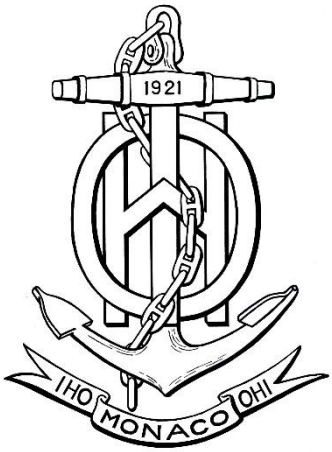
INTERNATIONAL HYDROGRAPHIC ORGANIZATION



IHO TEST DATA SETS IN ECDIS

Edition 3.0(.2) - July 2017

INSTRUCTION MANUAL FOR THE USE OF IHO TEST DATA SETS IN ECDIS

Publication S-64

Published by the
International Hydrographic Organization
4b quai Antoine 1er
Principauté de Monaco
Tel: (377) 93.10.81.00
Fax: (377) 93.10.81.40
E-mail: info@iho.int
Web: www.iho.int

Table of Contents

Pages

1 Introduction

1.1 Change Control History

Version Number	Date of Issue	Author(s)	Brief Description of Change(s)
2.0.0	01/01/2011	TSMAD	Additional test 7.1 added
3.0.0	09/01/2015	TSMAD	Comprehensively expanded and updated to reflect revised S-52 Presentation Library – Edition 4.0.0
3.0(.1)	June 2015	ENCWG	Clarifications and corrections agreed by the ENC Standard Maintenance Working Group
3.0(.2)	July 2017	ENCWG	Clarifications and corrections agreed by the ENC Standard Maintenance Working Group

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 64 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 3.0 and its subsequent clarifications has been produced with assistance from many expert contributors and members of the IHO ENC Standard Maintenance Working Group (ENCWG); their input during the 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-52 - Specifications for Chart Content and Display Aspects of ECDIS
IHO S-57 - Transfer Standard for Digital Hydrographic Data
IHO S-62 - List of Data Producer Codes
IHO S-63 - Data Protection Scheme

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

1.6 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) vis-à-vis 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.

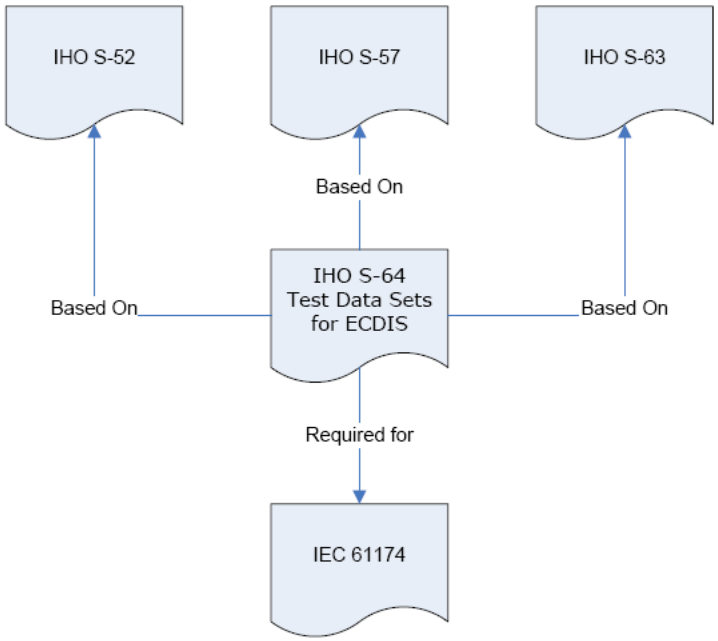


Figure 1 – The TDS and its relationship to other standards

The S-64 test data set contains both encrypted and unencrypted data. The inclusion of an encrypted dataset, conforming to the ENC encryption standard S-63, is so that ECDIS data loading and management operations can be tested under IEC 61174. There is also an unencrypted dataset which tests visualisation and operation aspects of the ECDIS.

1.7 Structure of the Instruction Manual

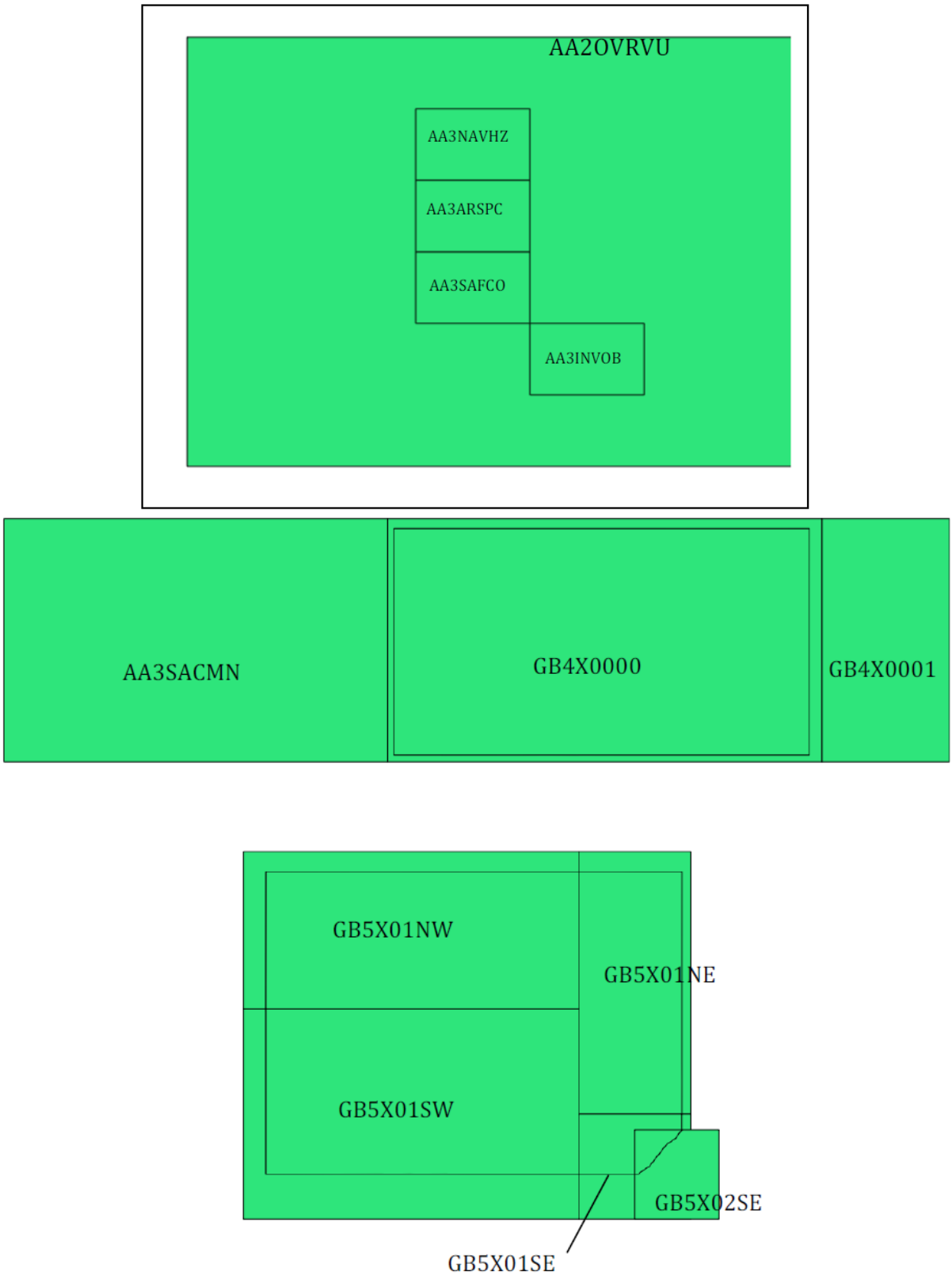
This document consists of an introduction followed by tests arranged over 6 sections in a task based layout. All tests are listed in a common format which is shown in the example below:

Test Reference	(S-64 reference)	**IHO Reference**	(S-52 Part I/S-52)*
Test description			
A short description of what the test covers.			
Setup			
The configuration required to perform the test including cells 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.			

* References to S-52 without brackets are to Annex A - Part I; references in square brackets refer to the main S-52 document itself.

1.8 Organization and Coverage of the TDS

The TDS contains a folder/directory for each section of the TIM which requires test data. Depending on the test requirement, the folder may also contain an ENC_ROOT directory containing the files of the exchange set (CATALOG.031.000, plus any updates or other optional/related files, e.g. .TIF, .TXT necessary). Each ENC_ROOT directory 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 2.5, contains multiple exchange sets, each with their own ENC_ROOT directory and full test scripts describing how to use the data. The location (or path) of ENC exchange set and/or ENC cell will be indicated using italic notation, e.g. *2.1.1 Power Up\ENC_ROOT\GB4X000.000*. The manual frequently refers to test data "location" using a drive prefix of "D:" – this is because usually the test data is loaded from a hard media drive on the ECDIS but this may vary between systems and according to how the data is being imported onto the ECDIS. To conform to the directory structure as defined in S-57 Appendix B.1 Section 5.4.3, the ENC_ROOT directory should be located in the media's root directory. This should be viewed as a requirement. However, in practical terms, many systems can "browse" and load files from almost any location and removable media. Consult with the equipment manufacturer for further information.


AA2OVRVU
AA3NAVHZ
AA3ARSPC
AA3SAFCO
AA3INVOB
AA3SACMN
GB4X0000
GB4X0001
GB5X01NW
GB5X01NE
GB5X01SW
GB5X02SE
GB5X01SE

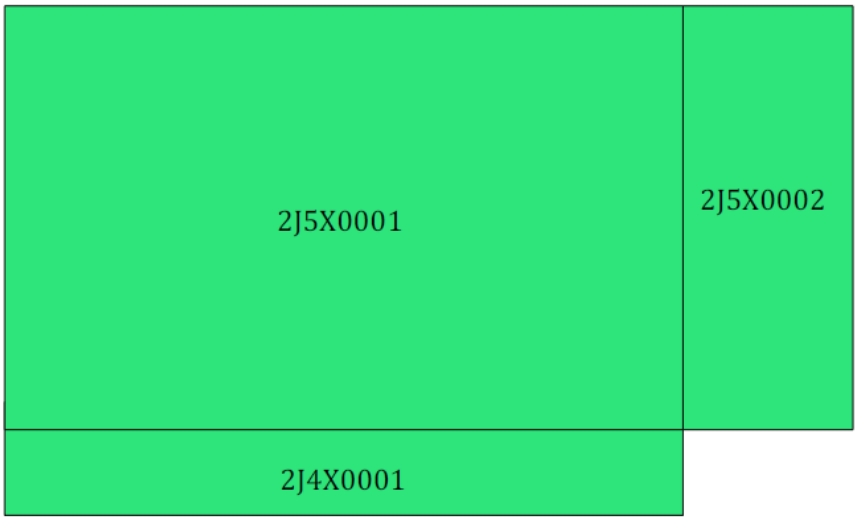


Figure 2 – ENC TDS Cell Coverage

1.9 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 ECDIS Presentation Library contained in S-52, Annex A including an ECDIS Chart 1 and colour differentiation diagrams. If the manufacturer provides his own presentation library, Chart 1 has to be adapted accordingly.*

2. *IHO S-64 test data sets for ECDIS which includes ENC data, both encrypted and unencrypted, and its updates, together with the associated instruction manual.*

3. *SENC test data sets, if supported from each SENC distributor.*

The first item in the list, the IHO ECDIS Presentation Library (S-52, Annex A) including an ECDIS Chart 1 and colour differentiation diagrams must 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-64, 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 (3.0.1) will remain the same as long as the corrections do not impact this document.

The third item on the list, SENC test data set, if supported, must be provided by the manufacturer.

1.10 Notes on ECDIS screen samples

The following notes may be applicable to the ECDIS screen samples within this document:

Light Descriptions

Between the light characteristics abbreviation and the colour attribute it is acceptable for the ECDIS to display the light description text with or without a space. There must be a space between the light colour and signal period, for example:

Fl W 30s7m10M or **FlW 30s7m10M** are both acceptable options

Further details are given in S-52 Presentation Library edition 4.0.2 Part 1 10.6.3 Light Description Text Strings

Light Descriptions for Sectored Lights

The light description text string is normally not used for sector lights because it would cause clutter however OEMs are not prevented from doing so. Where OEMs have displayed the text strings in their ECDIS they must provide a method to select/deselect them from the ECDIS display. Further details are available in S-52 Presentation Library edition 4.0.2 Part 1 LIGHTS06 conditional symbology procedure.

Centred Symbols

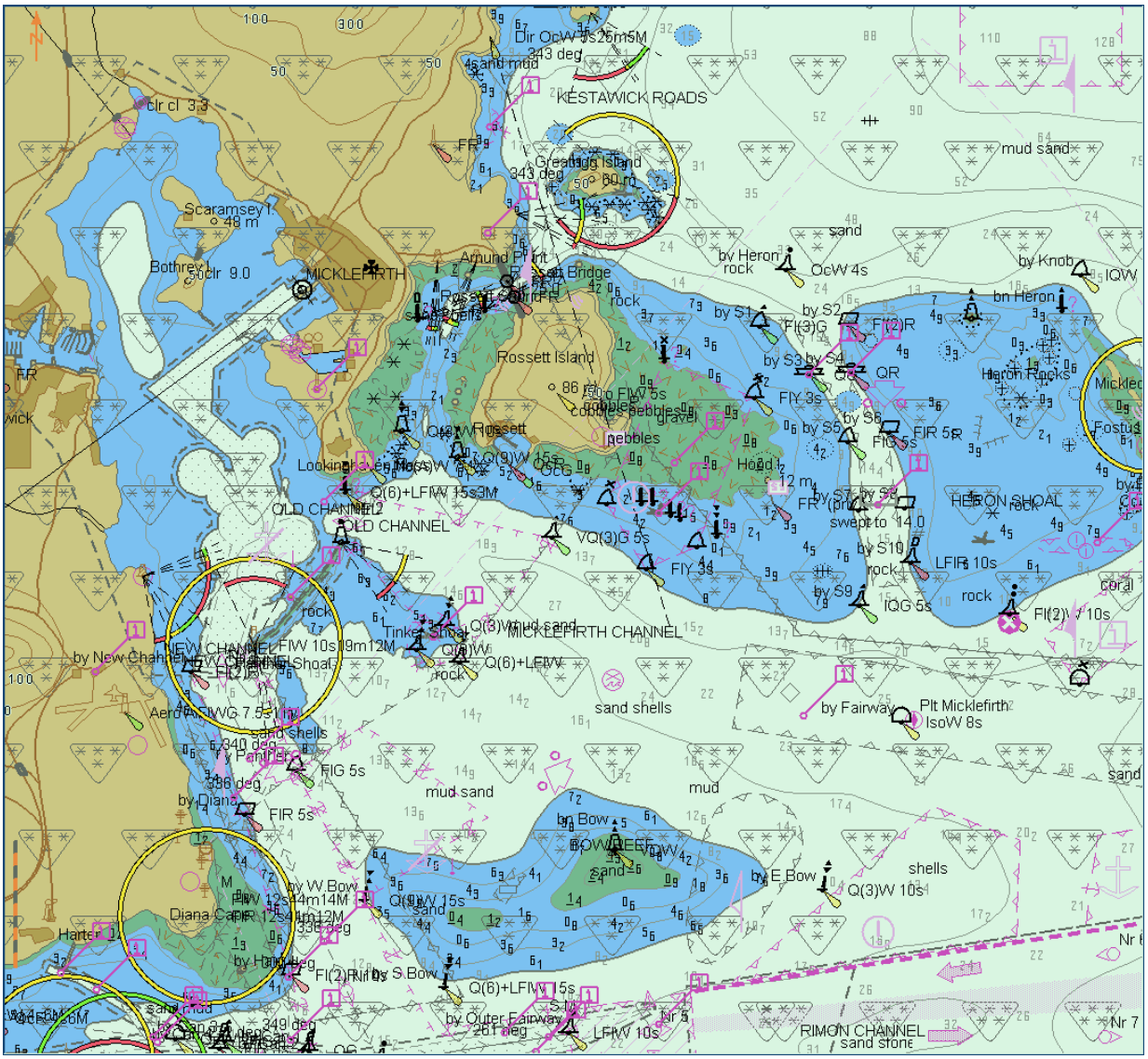
There is no algorithm specified by S-52 for OEMs to calculate the centre of an area. Therefore depending on the ECDIS there maybe instances where the centred symbol is not visible. If the centred symbol is not visible in the ECDIS display the zoom level should be increased until the symbol becomes visible.

