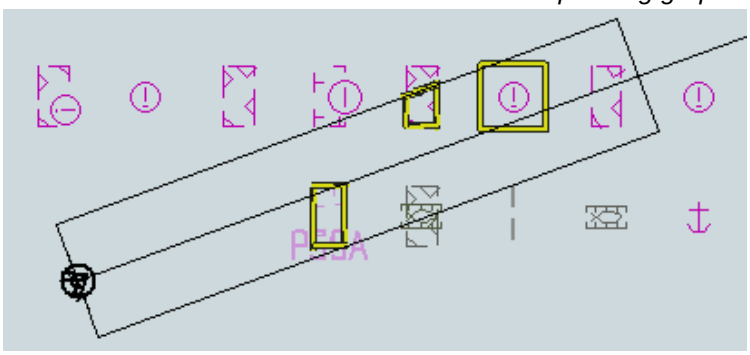
As for test SpecialConditionsDF

Action

Check ENC symbols shown in the ECDIS for each special condition against the corresponding graphical plot

Results

The ENC in the ECDIS should match the corresponding graphical plot of test 6.1.



An example with PSSA and Military practice area as selected.

tbd

9.7.4 Detection and Notification of Areas for which special conditions exist – use of largest scale available – monitoring mode

Test Reference	SpecialConditionsDFLSMon	**IHO Reference**	(S-100 Part 9 S-98 C-18.3

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of areas with special condition whilst operating in Dual Fuel mode..

This test is performed by loading test exchange sets, sailing with a simulated ship over the test area, selecting one by one each special condition for the test and checking display against the graphical plots of tests SpecialConditionsDF and SpecialConditionsDFLS (Route plan) corresponding to each special condition settings.

Setup

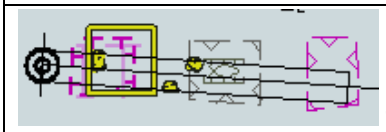
As for test SpecialConditionsDFLS

Action

(1) *Select position 39°45'•000N 104°49'•000W at compilation scale (1:350 000) of 101AA00OVRVU. Heading approximately 100°.*
(2) *Set vessel position to 39°47.877'N 104°57.590'W, heading 94.3°.*
(3) *Check ENC symbols shown in the ECDIS for each special condition against the corresponding graphical plot*
(4) *Repeat test as described in SpecialConditionsDFLS*

Results

The ENC in the ECDIS should match the corresponding graphical plot of tests SpecialConditionsDF and SpecialConditionsDFLS.



tbd

An example with Caution area, Military practice area and PSSA as selected

9.8 Detection and Notification of the Safety Contour

9.8.1 Detection and Notification of the safety contour – Basic test

Test Reference	SafetyContourDF	**IHO Reference**	(S-100 Part 9/ S-98 C-18.3

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route across an own ship's safety contour whilst operating in Dual Fuel mode. The features satisfying the conditions for this test are listed in listed in the alerts and indications catalogue within the S-101 Portrayal Catalogue and are included in the test datasets AA5SAFCO.000 and 101AA00SAFCO.000.

This test is performed by loading the test exchange set, manually creating a route connecting all way points between features marked as WP1 through WP4 and checking the display against the corresponding graphical plot.

Setup

*Load the exchange set **SafetyContourDF***

- *Select Display Category Other*
- *Set the Safety Contour value to 0 m*
- *Set the Safety Depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Simplified Point Symbols = true*
- *Select all Text groups*
- *Select Contour label*
- *Manually create a route connecting all way points between features marked WP1 through WP4*

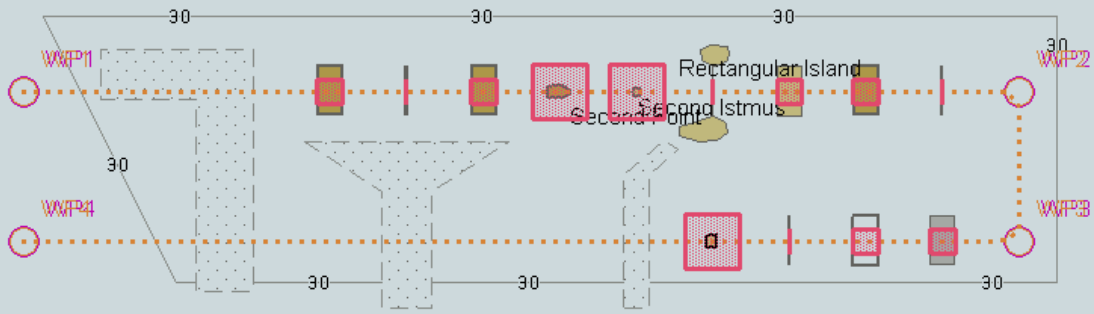
Set user-specified distance for detecting of Safety Contour as 0.1 NM

Action

Check portrayal shown in the ECDIS against the corresponding graphical plot.
Repeat sequentially for Safety Contour value 0m, 6m, 11m, 13m, 43m.