2 Chart Loading and Updating

2.1 Chart Loading of Unencrypted ENCs

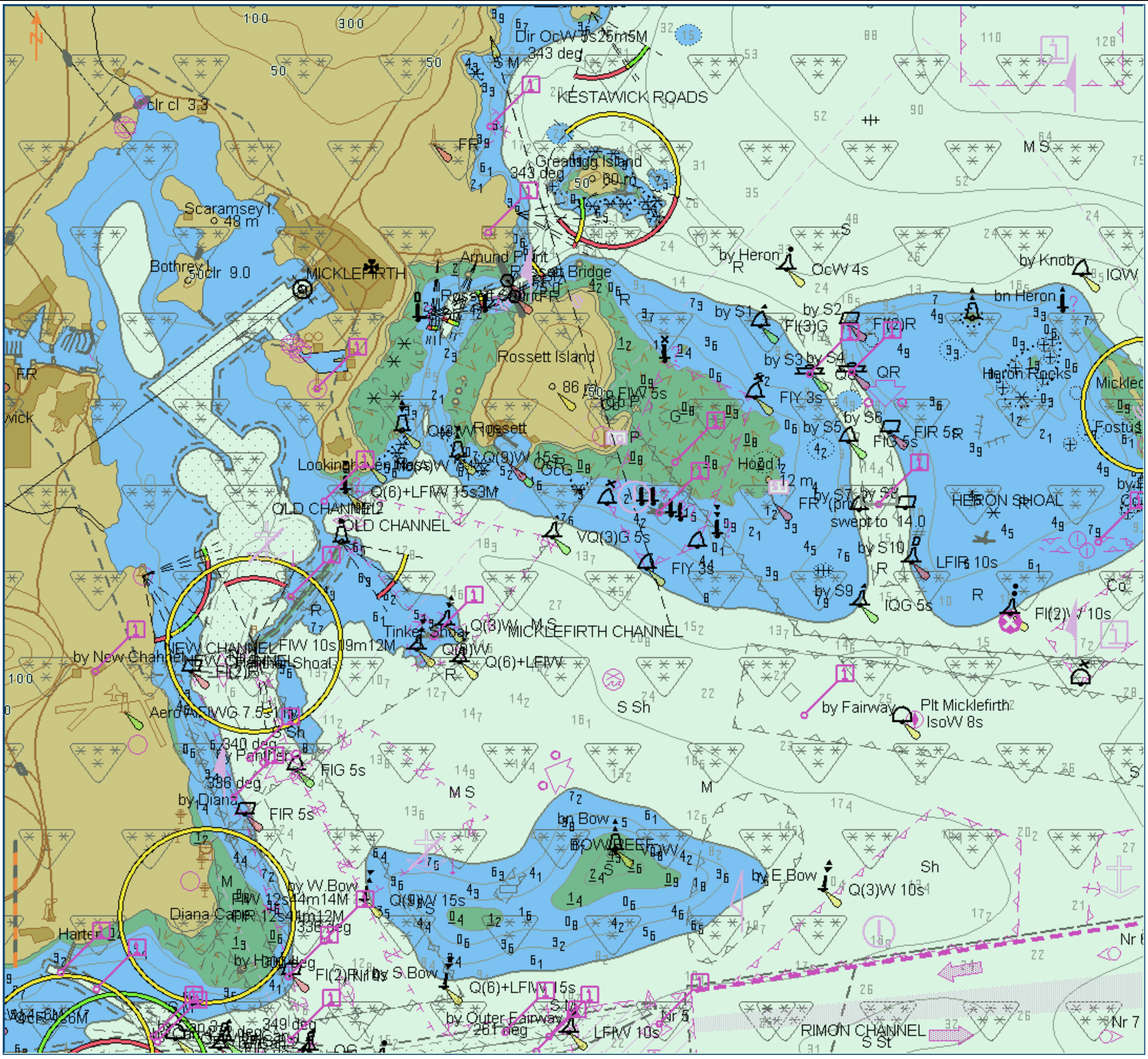
2.1.1 Preparation and Power Up

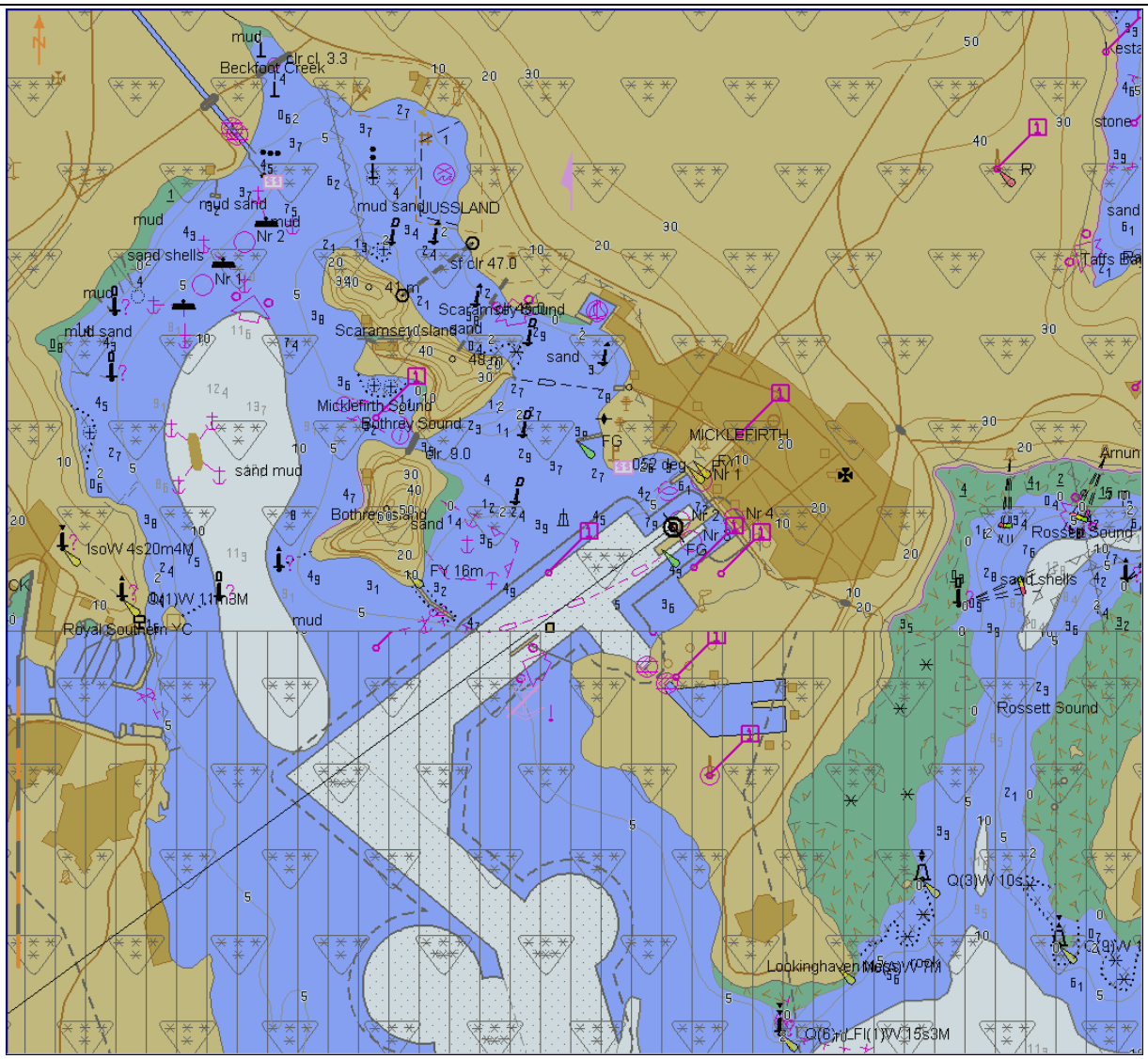
Test Reference	2.1.1	**IHO Reference**	IEC 61174/ 4.4.1
Test description			
Loading of initial datasets and indication of own ship stationary position.			
Setup			
Load cells *2.1.1 Power Up\ENC_ROOT\GB4X0000.000* *2.1.1 Power Up\ENC_ROOT\GB5X01NW.000 with the following settings:* *Select Display Category Other* *Set the Safety Contour value to 8 m* *Set the Safety Depth value to 8 m* *Select Symbolized Boundaries* *Select Paper chart symbols* *Select all Text groups* *Select Accuracy* *Select Highlight info* *Select Highlight date dependent* *Ship position 32°29.66'S, 060°55.86'E* *Heading 234.0 degrees*			
Action			
Load cells and view the chart display.			
Results			
With the charts displayed the own ship shall be placed at the jetty in Micklefirth.			



After loading of GB4X0000.000, displayed scale 1:50 000
Note: Screen plot above 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 (see screen plot on next page).

Note: Within this test dataset there are two omni directional lights co-located at 32º34.688S, 060º54.955E, this case is not a real-world example, as such the ECDIS may show a red-light sector.


KESTAWICK ROADS
Scaramsey I.
MICKLEFIRTH
Rossett Island
OLD CHANNEL
NEW CHANNEL
MICKLEFIRTH CHANNEL
HERON SHOAL
Heron Rocks
Greatagg Island
Amund Point
Rossett Bridge
Tinker Shoal
by Fairway
Plt Micklefirth
IsoW 8s
RIMON CHANNEL
by Outer Fairway
by E Bow
by W Bow
Diana Carr
by Heron
by Knob
bn Heron
343 deg
349 deg
261 deg
340 deg
336 deg



After loading of GB5X01NW.000, displayed scale 1:20 000

2.1.2 Number and date in chart library

Test Reference	2.1.2	**IHO Reference**	IEC 61174/ 4.4.1
Test description			
Loading of initial datasets and confirmation of information in chart library.			
Setup			
Load all cells from *2.1.1 Power Up\ENC_ROOT*			
Action			
Check that in the chart library the information about the cells is provided as follows			
Results			
The information in the chart library shall be identical to the above table.			

ENC	Edition (EDTN)	Update number (UPDN)	Update Application Date (UADT)	Issue Date (ISDT)
GB4X0000.000	2	0	20010409	20010409
GB5X01NE.000	1	0	20010406	20010406
GB5X01NW.000	2	0	20010406	20010406
GB5X01SE.000	1	0	20010406	20010406
GB5X01SW.000	1	0	20010408	20010408
GB5X02SE.000	1	0	20010407	20010407

2.1.3 Load additional cell and check chart library

Test Reference	2.1.3	**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 2.1.2			
Action			
Load the following cell 3.3 Settings\ENC_ROOT\GB4X0001.000 *Check that in the chart library the details of the cell have been added.*			
Results			
The information in the chart library shall reflect the cell loaded and the chart coverage shall have changed accordingly.			

2.1.4 Remove cell and check chart library

Test Reference	2.1.4	**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 2.1.3			
Action			
Remove the following cell GB4X0001.000 *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.

2.1.5 Loading of Corrupted Data

Test Reference	2.1.5	**IHO Reference**	IEC 61174/ 4.4.1
Test description			
Loading corrupt data.			
Setup			
-			
Action			
Load the following cell: *2.1.5 Loading Corrupt Data\ENC_ROOT\GB5X01NE.000*			
Results			
The EUT shall generate a warning when loading of this file is attempted and reject installation.			

2.2 Automatic updates of Unencrypted ENCs

2.2.1 Loading corrupted update

Test Reference	2.2.1	**IHO Reference**	S-52 appendix 1/ 3.4.1f, 3.4.2d and IEC 61174/ 4.4.2
Test description			
Loading corrupt update files.			
Setup			
Load the following cell: *2.1.1 Power Up\ENC_ROOT\GB5X01SW.000*			
Action			
Load the following updates: *2.2.1 Corrupt Update\ENC_ROOT*			
Results			
The update process shall stop, the update flagged as invalid, and the user provided with an appropriate message.			

2.2.2 Loading sequential update

Test Reference	2.2.2	**IHO Reference**	S-52 appendix 1/ 3.4.2f and IEC 61174/ 4.4.2
Test description			
Loading correct sequential update files.			
Setup			
As for test 2.1.2 *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-64 plots.* *.001* *Update review date range: 1st May 2001 – 21st May 2001* *.002* *Update review date range: 1st Dec 2004 – 1st Mar 2005* *.003* *Update review date range: 1st Sep 2005 – 14th Sep 2005* *.004* *Update review date range: 15th Sep 2005 – 30th Sep 2005* *.005* Update review date range: 1st Oct 2005 – 14th Oct 2005			
Action			
Load the following five updates: *2.2.2 Loading of Updates\ENC_ROOT*			

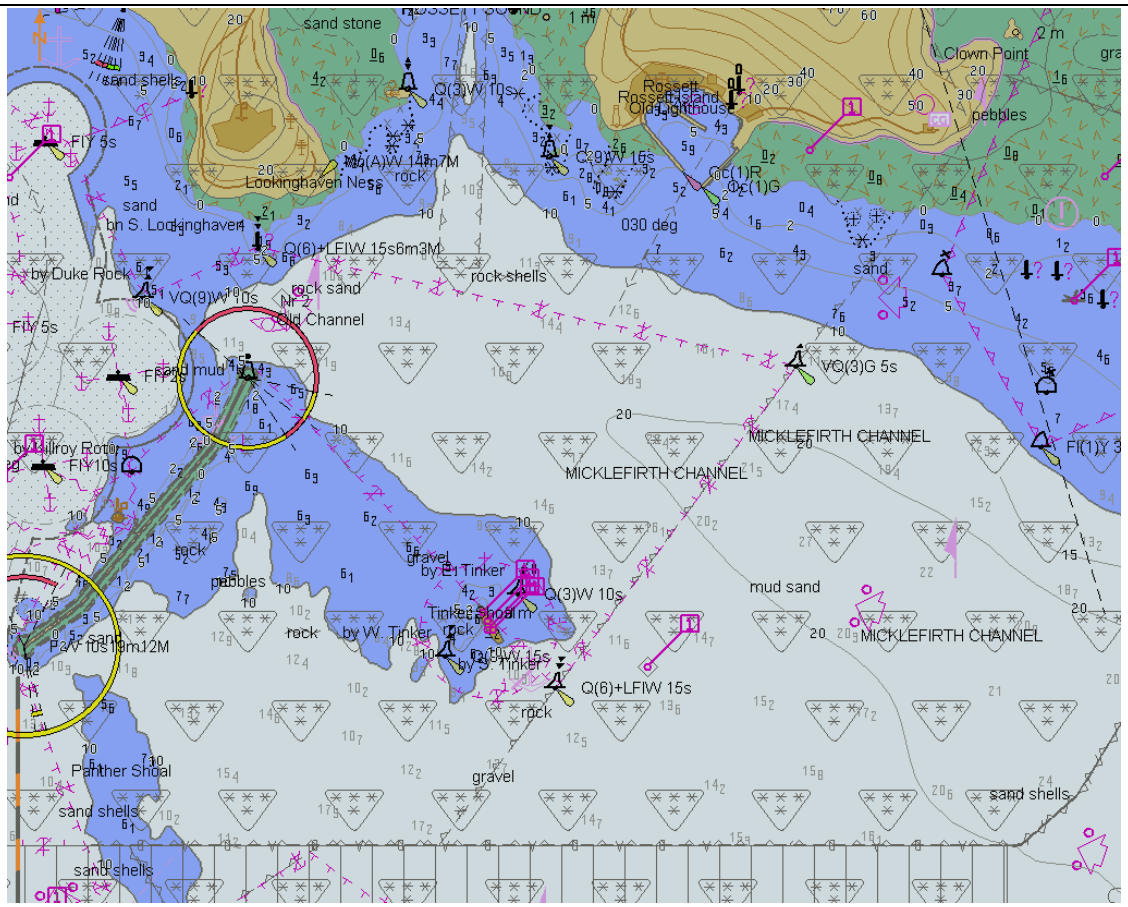
Results

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:

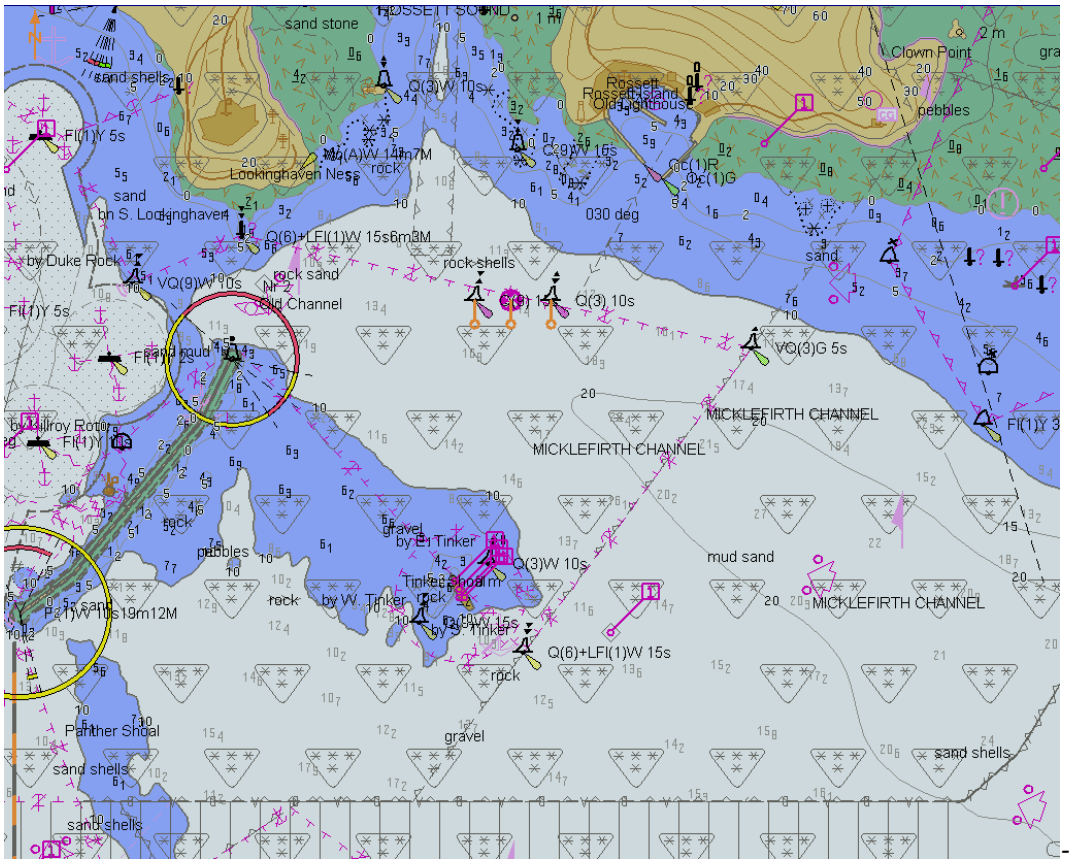
- *identification of issuing authority;*
- *update numbers of the update files;*
- *cell identifiers of cells affected;*
- *edition number and date of cell involved;*
- *number of updates in the affected cells.*

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

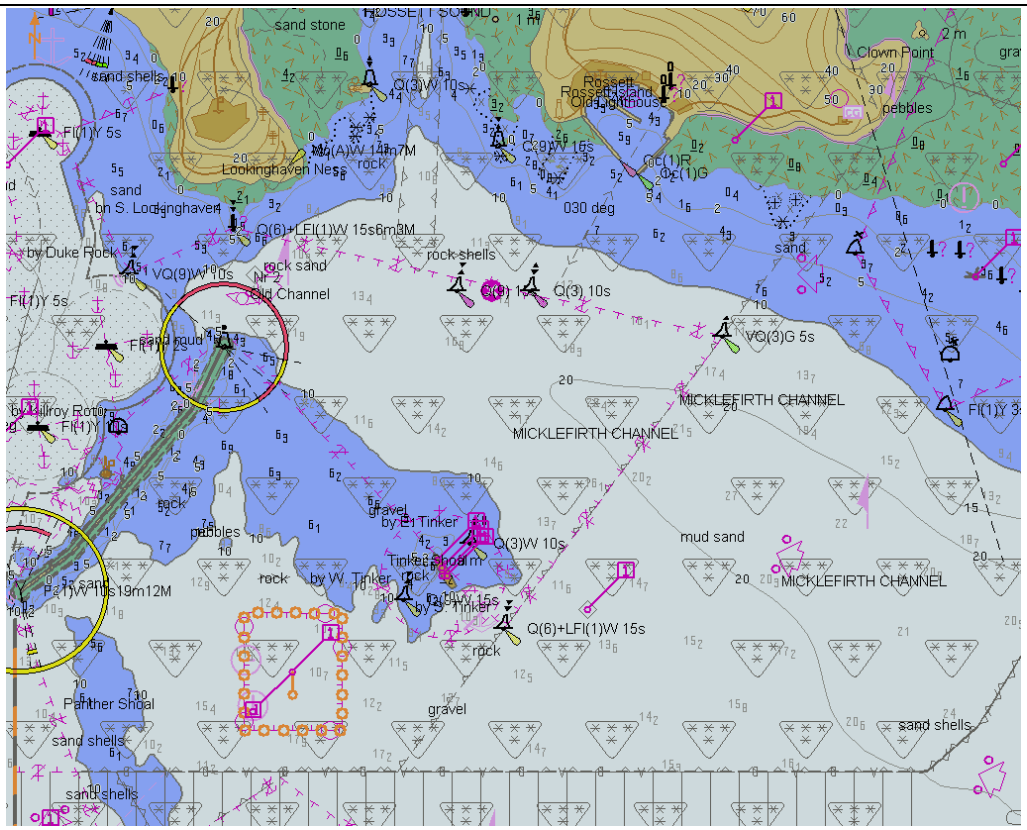
Note Manufacturers can use their own algorithms for calculating the position of centred symbols S-52 PL 8.5.1.



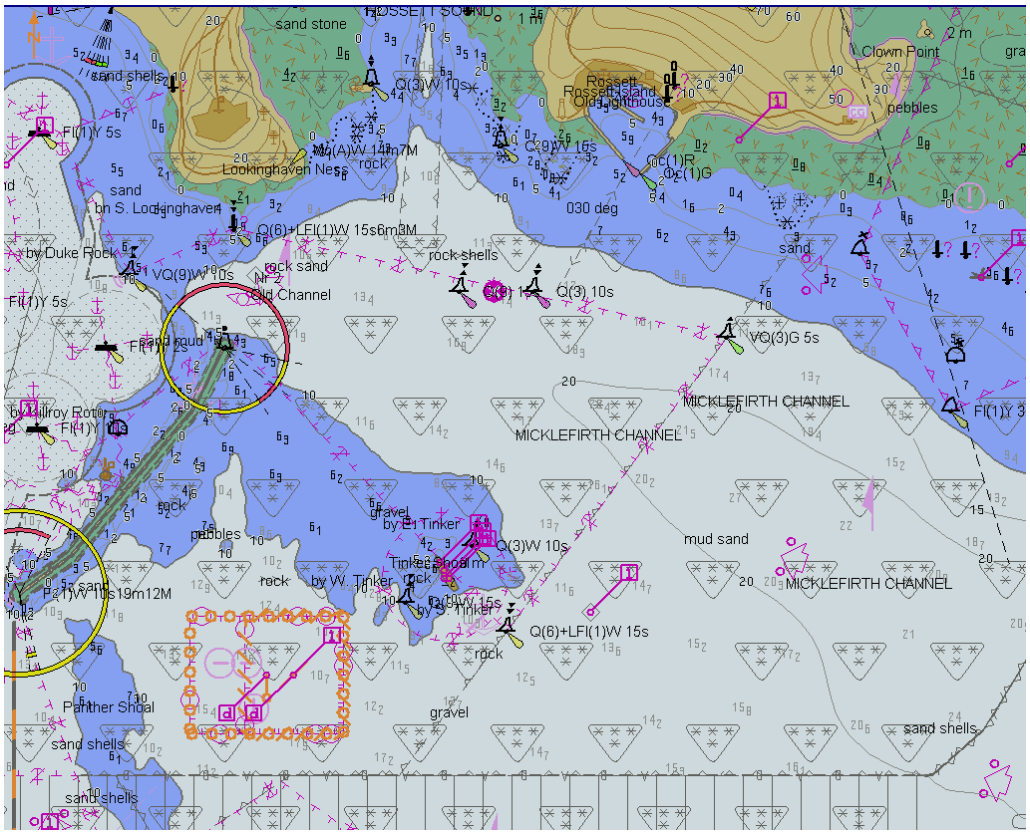
Before loading of updates, displayed scale 1:20 000
Note: Screen plots are based on the full text NATSUR attribute. To reduce undue clutter in the ECDIS chart display, the use of the abbreviations of the NATSUR attribute is recommended.



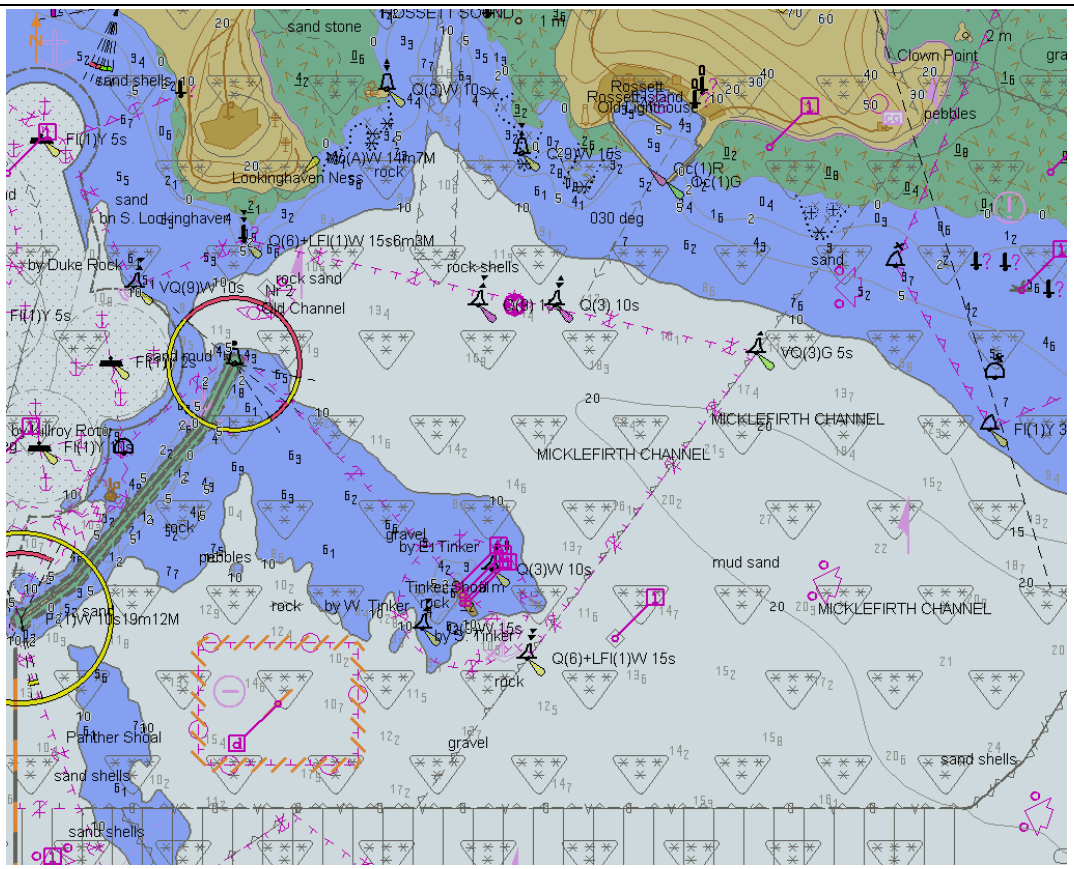
After loading of GB5X01SW.001, displayed scale 1:20 000, date range include 9thMay 2001



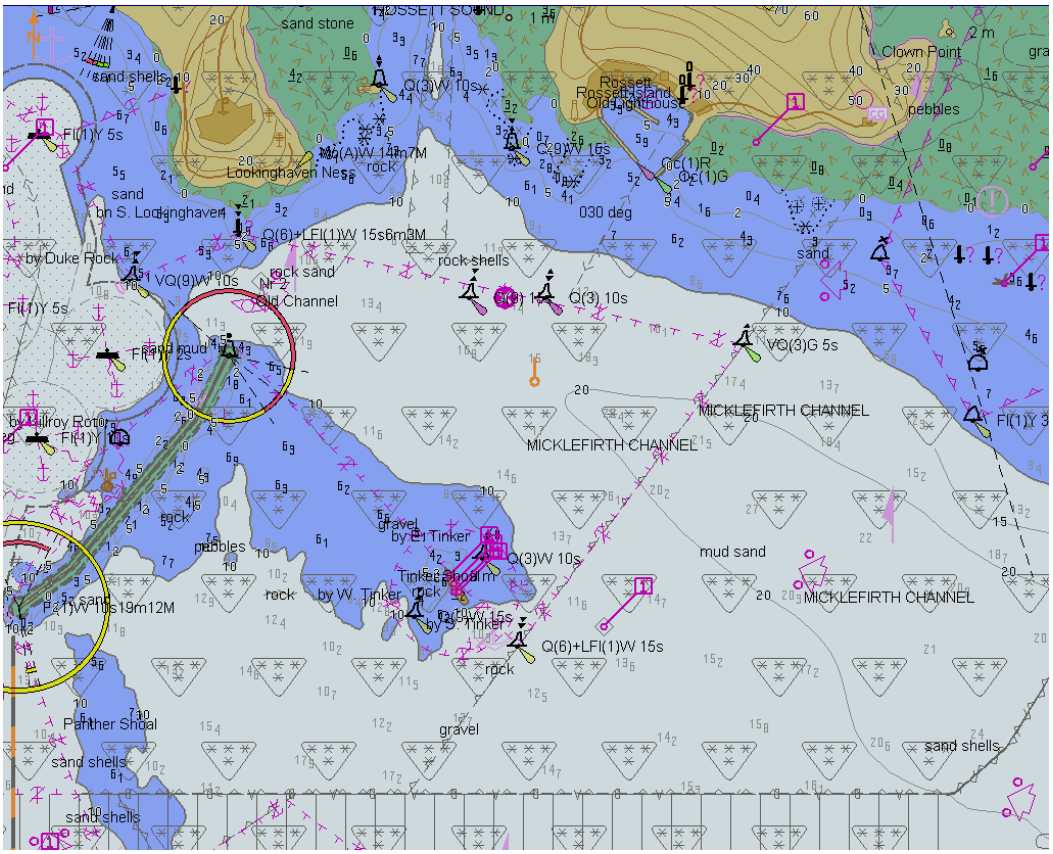
After loading of GB5X01SW.002, displayed scale 1:20 000, date range 1st Jan 2005 - 21st Feb 2005



After loading of GB5X01SW.003, displayed scale 1:20 000, date range include 8th Sep 2005



After loading of GB5X01SW.004, displayed scale 1:20 000, date range include 22nd Sep 2005



After loading of GB5X01SW.005, displayed scale 1:20 000, date range include 6th Oct 2005

2.2.3 Loading update in an invalid sequence

Test Reference	2.2.3	**IHO Reference**	S-52 appendix 1/ 3.4.2c and IEC61174/ 4.4.2
Test description			
Loading update files in an invalid sequence.			
Setup			
Load the following cell: *2.1.1 Power Up\ENC_ROOT\GB5X01SW.000*			
Action			
Load the following five updates: *2.2.3 Loading of Invalid Sequence\00x\ENC_ROOT\ 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.			