Results

The ENC in the ECDIS should match the corresponding graphical plot shown below..



Safety Contour = 0 m
tbd

9.8.2 Detection and Notification of the safety contour – use of largest scale available.

Test Reference	SafetyContourDFLS	**IHO Reference**	(S-100 Part 9/ S-98 C-18.3

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detecting that the route crosses an own ship's safety contour whilst operating in Dual Fuel mode.

This test is performed by loading the test exchange sets, manually creating a route connecting way points between features marked as WP11, WP24, WP25 and WP26 and checking display against the corresponding graphical plot. The same test is run twice with different overview exchange sets comprising the smaller scale data

Setup

(A) As for test SafetyContourDF and in addition load the exchange set ***NavigationalHazardsOverview1***

- *Select Display Category Other*
- *Set the Safety Contour value to 11 m*
- *Set the Safety Depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Paper chart symbols*

Select Contour label

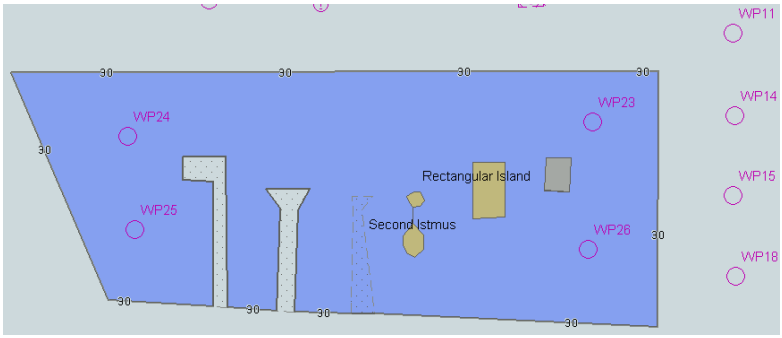
(B) Repeat test using exchange sets ***SafetyContourDF*** *and* ***NavigationalHazardsOverview2***

Action

Select position 39°27'•000N 104°49'•000W at maximum display scale (1:350 000) of 101AA00OVRVU.
1) View chart before route planning.
2) Manually create a route connecting way points between features marked WP11, WP24, WP25 and WP26. Set user-specified distance for indication navigational hazards as 0.5 NM. Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

Results

The ENC in the ECDIS should match the corresponding graphical plot shown below **[Images To Follow]**



tbd

9.8.3 Detection and Notification of the safety contour – use of largest scale available – monitoring mode

Test Reference	SafetyContourDFMonLS	IHO Reference	(S-100 Part 9/ S-98 C-18.3

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate alarm if the ship, within a specified time set by the Mariner, is going to cross own ship's safety contour whilst operating in monitoring mode. The features satisfying the conditions for this test are listed listed in the alerts and indications catalogue within the S-101 Portrayal Catalogue and are included in the test datasets AA5SAFCO.000 andl 101AA00SAFCO.000.

*This test is performed by loading the exchange set **SafetyContourDFMon**, sailing with a simulated ship over the test area, setting the Safety Contour to the appropriate values (0m, 6m, 11m, 13m, 43m) and checking display against the graphical plots of test SafetyContourDF (Route plan) corresponding to each set of Safety Contour settings.*