2.2.4 Loading update of newer edition

Test Reference	2.2.4	IHO Reference	S-52 appendix 1/ 3.4.2c and IEC 61174/ 6.8.16.1

Test description

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

Setup

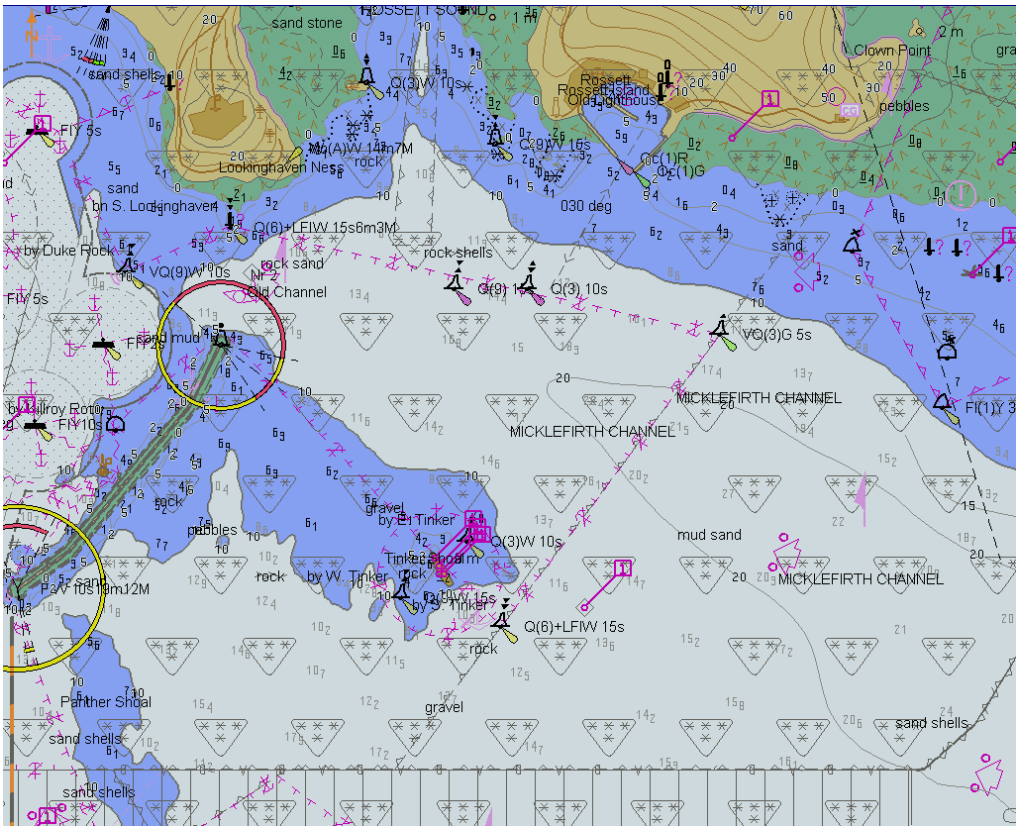
As result of test 2.2.3
Note: Following cell is already loaded*:*
2.1.1 Power Up\ENC_ROOT\GB5X01SW.000 (edition 1)

Action

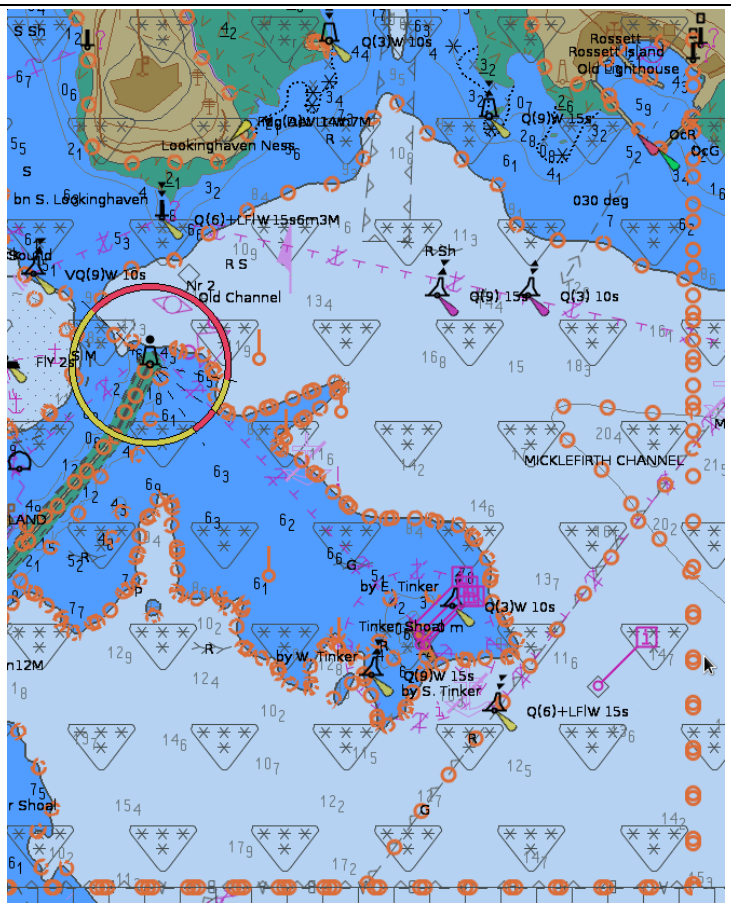
1. *Load the following update:*
   2.2.4 Loading of New Update\ENC_ROOT|GB5X01SW.001 (edition 2)
2. *Display installed chart.*
3. *Install the following base cell:*
   2.2.5 Good Base Cells\ENC_ROOT\GB5X01SW.000 (edition 2); and load the following update:
   2.2.4 Loading of New Update\ENC_ROOT|GB5X01SW.001 (edition 2)
4. *Display installed chart.*

Results

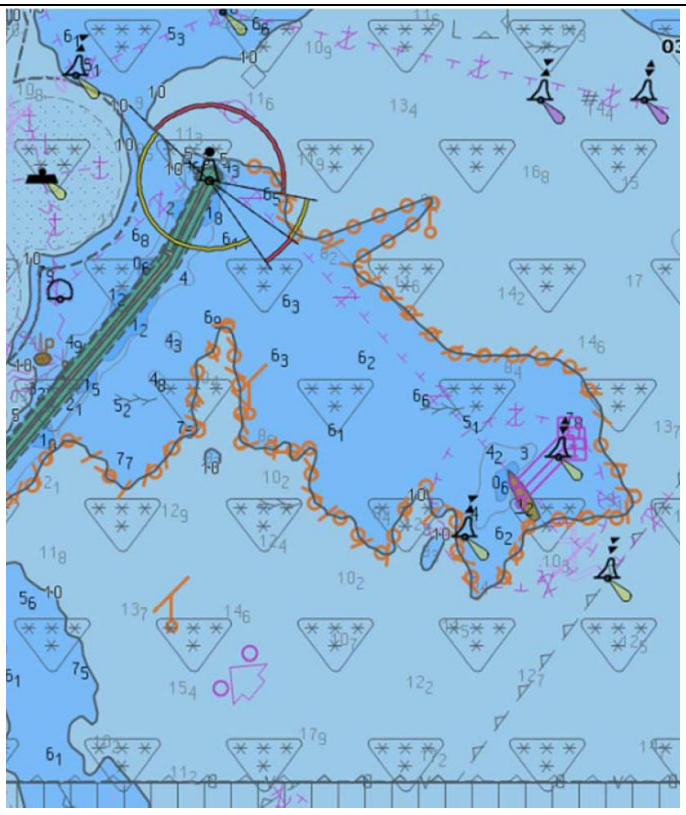
1. *The update process shall refuse to install the update and inform the user that chart data of a newer edition are available.*
2. *A permanent indication "Chart information not up to date" shall be available in the chart display area when such a chart is in use (either displayed on chart area or used 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.*



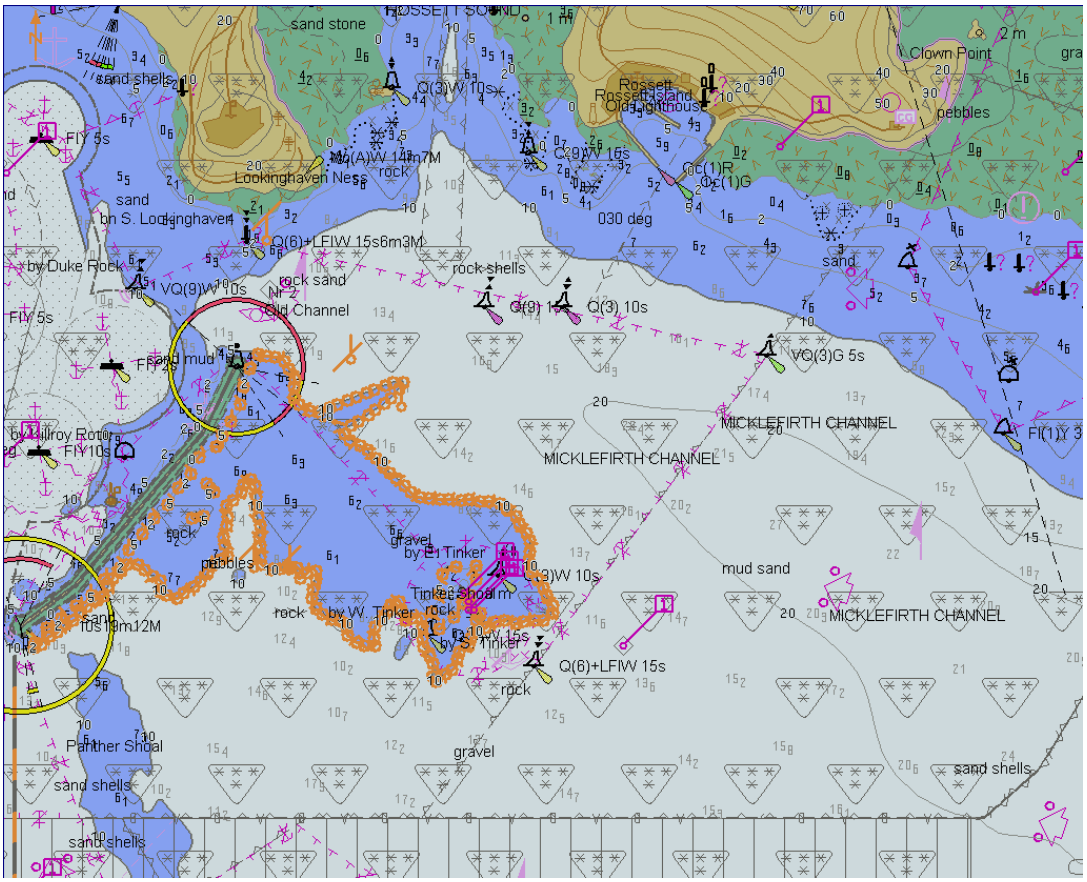
After loading of GB5X01SW.000 2nd edition, displayed scale 1:20 000
Note: Screen plot is based on the full text NATSUR attribute. To reduce undue clutter in the ECDIS chart display, the use of the abbreviations of the NATSUR attribute is recommended.



After loading of GB5X01SW.001 2nd edition, displayed scale 1:20 000, all objects and their geometries being subject to this update review are highlighted



After loading of GB5X01SW.001 2nd edition, displayed scale 1:20 000, update review highlight filtered for real changes (example 1)



After loading of GB5X01SW.001 2nd edition, displayed scale 1:20 000, update review highlight filtered for real changes (example 2)

2.2.5 Loading update of older edition

Test Reference	2.2.5	**IHO Reference**	S-52 appendix 1/ 3.4.2c and IEC 61174/ 4.4.2
Test description			
Loading update file of an older edition than base cell installed.			
Setup			
Load the following cell: *2.2.5 Good Base Cells\ENC_ROOT\GB5X01SW.000 (edition 2)*			
Action			
Load the following update: *2.2.5 Old Update\ENC_ROOT\ (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"			

2.2.6 Loading a re-issue of a data set

Test Reference	2.2.6	**IHO Reference**	S-52 appendix 1/ 3.4.1a and IEC 61174/ 4.4.2
Test description			
Loading a re-issue of a data set.			

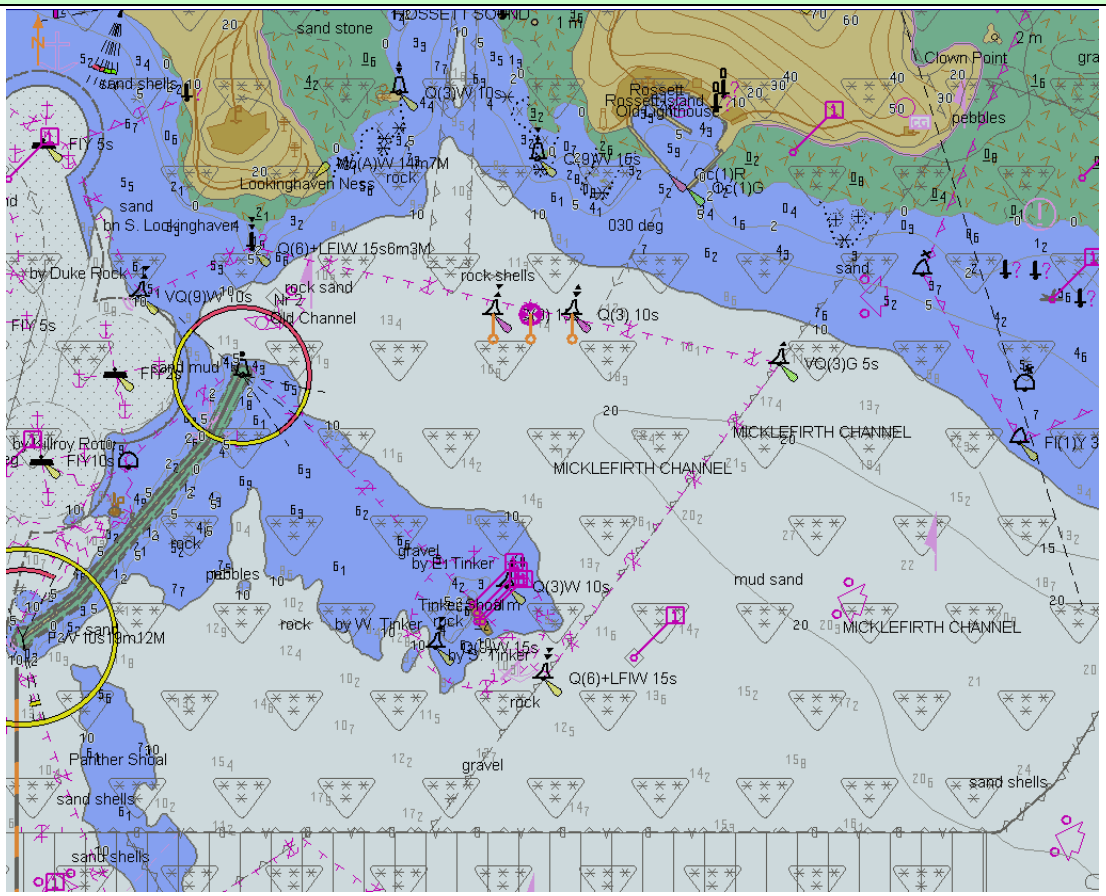
Setup

As result of test 2.1.1
Load the following cell:
2.1.1 Power Up\ENC_ROOT\GB5X01SW.000 (edition 1)
2.1.1 Power Up\ENC_ROOT\GB5X01SE.000
2.1.1 Power Up\ENC_ROOT\GB5X01NE.000

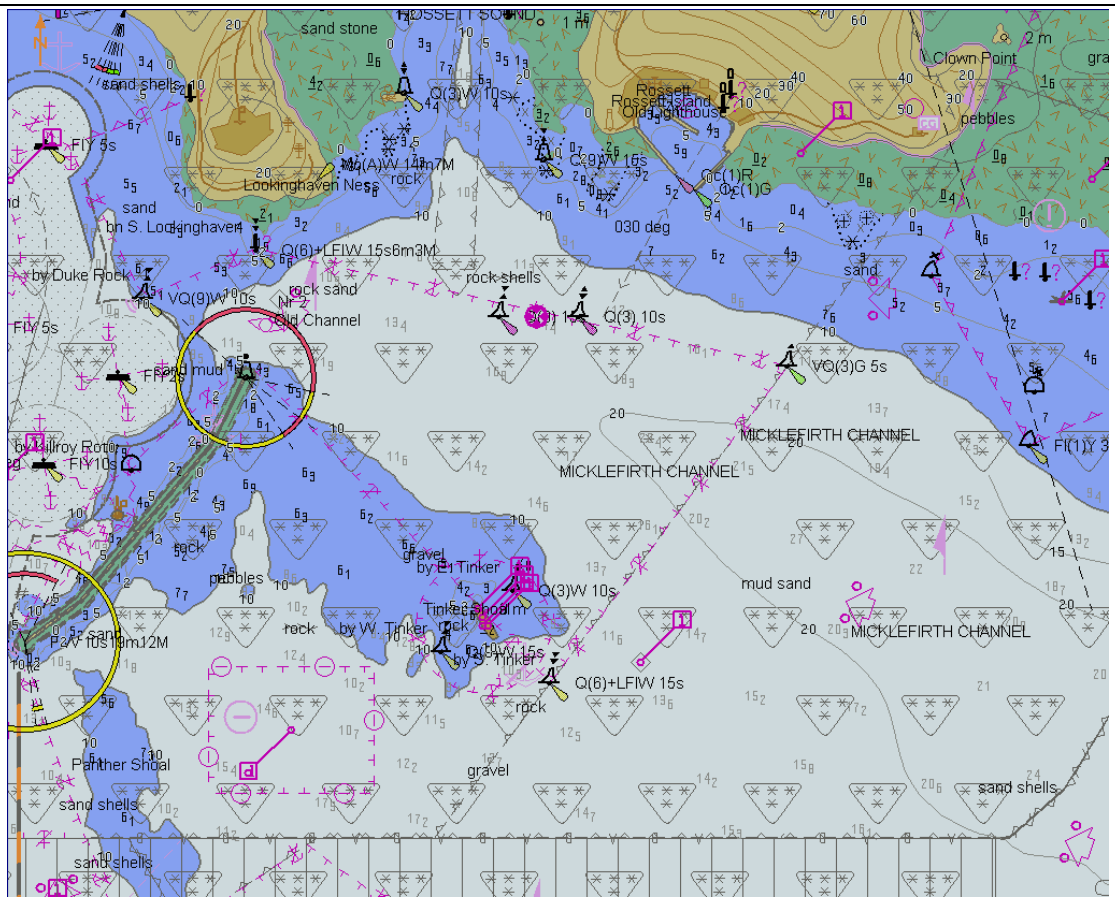
Action

Load the following updates in sequence:
2.2.6 Re-issue\GB5X01SW_001\ENC_ROOT\GB5X01SW.001 (edition 1)
2.2.6 Re-issue\GB5X01SW_RE-ISSUE\ENC_ROOT\GB5X01SW.000 (re-issue, edition 1, update 3 included)
2.2.6 Re-issue\GB5X01SW_004 \ENC_ROOT\GB5X01SW.004 (edition 1)
Note: Data for updates 2 and 3 of GB5X01SW are included within the reissue GB5X01SW.000 and therefore GB5X01SW.002 and GB5X01SW.003 are not included in the dataset.

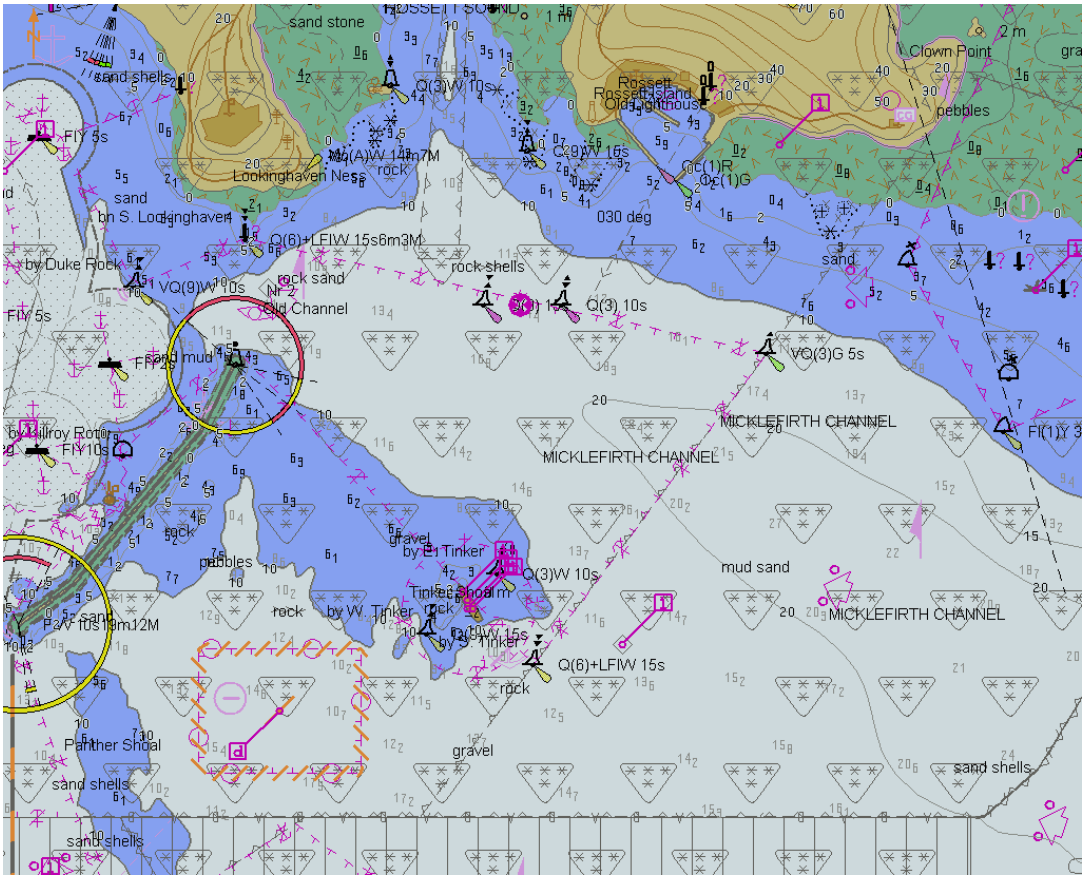
Results



After loading of GB5X01SW.001 1st 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.



After loading of GB5X01SW.000 re-issue, edition 1, update 3, displayed scale 1:20 000



After loading of GB5X01SW.004, displayed scale 1:20 000

2.2.7 Loading cancellation update

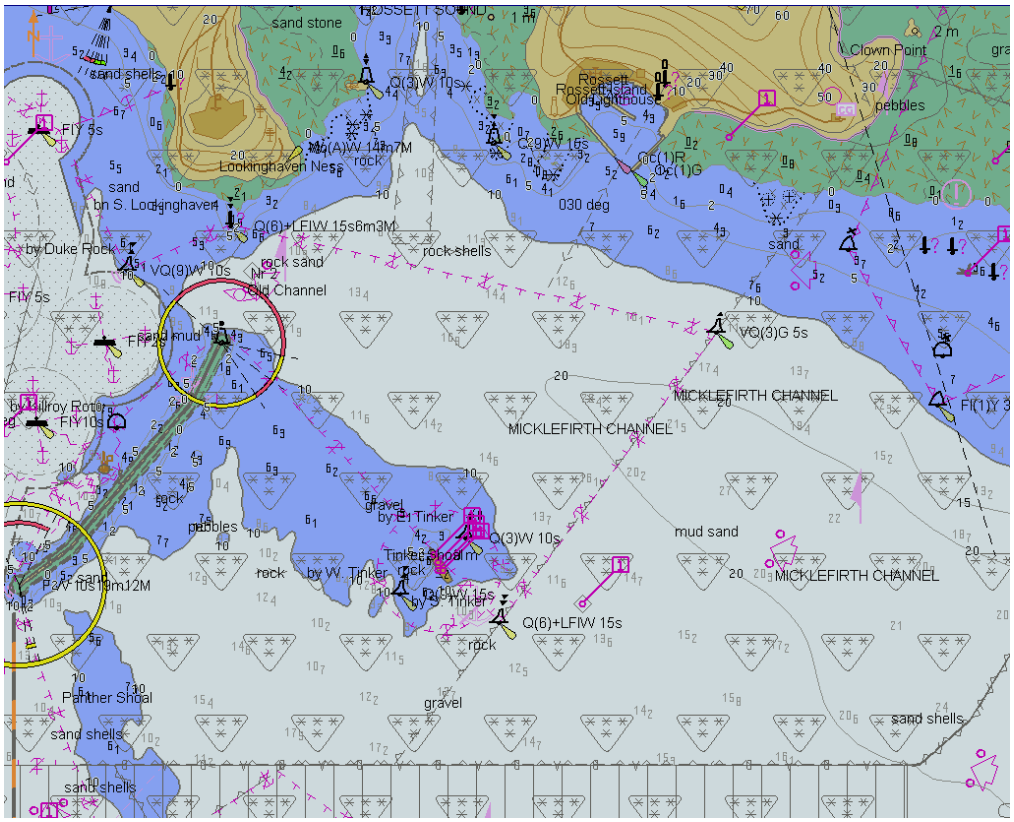
Test Reference	2.2.7	**IHO Reference**	S-52 appendix 1/ 3.4.1a and IEC 61174/ 4.4.2
Test description			
Loading cancellation update.			
Setup			
Load the following cell: *2.1.1 Power Up\ENC_ROOT\GB4X0000.000*			
Action			
Load the following update: *2.2.7 Cancellation\ENC_ROOT\GB4X0000.001*			
Results			
The system shall report any cell(s) that have been identified as cancelled at load time. 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 must 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.*			

2.2.8 Rejection of automatic update

Test Reference	2.2.8	**IHO Reference**	S-52 appendix 1/ 3.4.2h and IEC 61174/ 4.4.2
Test description			
Manual rejection of an automatic update.			
Setup			
As result of test 2.1.1 *Load the following cell:* *2.1.1 Power Up\ENC_ROOT\GB5X01SW.000 (edition 1)* *2.1.1 Power Up\ENC_ROOT\GB5X01SE.000* *2.1.1 Power Up\ENC_ROOT\GB5X01NE.000*			
Action			
Load the following update: *2.2.2 Loading of Updates\ENC_ROOT\GB5X01SW.001 (edition 1, update 1)* *After loading of the update, manually annotate the objects of the update as rejected using the deletion available in the manual update method.*			

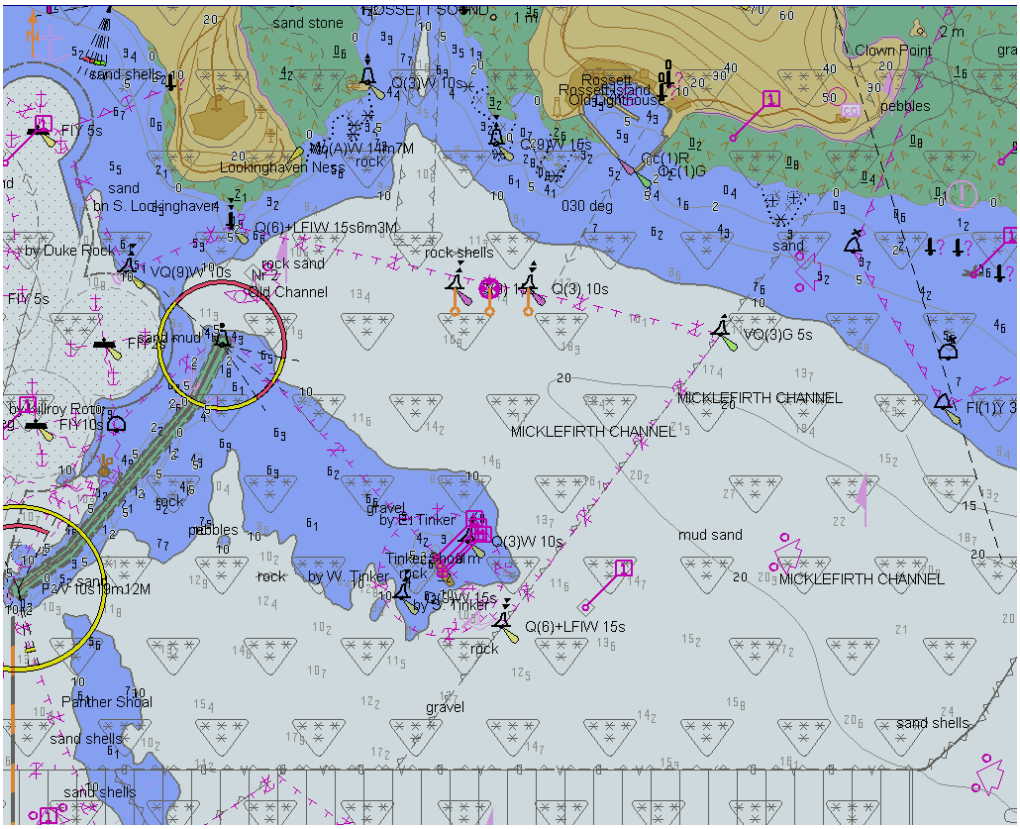
Results

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

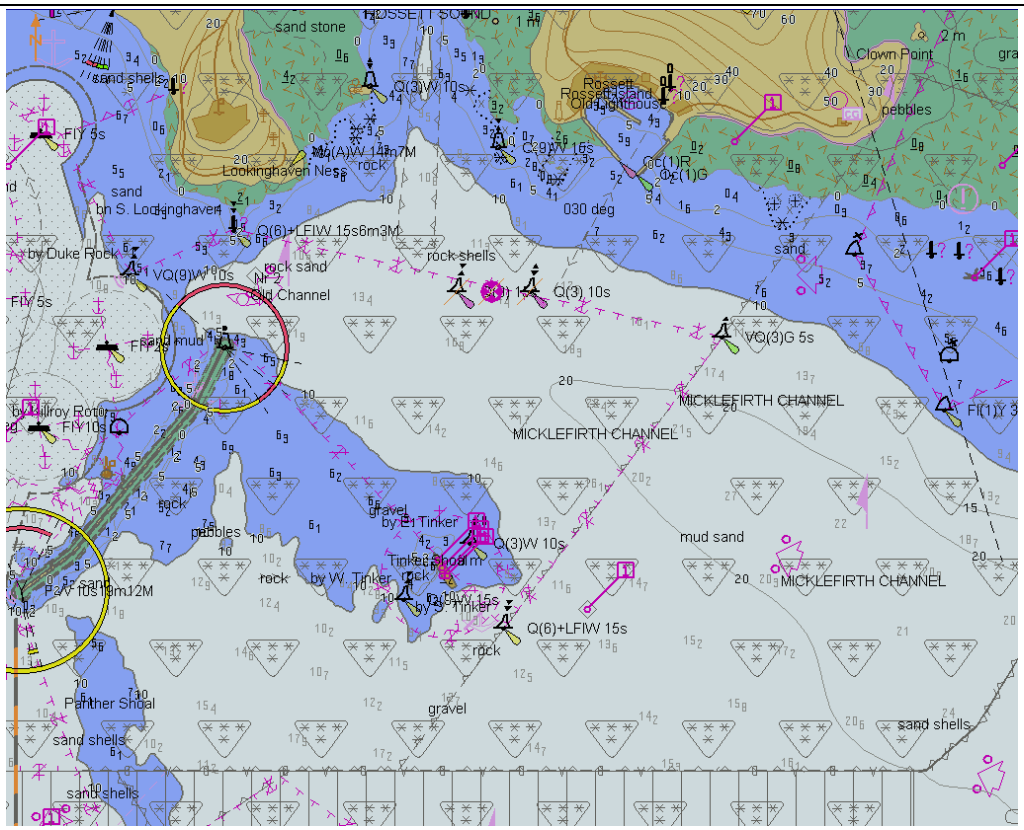


Before loading of update, displayed scale 1:20 000

Note: Screen plot are 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.



After loading of GB5X01SW.001, displayed scale 1:20 000



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

2.3 Manual Updates

Test Reference	2.3	**IHO Reference**	S-52 appendix 1/ 3.4.4 and IEC 61174/ 6.8.17
Test description			
Manual updates			
Setup			
Load the following cell: *2.1.1 Power Up\ENC_ROOT\GB5X01SW.000* *Select Display Category Standard* *Set the Safety Contour value to 8 m* *Set the Safety Depth value to 8 m* *Select Symbolized Boundaries* *Select Paper chart symbols* *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 20150220;

e. insert a cautionary area in the same location being in force from date of issue to 20150220;

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 20150220. Display chart cell with manual updates.