Setup

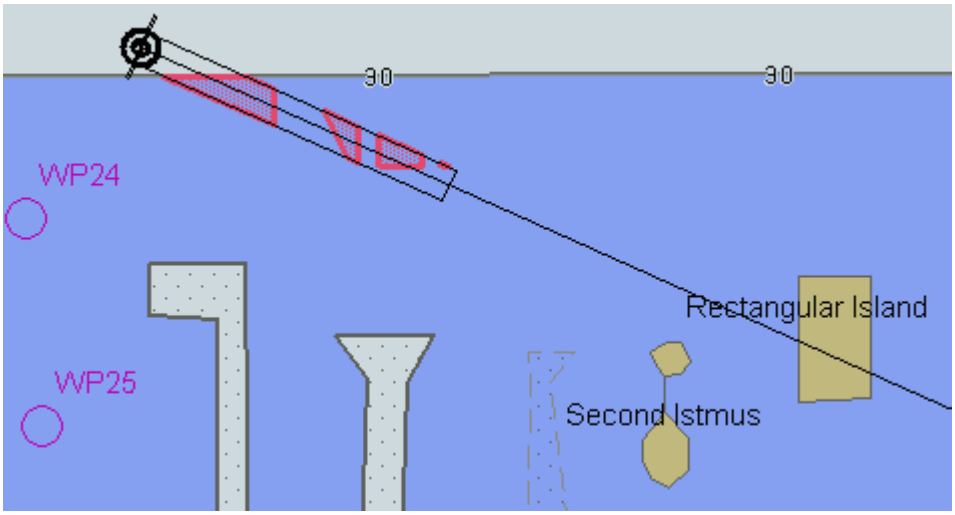
*Load exchange set **SafetyContourDFMon***

Action

Set vessel position to 39°40.522'N 105°05.654'W, heading 112°. Check ENC symbols shown in the ECDIS for each Safety Contour setting against the corresponding graphical plot.

Results

The ENC in the ECDIS should match the corresponding graphical plot of test 7.1 and 7.2.



tbd

9.8.4 Detection and Notification of the safety contour – monitoring mode

Test Reference	SafetyContourDFMon	**IHO Reference**	(S-100 Part 9/ S-98 C-18.3

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate alarm if the ship, within a specified time set by the Mariner, is going to cross own ship's safety contour. The features satisfying the conditions for this test are listed in listed in the alerts and indications catalogue within the S-101 Portrayal Catalogue and are included in the test cells AA5SAFCO.000 and 101AA00SAFCO.000.

*This test is performed by loading the exchange set **SafetyContourDFMon**, sailing with a simulated ship over the test area, setting the Safety Contour to the appropriate values (0m, 6m, 11m, 13m, 43m) and checking display against the graphical plots of test SafetyContourDF (Route plan) corresponding to each set of Safety Contour settings.*

Setup

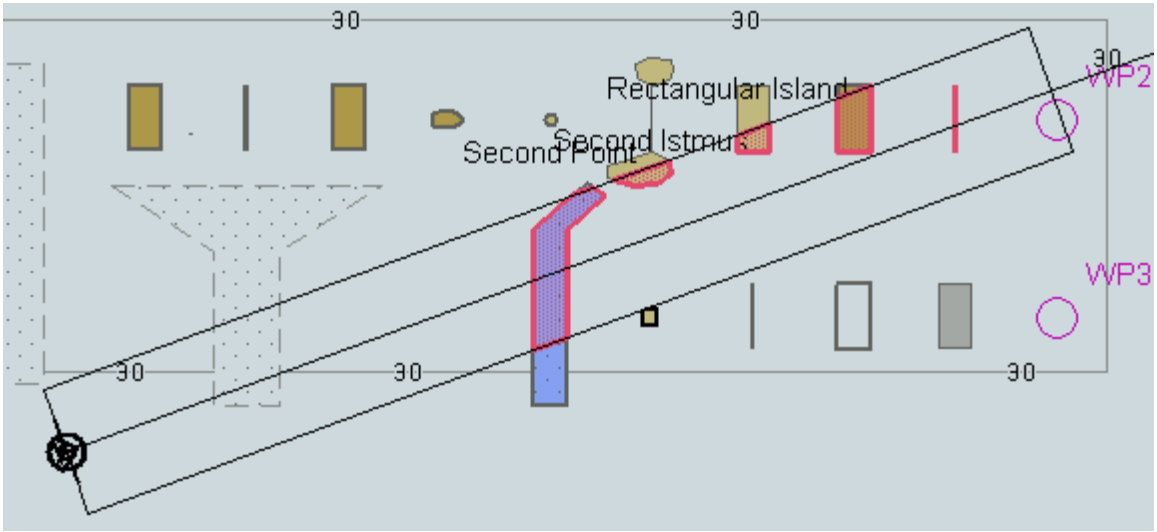
- *As for test SafetyContourDF*
- *Select all Text groups*
- *Select Contour label*

Action

Set vessel position to 39°36.516'N 104°55.737'W, heading 70.3°. Check ENC symbols shown in the ECDIS for each Safety Contour setting against the corresponding graphical plot

Results

The ENC in the ECDIS should match the corresponding graphical plot of SafetyContourDF



tbd

An example with Safety Contour = 6 m.

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