3. Set viewing date after 20150220. 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 20150220. Display chart cell with manual updates.

6. Set viewing date after 20150220. Display chart cell with manual updates.

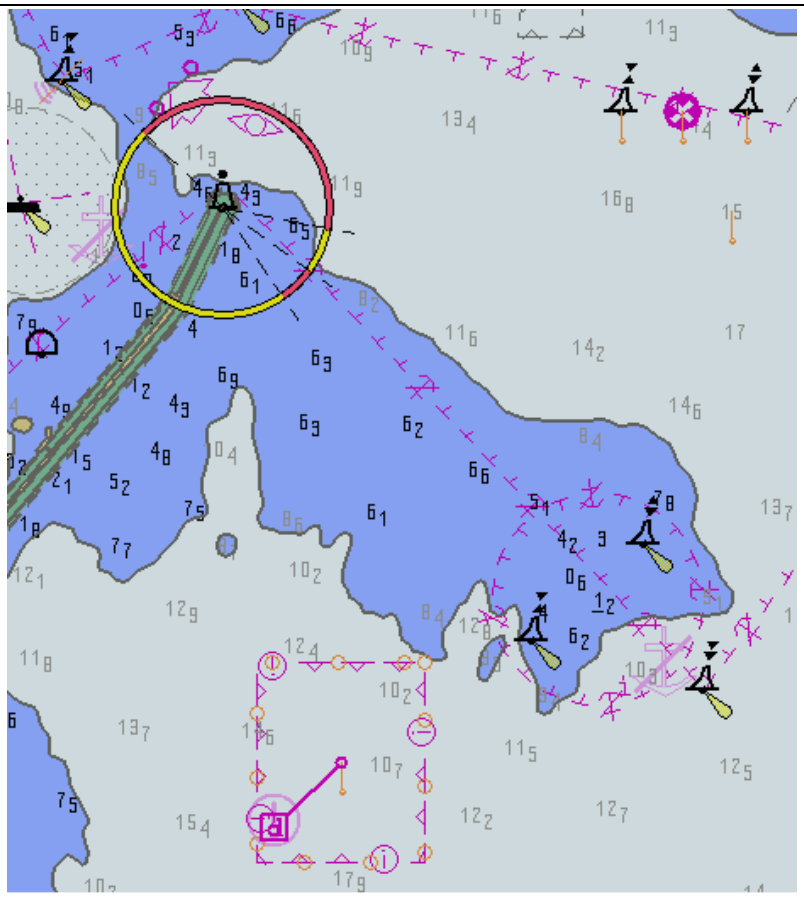
7. Review manual updates.

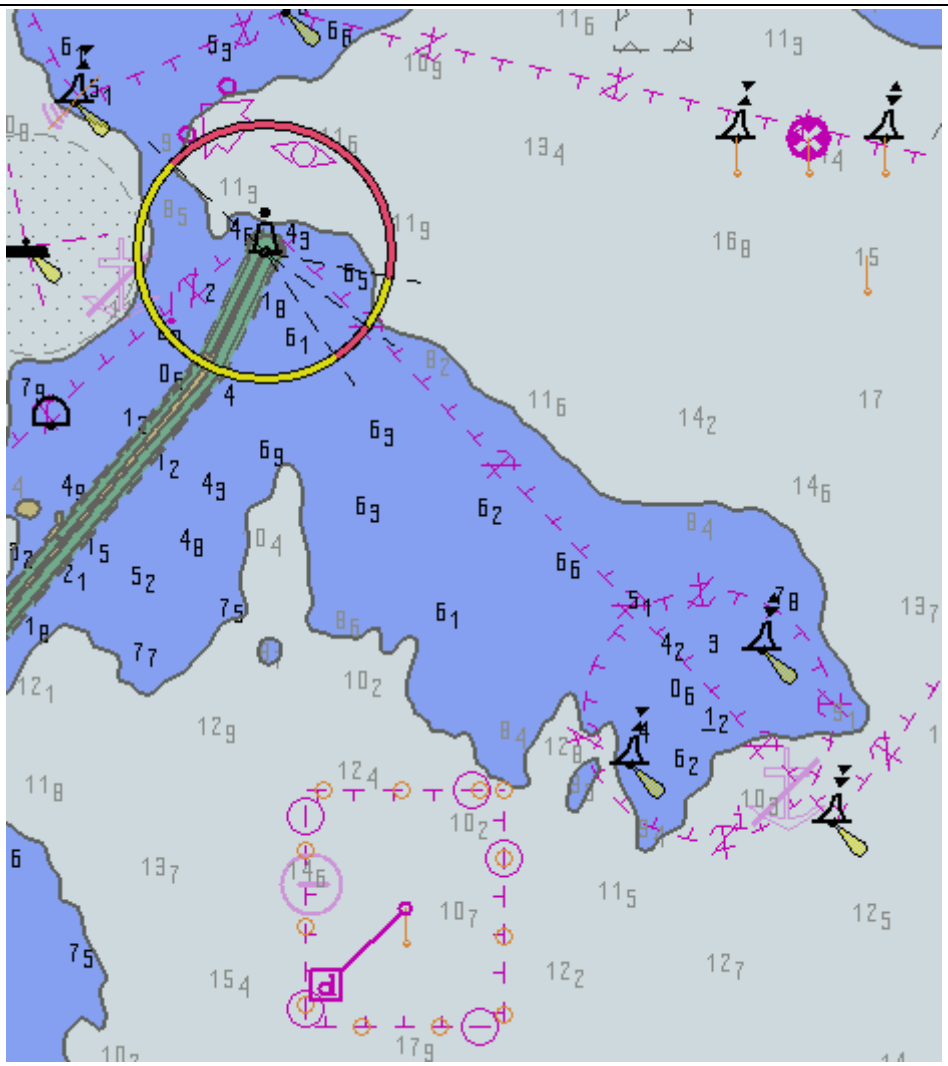
8. Retrieve textual description from record.

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

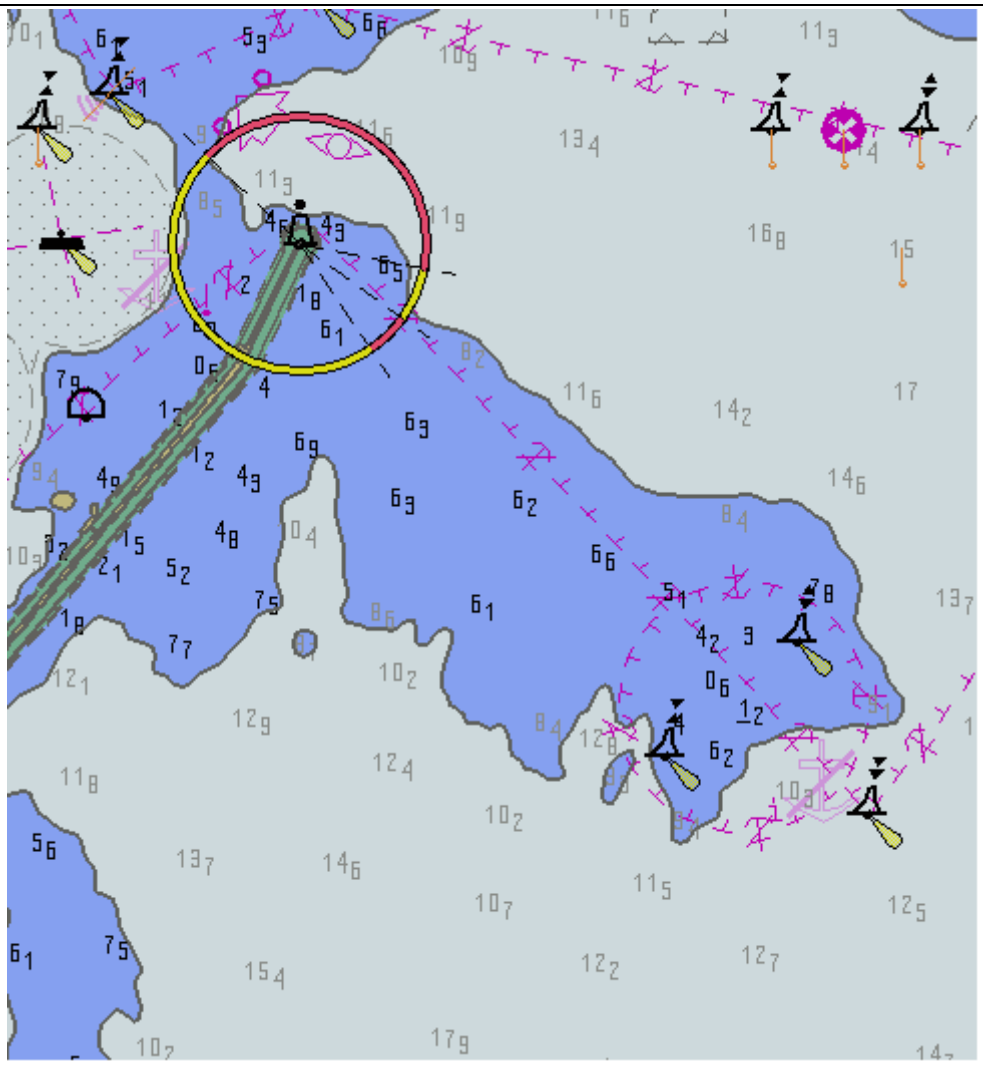
Results

2. Set viewing date before 20150220. The ENC in the ECDIS should match the corresponding graphical plot shown below. Manual updates shall be distinguishable as described in S-52, 2.3.4.

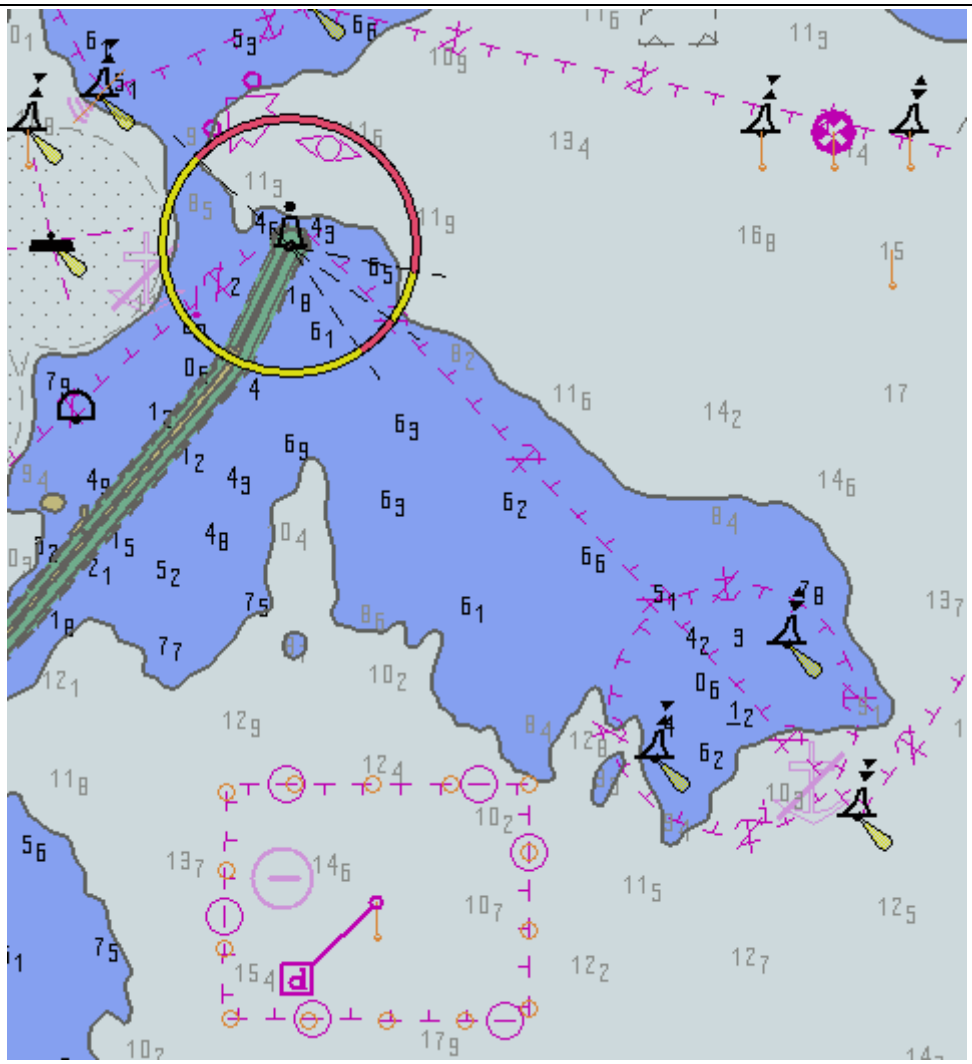




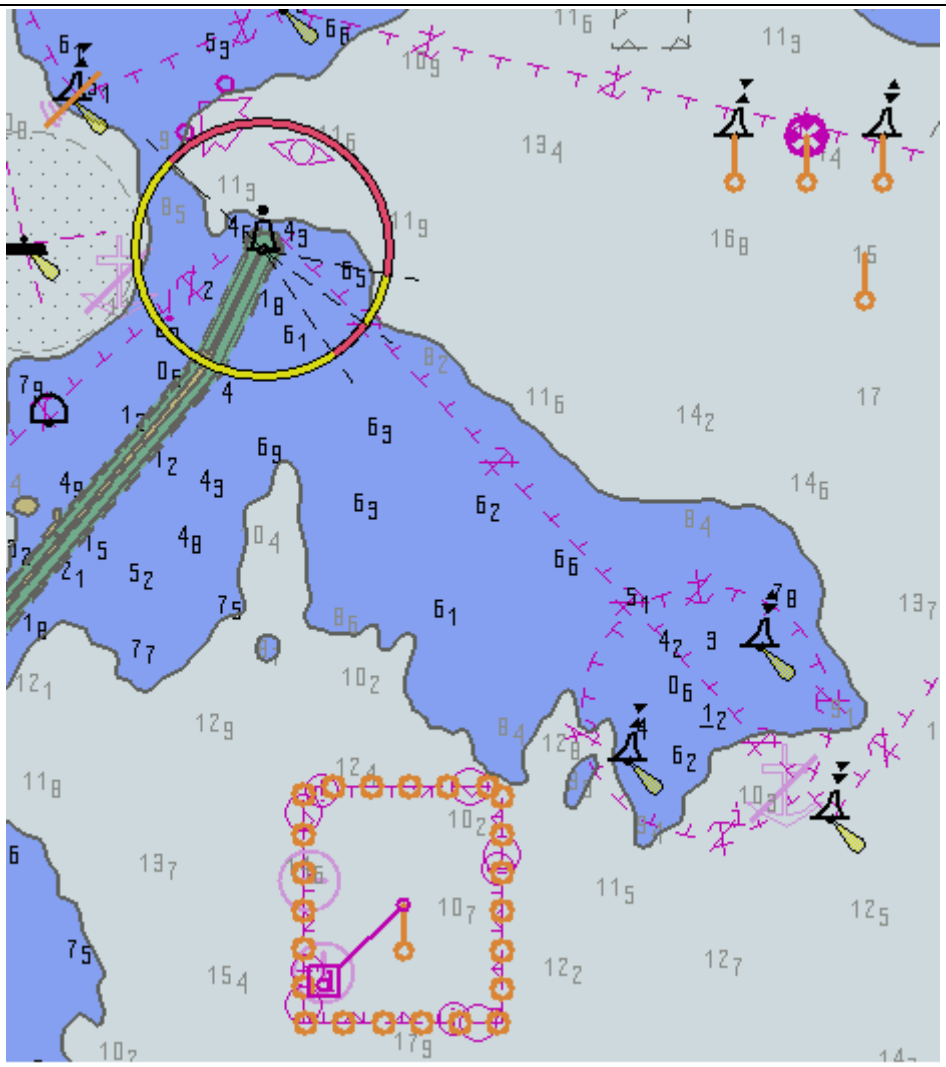
3. Set viewing date after 20150220. The ENC in the ECDIS should match the corresponding graphical plot shown above.



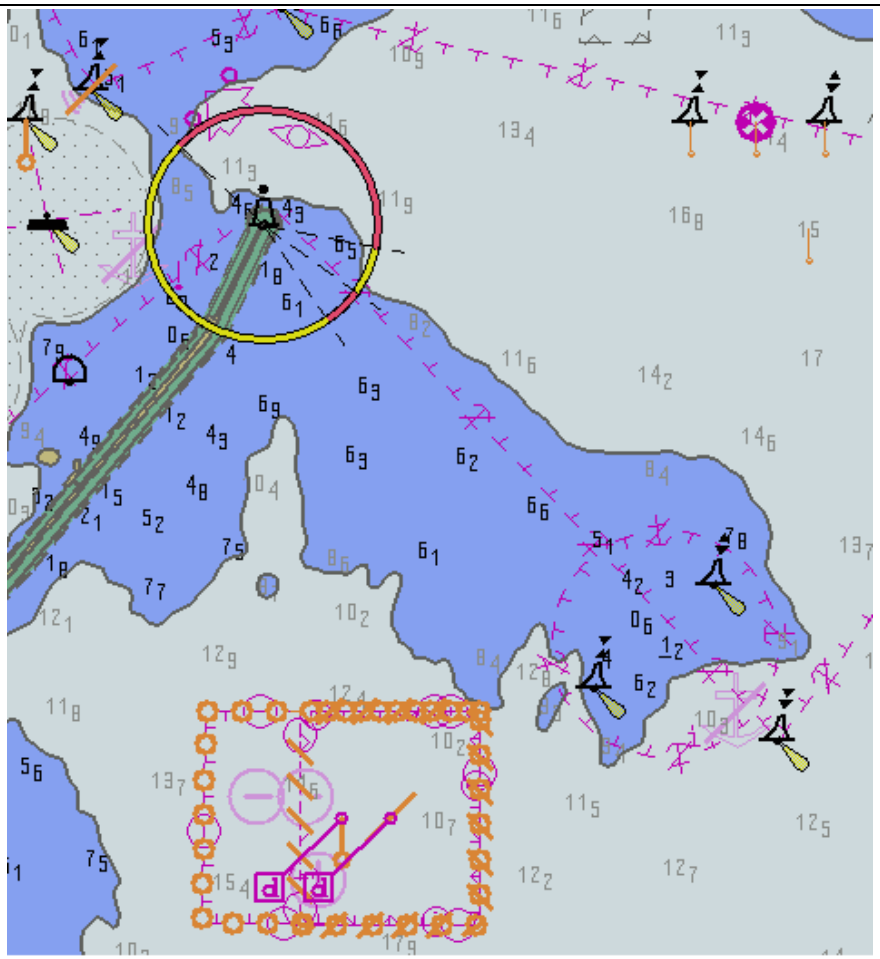
5. Set viewing date before 20150220. The ENC in the ECDIS should match the corresponding graphical plot shown above.



6. Set viewing date after 20150220. The ENC in the ECDIS should match the corresponding graphical plot shown above.



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



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.

2.4 Loading and Updating using SENC delivery (if provided)

Test Reference	2.4	**IHO Reference**	IEC 61174/ 6.8.16
Test description			
Loading and Updating using SENC delivery (if provided).			
Setup			
If the ECDIS supports SENC delivery (accepting a SENC resulting from conversion of ENC to SENC ashore, in accordance with IHO Resolution 4/2002 as amended (see IHO Publication M-3), then the manufacturer shall supply a SENC version of the IHO S-64 test data set for each SENC format for which SENC delivery is to be approved. *Note: The test data sets should be provided by the SENC producers for each SENC distributor approved for use with the EUT.*			
Action			
For each SENC 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 SENC 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 SENCs that is not inferior to the update mechanism of ENCs.*			

2.5 Loading and Updating of Encrypted ENCs

2.5.1 Organization of the Encrypted TDS

The tests for loading encrypted data are stored in the root directory “IHO S-64 [S-63 TDS v1.2.1]”. The tests are subdivided into seven categories. Each category contains a number of tests which have corresponding test scripts provided in this section.

There are additional tests provided in “7 ENC Data Management [Optional]”. These are provided to assist manufacturers who have included additional ENC Data Management functions into their systems and are fully described in sections 2.5.7i), 2.5.7j) and 2.5.7k).

Test Definitions

Default test data parameters

The ENC permits that accompany the encrypted ENC test data have been generated for the User Permit specified below. To carry out the tests described in this document manufacturers will have to create a hard lock device or program their software with the following manufacturer information and hardware ID (HW_ID).

Manufacturer ID: (M_ID)	=	10	(or 3130 hexadecimal)
Manufacturer Key: (M_KEY)	=	10121	(or 3130313231 hexadecimal)
Hardware ID: (HW_ID)	=	12345	(or 3132333435 hexadecimal)
USERPERMIT	=	66B5CBFDF7E4139D5B6086C23130	

This is the official manufacturer information issued for and by the Scheme Administrator (IHB) 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-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.

2.5.2 ENC Licensing – Permit Management

2.5.2 a) Check permit string availability

Test Reference	2.5.2 a)	**IHO Reference**	S-63 10.5.1
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.TXT file (empty file)* *2) TEXT.TXT file (wrong name)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\2 ENC Licencing\Test 2a*			
Action			
1) Attempt to load a PERMIT.TXT file with no cell permits listed. *2) Attempt to load a non compliant text file.*			
Results			
Security Scheme Error (SSE 11) and accompanying description is displayed in the system at permit installation. *i.e.* ***SSE 11 – Cell permit not found***			

2.5.2 b) ENC cell permit string incorrect format

Test Reference	2.5.2 b)	**IHO Reference**	S-63 4.3 and 10.5.2
Test description			
ENC Licensing – Permit Management *ENC cell permit string incorrect format* *Test how the system performs when loading a PERMIT.TXT 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 SENC. *Test data used:* *1) PERMIT.TXT* *2) b) V01X01 (Exchange Set - GB100001, GB100002 plus updates)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\2 ENC Licencing\Test 2b*			
Action			
Load the permit file (PERMIT.TXT) and then the exchange set (V01X01) from the location above.			
Results			
*Security Scheme Error (SSE 12) and accompanying description is displayed in the system at permit installation. That is, GB100012, "****SSE 12 – Cell permit format is incorrect****" GB100002, 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 GB100002 (edition #13 update # 5) and updates should be loaded into the SENC. The permit string for GB100001 is the wrong length [The cell name has been shortened to GB10001 hence the expected result will return GB100012 because the software should pick up the first character of the expiry date]. The permit string for GB100002 is the correct length and is valid.*			

2.5.2 c) Validate permit CRC

Test Reference	2.5.2 c)	**IHO Reference**	S-63 10.5.4
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.TXT* *Test data location:* *a) D:\IHO S-64 [S-63 TDS v1.2.1]\2 ENC Licencing\Test 2c\1* *b) D:\IHO S-64 [S-63 TDS v1.2.1]\2 ENC Licencing\Test 2c\2*			
Action			
Attempt to load the PERMIT.TXT file from locations (a) and (b) above into the ECDIS.			
Results			
The system reports a CRC failure on GB100001 accompanied by the appropriate error message as follows: *"**SSE 13 – Cell Permit is invalid (checksum is incorrect)**"* *In both cases the permit for GB100002 imports without any error or warning.* *1) Cell GB100001 has had its CRC changed from* 760CD6BA8AAEF1A0 to 760CD6BA8AAEE1A0*.* *2) Cell GB100001 has had the encrypted cell keys 1 & 2 altered slightly.* *3) Cell GB100002 has a valid CRC value for both tests.)*			

2.5.2 d) Check remaining permit expiry period

Test Reference	2.5.2 d)	**IHO Reference**	S-63 10.5.5
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.TXT* *The expiry date set in this test permit is 20121231 (31st December 2012).* *Test data location:* *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 2012 *Install the PERMIT.TXT file:*			
Results			
The system must return a SSE 20 warning message as follows: *"**SSE 20 – Subscription service will expire in less than 30 days. Please contact your data supplier to renew the subscription licence**."*			

2.5.2 e) Check for expired permits

Test Reference	2.5.2 e)	**IHO Reference**	S-63 10.5.5
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.TXT* *The expiry date set in this test permit is 20121231 (31st December 2012).* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\2 ENC Licencing\Test 2e*			
Action			
Load the PERMIT.TXT file. [Note The expiry dates for these permits are set to 31st Dec 2012. ***Set the computer Date/Time to 1st Jan 2013** and install the PERMIT.TXT file]*			
Results			
The system must report the correct SSE 15 warning message as follows: *"**SSE 15 – 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 10.5.5 of S-63.*			

2.5.2 f) Permit installation and reporting

Test Reference	2.5.2 f)	**IHO Reference**	S-63 4.3 & 10.5
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.TXT* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\2 ENC Licencing\Test 2f* *The expiry dates for these permits are set to 31st Dec 2018.* ***Set the computer Date/Time prior to 1st Dec 2018** and install the PERMIT.TXT file.*			
Action			
Load the file PERMIT.TXT 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 IHB manufacturer hardware ID and M_KEY.)*			

2.5.2 g) Management of permits from multiple data servers.

Test Reference	2.5.2 g)	**IHO Reference**	S-63 4.3.3 & 10.5.6
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.TXT* *Test data location:* *a) D:\IHO S-64 [S-63 TDS v1.2.1]\2 ENC Licencing\Test 2g\DS1* *b) D:\IHO S-64 [S-63 TDS v1.2.1]\2 ENC Licencing\Test 2g\DS2* *There are two ENC cells common to both PERMIT.TXT files. These common permits have been created using different encryption keys.*			
Action			
Load the PERMIT.TXT file at the test data location (a) above. *Load the PERMIT.TXT 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.TXT files. These common permits have been created using different encryption keys.)			

2.5.2 h) Management of installed permits

Test Reference	2.5.2 h)	**IHO Reference**	S-63 4.3
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 2.5.2g *Test data used:* *PERMIT.TXT files loaded in the previous test 2.5.2g* *Two permit files have been supplied with this test imitating 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.			

2.5.3 Not currently used

2.5.4 ENC Authentication Part 1

2.5.4 a) Install and validate the SA certificate and/or public key

Test Reference	2.5.4 a)	**IHO Reference**	S-63 10.6.1 & 10.6.2
Test description			
Confirm that the system can import a valid certificate/public key and supply the user with confirmation. Validate it against the SA signature contained in the ENC signature files of the supplied exchange set.			
Setup			
No pre-installed permits, Certificate/Public Key or ENC data. *Test data used:* *1) UKHO.CRT and/or UKHO.PUB* *2) PERMIT.TXT* *3) V01X01 (Exchange Set)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\4 Authentication_Part1\Test 4a* *The signature files within this Exchange Set contain the UKHOs self signed certificate. The SSE 26 warning is displayed because this certificate has not been provided by the Scheme Administrator (IHO). Validation can be carried by the system against the file name and/or the "Issuer" if the certificate file is pre- installed.* *The certificate expiry date is 16/08/2010. Set the computer Date/Time prior to 16th Aug 2010.*			
Action			
Depending on the system install the certificate and/or the public key file(s). Install the PERMIT.TXT and install the exchange set from the location above			
Results			
*1) The appropriate warning must be displayed "**SSE 26 - This ENC is not authenticated by the IHO acting as the Scheme Administrator".*** *2) The permit file installs without error* *3) When the exchange set is authenticated the system must display the SSE 26 warning, once, to alert the user as in (1) above. The exchange set must load without any authentication failures.*			

2.5.4 b) Change and update installed certificate

Test Reference	2.5.4 b)	**IHO Reference**	S-63 10.6.1 & 10.6.2
Test description			
Confirm that the system can import a new certificate/public key and return a report informing the user of the fact. Validate it against the SA signature contained in the ENC signature files of the supplied exchange set.			
Setup			
Use the pre-installed information and data from the previous test 2.5.4a. *Test data used:* *1) IHO.CRT and/or IHO.PUB* *2) PERMIT.TXT* *3) V01X01 (Exchange Set)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\4 Authentication_Part1\Test 4b* *IHO Public key used for this is the same as that posted on their website at the time this 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 10.6.1.1 in S-63. *Depending on the system install the certificate and/or public key file(s).* *Install the PERMIT.TXT 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 26 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 GB100004 (Edition #7, Update #1) installed without error or warning* *ENC cell GB100005 (Edition #3, Update #2) installed without error or warning*			

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

Test Reference	2.5.4 c)	**IHO Reference**	S-63 10.6.2
Test description			
Test how the system performs when there is no pre-installed certificate. Confirm that the correct SSE 05 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.TXT* *2) V01X01 (Exchange Set)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\4 Authentication_Part1\Test 4c* *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 05 error message similar to the one below. *"**SSE 05 – 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 GB100001 (Edition #3, Update #6) not installed. "SSE 05" Error Message* *ENC cell GB100002 (Edition #13, Update #5) not installed. "SSE 05" Error Message*

2.5.4 d) Check SA Certificate Expiry Date

Test Reference	2.5.4 d)	**IHO Reference**	S-63 10.6.2
Test description			
Test how the system performs if the IHO digital certificate (IHO.CRT) has expired. To confirm that the correct SSE 22 error message is displayed and that the system does not progress to the decompress/decrypt stage. *Note: This test is only intended for those systems that authenticate against the .CRT encoding of the certificate file which contains an expiry date.*			
Setup			
No pre-installed certificate, permits or ENC data. *Test data used:* *IHO.CRT PERMIT.TXT* *V01X01 (Exchange Set)* *Test data location:* *a) D:\IHO S-64 [S-63 TDS v1.2.1]\4 Authentication_Part1\Test 4d\Expired* *b) D:\IHO S-64 [S-63 TDS v1.2.1]\4 Authentication_Part1\Test 4d\Current* *The IHO.CRT (Expired) certificate expired on 31st December 2004* *The IHO.CRT (Current) certificate expires on 29th August 2013*			
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 2021)*			

Results
1) When installing the expired certificate the system must report a SSE 22 error message similar to the one below. *"**SSE 22 – 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 05 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 GB100001 (Edition #3, Update #6) installed without errors and warnings* *ENC cell GB100002 (Edition #13, Update #5) installed without errors and warnings* ***Expired*** *ENC cell GB100001 (Edition #3, Update #1) not installed. "SSE 22 & 05" Error Messages* *ENC cell GB100002 (Edition #12, Update #7) not installed. "SSE 22 & 05" Error* Messages

2.5.4 e) Incorrectly formatted certificate and public key files

Test Reference	2.5.4 e)	**IHO Reference**	S-63 10.6.2

Test description
Test how the system performs if the IHO digital certificate (IHO.CRT) is incorrectly formatted. Confirm that the correct SSE 08 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/IHO.PUB* *PERMIT.TXT* *V01X01 (Exchange Set)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\4 Authentication_Part1\Test 4e* *1) The last hexadecimal pair, "F8", has been removed from the public key string (Big y) in the certificate file (IHO.CRT).* *2) The last hexadecimal pair, "F8", has been removed from the public key file (IHO.PUB).*
Action
Depending on which file the system uses install the relevant IHO.CRT and/or IHO.PUB file(s). Then attempt to load the exchange set using the permits provided.
Results
The system must report a SSE 08 error message similar to the one below. *"**SSE 08 – 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 05 – SA Digital Certificate file is not available. A valid certificate can be obtained from the IHO website or your data supplier**."* *ENC cell GB100001 (Edition #3, Update #6) not installed. "SSE 08 & 05" Error Messages* *ENC cell GB100002 (Edition #13, Update #5) not installed. "SSE 08 & 05" Error Messages*

2.5.4 f) Check certificate parameter values

Test Reference	2.5.4 f)	**IHO Reference**	S-63 10.6.1.1

Test description

Test how the system performs if the IHO digital certificate (IHO.CRT) or Public Key file is incorrectly formatted. Confirm that the correct SSE 08 error message is displayed and that the system does not progress to the decompress/decrypt stage. Note that this test is only intended for those systems that authenticate against the .CRT encoding of the certificate file

Setup

No pre-installed certificate, permits or ENC data.

Test data used:

Data Server 1 (DS1)	***Data Server 2 (DS2)***
IHO.CRT [024100 Parameter]	*IHO.CRT [0240 Parameter]*
PERMIT.TXT	*PERMIT.TXT*
V01X01 (Exchange Set)	*V01X01 (Exchange Set)*

Test data location:
a) D:\IHO S-64 [S-63 TDS v1.2.1]\4 Authentication_Part1\Test 4f\DS1
b) D:\IHO S-64 [S-63 TDS v1.2.1]\4 Authentication_Part1\Test 4f\DS2

Note: This test is designed only for those systems using the IHO.CRT file to authenticate the SA signed data server certificate in the ENC signature file.

Action

Depending on which file the system uses install the relevant IHO.CRT and/or IHO.PUB file(s).
Then attempt to load the exchange set using the permits provided.

Results

Data Server 1 *certificate must install without error or warning. The exchange set should authenticate and import without error or warning.*
Data Server 2 *is using a non SA Certificate. The certificate should install but with the appropriate SSE 26 warning displayed. The exchange set should authenticate and import without error but a further SSE 26 warning ("**SSE 26 - This ENC is not authenticated by the IHO acting as the Scheme Administrator**.") should be displayed prior to import (See Test 2.5.4a).*
DS1
ENC cell GB58932B (Edition #1, Update #0) Installed without errors or warning
ENC cell GB60242T (Edition #2, Update #0) Installed without errors or warning
ENC cell GB61011A (Edition #1, Update #1) Installed without errors or warning
DS2
ENC cell GB60242T (Edition #2, Update #0) Installed without error. "SSE 26" Warning Message
ENC cell GB61011A (Edition #1, Update #1) Installed without error. "SSE 26" Warning Message
ENC cell GB61021A (Edition #1, Update #1) Installed without error. "SSE 26" Warning Message
ENC cell GB61021B (Edition #1, Update #1) Installed without error. "SSE 26" Warning Message
ENC cell GB61032A (Edition #1, Update #2) Installed without error. "SSE 26"Warning Message

Note: When loading DS2, systems should report "already installed" messages for cells GB60242T and GB61011A as they are already installed from DS1

2.5.5 ENC Authentication

2.5.5 a) Invalid SA signature in the ENC Signature File

Test Reference	2.5.5 a)	**IHO Reference**	S-63 10.6.2
Test description			
To test how the system performs when an invalid certificate element of an ENC signature file is authenticated against the installed IHO certificate and/or public key. Confirm the correct SSE 06 message is returned by the ECDIS.			
Setup			
No pre-installed certificate, permits or ENC data. *Test data used:* *1) IHO.CRT / IHO.PUB* *2) PERMIT.TXT* *3) V01X01 (Exchange Set)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\5 Authentication_Part2\Test 5a* *The signature file associated with update GB61021A.001 contains the data servers self signed key (SSK) and not the SA signed data server certificate. GB61021A.000, GB61021B.000 and GB61021B.001 contain valid certificates.*			
Action			
Install the IHO.CRT and/or IHO.PUB, Permits and exchange set from the location above.			
Results			
The system must report the appropriate message as follows for ENC file GB61021A.001: *"**SSE 06 - The SA Signed Data Server Certificate is invalid. The SA may have issued a new public key or the ENC may originate from another service. A new SA public key can be obtained from the IHO website or from your data supplier**"* *The system should validate each certificate in turn and not halt at an error. Some systems may report an SSE 03 which is acceptable (similar validation)* *ENC cell GB61021A (Edition #1, Update #1) Update 1 is not installed (SSE 06 message)* *ENC cell GB61021B (Edition #1, Update #1) base cell and update installed without error or warning.*			

2.5.5 b) Authentication against a non SA certificate/public key

Test Reference	2.5.5 b)	**IHO Reference**	S-63 10.6.2.1
Test description			
Test that the system will authenticate against an alternative certificate/public key stored on the system which is not issued by the Scheme Administrator. *Test that the correct SSE 26 warning is displayed informing the user that the ENC data is not authenticated by the SA.*			

Setup
No pre-installed certificate/public key, permits or ENC data. *Test data used:* *1) NONSA.CRT/.PUB* *2) PERMIT.TXT* *3) V01X01 (Exchange Set - GB61021A, GB61021B, GB61032A)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\5 Authentication_Part2\Test 5b* *This test uses an installed certificate/public key file which is the same as the public key contained in the signature file of the exchange set.*
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. A warning must be displayed as follows: *"**SSE 26 – ENC is not authenticated by the IHO acting as the SA**"* *This test should not prevent the exchange set from being loaded.* - *ENC cell GB61021A (Edition #1, Update #1) Cells import without error but with a "SSE 26" Warning Message* - *ENC cell GB61021B (Edition #1, Update #1) Cells import without error but with a "SSE 26" Warning Message* - *ENC cell GB61032A (Edition #1, Update #2) Cells import without error but with a "SSE 26" Warning Message*

2.5.5 c) ENC signature validation

Test Reference	2.5.5 c)	**IHO Reference**	S-63 5.3 & 10.6.3
Test description			
Test how the system responds when validating an incorrectly signed cell file. Confirm that the correct SSE 09 message is displayed.			
Setup			
No pre-installed certificate/public key, permits or ENC data. *Test data used:* *1) IHO.CRT / IHO.PUB* *2) PERMIT.TXT* *3) V01X01 (Exchange Set)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\5 Authentication_Part2\Test 5c* *ENC Signature GBK01620.000 is in the correct format but the signature is invalid. ENC Signature GBK01640.000 is in the correct format and is valid.*			
Action			
Install the IHO.CRT and/or IHO.PUB file, PERMIT.TXT and ENC exchange set from the location described below.			

Results
*The system must display the correct SSE 09 error message for cell GB301620 as follows: "**SSE 09 – ENC Signature is invalid**."* *The system must not load this cell as its integrity may have been compromised.* *The system should validate the signature file for GB01640 and load this cell in the normal way.* *ENC cell GB301620 (Edition #3, Update #0) Not installed. Error message SSE 09*

2.5.5 d) ENC signature format validation

Test Reference	2.5.5 d)	**IHO Reference**	S-63 5.4.2.7 & 10.6.3
Test description			
Test how the system responds when validating against an incorrectly formatted ENC signature. Confirm that the correct SSE 24 message is displayed.			
Setup			
Use data installed from the previous test (2.5.5c) *Test data used:* *V01X01 (Exchange Set)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\5 Authentication_Part2\Test 5d* *GBK01620.000 has a valid ENC signature and is correctly formatted. GBK01660.000 has an invalid ENC signature format (deliberately corrupted).*			
Action			
Load the exchange set from the location above.			
Results			
*The system displays the correct SSE 24 error message for cell GB301660 as follows: "**SSE 24 – 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 GB301620 and load this cell in the normal way.* *Some systems may report an SSE 09 (ENC Signature is invalid) error this is acceptable as the expected outcome is the same, i.e. the data file is rejected.* *ENC cell GB301620 (Edition #3, Update #0) installed without error or warning* *ENC cell GB301660 (Edition #5, Update #0) is not installed. Error message SSE24*			

2.5.5 e) Check authentication is continuous and complete

Test Reference	2.5.5 e)	**IHO Reference**	S-63 5.3, 5.4.2.7 & 10.6.3
Test description			
Tests that the system authenticates all signature files individually and continuously without hanging at an error. Check that the SSE 09 and SSE 24 messages are reported correctly.			

Setup
Use data installed from the previous test (2.5.5d, with GB301620 & GB301640 already installed) *Test data used:* *1) PERMIT.TXT* *2) V01X01 (Exchange Set)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\5 Authentication_Part2\Test 5e* *GB301820.000/GBK01820.000 (invalid signature) GB301860.001/GBK01840.001 (Incorrect signature format)*
Action
Load the PERMIT.TXT 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: *"**GB301820.000 – SSE 09 – ENC Signature is invalid**."* *"**GB301860.001 – SSE 24 – ENC Signature format is incorrect**."* *The system must load all ENC data files with authenticated signatures but not those that do not.* ***Some systems may report an SSE 09 (ENC Signature is invalid) error for both GB301820.000 & GB301860.001**. This is acceptable as the expected outcome is the same, i.e. the data file is rejected.* *Note: GB301860.002 should also return a sequential update error as it was not possible to install GB301860.001.* *e.g* *ENC cell GB301620 (Edition #3, Update #0) installed without error or warning* *ENC cell GB301640 (Edition #4, Update #0) installed without error or warning* *ENC cell GB301660 (Edition #5, Update #0) installed without error or warning* *ENC cell GB301820 (Edition #3, Update #0) is not installed. Error message SSE09* *ENC cell GB301840 (Edition #8, Update #1) installed without error or warning* *ENC cell GB301860 (Edition #3, Update #2) Base cell is installed without error or warning. Update #1 is not installed. Error message SSE 24*

2.5.5 f) Single exchange set with ENC signature files signed by multiple data servers

Test Reference	2.5.5 f)	**IHO Reference**	S-63 5.3
Test description			
To test how the system performs when an exchange set contains signature files from multiple data servers. That is, signed with different data server private keys and containing different SA signed certificates.			
Setup			
No pre-installed certificates, permits or ENCs. *Test data used:* *1) IHO.CRT / IHO.PUB* *2) PERMIT.TXT* *3) V01X01 (Exchange Set)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\5 Authentication_Part2\Test 5f*			
ENC Signature File components Signed by Data Server 1 (DS1) DS1 "s SA signed certificate *GB301620.000, GB301640.000, GB301660.000, GB301820.000, GB301840.000*		***ENC Signature File components Signed by Data Server 2 (DS2) DS2 "s SA signed certificate*** *GB301840.001 GB301860.000,001 & 002 GB302020.000 & 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 GB301620 (Edition #3, Update #0) installed without error or warning* *ENC cell GB301640 (Edition #4, Update #0) installed without error or warning* *ENC cell GB301660 (Edition #5, Update #0) installed without error or warning* *ENC cell GB301820 (Edition #3, Update #0) installed without error or warning* *ENC cell GB301840 (Edition #8, Update #1) installed without error or warning* *ENC cell GB301860 (Edition #3, Update #2) installed without error or warning* *ENC cell GB302020 (Edition #4, Update #1) installed without error or warning*

2.5.6 ENC Decryption

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

Test Reference	2.5.6 a)	**IHO Reference**	S-63 10.7.1 & 10.7.1.1
Test description			
To test how the system performs when importing new ENCs where the previously installed permits have expired.			
Setup			
Only the PERMIT.TXT and IHO.CRT/IHO.PUB files installed from the location below. *Test data used:* *1) IHO.CRT / IHO.PUB* *2) PERMIT.TXT* *3) V01X01 (Exchange Set - GB61021A & GB61021B)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\6 ENC Decryption\Test 6a*			
Action			
Install the exchange set from the location above. *Note: The computer clock must be to 1st Jan 2013.*			
Results			
The system must display the SSE 15 warning when importing the exchange set as follows: *"**SSE 15 – Subscription service has expired. Please contact your data supplier to renew the subscription licence**", (list affected cells)* *The system must display the following SSE 25 warning when viewing cells with expired permits:* *"**SSE 25 – 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 2012.)* *GB61021A (edition # 1 update # 1) should be installed.* *GB61021B (edition # 1 update # 1) should be installed.*			

2.5.6 b) Permit expiry within 30 days

Test Reference	2.5.6 b)	**IHO Reference**	S-63 10.7.1.2
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.TXT and IHO.CRT/IHO.PUB installed for previous test (2.5.6a). *Test data used:* *1) IHO.CRT / IHO.PUB (already installed)* *2) PERMIT.TXT (already installed)* *3) V01X01 (Exchange Set - GB61021A & GB61021B)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\6 ENC Decryption\Test 6b*			
Action			
Set the computer clock between 1st Dec 2012 and 31st Dec 2012. *Install the exchange set from the location above.*			
Results			
The system must import the exchange set but display the appropriate SSE 20 warning message as follows (Permits in this test are set to expire on 31st Dec 2012): *"**SSE 20 – Subscription service will expire in less than 30 days. Please contact your data supplier to renew the subscription licence**."* *GB61021A (edition # 1 update # 1) should be installed (with "SSE 20").* *GB61021B (edition # 1 update # 1) should be installed (with "SSE 20").*			

2.5.6 c) Incorrect cell keys encrypted in the ENC permits

Test Reference	2.5.6 c)	**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 21 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/Public key from previous tests, 2.5.6a and 2.5.6b. *Test data used:* *1) IHO.CRT / IHO.PUB (Pre-installed)* *2) PERMIT.TXT* *3) V01X01 (Exchange Set - GB58910B, GB58910C, GB58911A, GB58911B, GB58913A, GB58932A & GB58932B)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\6 ENC Decryption\Test 6c*			
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 21 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:- **GB58911A & GB58911B**.)* *The system must not halt at an error but continue on to the next ENC.* *The system must report on successful/unsuccessful imports.* *GB58910B (edition # 1 update # 0) should be installed (without error or warning).* *GB58910C (edition # 2 update # 1) should be installed (without error or warning).* *GB58911A (edition # 1 update # 1) should not be installed (with "SSE 21").* *GB58911B (edition # 1 update # 0) should not be installed (with "SSE 21").* *GB58913A (edition # 1 update # 0) should be installed (without error or warning).* *GB58932A (edition # 1 update # 0) should be installed (without error or warning).* *GB58932B (edition # 1 update # 0) should be installed (without error or warning).*

2.5.6 d) Validate ENC data file integrity

Test Reference	2.5.6 d)	**IHO Reference**	S-63 10.7.4
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 16 error message when the calculated CRC is incorrect or does not agree with the value contained in the corresponding CATALOG.031 record. Also determine whether the system correctly reports the SSE 23 (sequential update error).			
Setup			
IHO.CRT/IHO.PUB from previous test (2.5.6c) but no pre-installed permits or ENCs. *Test data used:* *1) IHO.CRT / IHO.PUB (Pre-installed)* *2) PERMIT.TXT* *3) V01X01 (Exchange Set – GB40162A, GB40162B, GB40162C & GB40164A)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\6 ENC Decryption\Test 6d*			
Action			
Install the ENC cell permits and exchange set from the location above.			
Results			
*1) The system must validate the CRC of each cell 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 16 – ENC <Cell Name> CRC is incorrect. Contact you 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 23 – Non sequential update, previous update(s) missing try reloading from the base media. If the problem persists contact your data supplier".*** *(GB40162B.000 – CRC altered manually in CATALOG.031 file* *GB40164A.003 – ENC data intentionally corrupted.)* *GB40162A (edition # 9 update # 3) should be installed (without error or warning).* *GB40162B (edition # 2 update # 1) should not be installed (with "SSE 16"followed by "SSE 23").* *GB40162C (edition # 1 update # 1) should be installed (without error or warning).* *GB40164A (edition # 1 update # 5) should be installed with only two updates (edition # 1 update # 2) (with "SSE 16" followed by "SSE 23").*			

2.5.6 e) Missing ENC update

Test Reference	2.5.6 e)	**IHO Reference**	S-63 10.7.4
Test description			
Confirm that the system correctly identifies a missing update within a delivered exchange set and outputs the correct error message.			
Setup			
IHO.CRT/IHO.PUB from previous test (2.5.6d) but no pre-installed permits or ENCs. *Test data used:* *1) IHO.CRT / IHO.PUB (Pre-installed)* *2) PERMIT.TXT* *3) V01X01 (Exchange Set – FR5TEST2)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\6 ENC Decryption\Test 6e*			
Action			
Install the ENC cell permits and exchange set from the location above.			
Results			
The system must identify that the exchange set contains a base cell but no update even though one is specified in the PRODUCTS.TXT. Update 1 is included in the PRODUCTS.TXT but not delivered in the data. *Install the ENC cell permits and exchange set from the location above. Select cell FR5TEST2 for display. The following error message must be output :* *"**SSE 27 - ENC<cell name> is not up to date. A New Edition, Re-issue or Update for this cell is missing and therefore MUST NOT be used for Primary NAVIGATION**".*			

2.5.7 ENC Data Management

2.5.7 a) Encrypted ENCs supplied by different Data Servers

Test Reference	2.5.7 a)	**IHO Reference**	S-63 6

Test description

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

Setup

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

a) Data Server 1 (DS1)

Test data used:

1) *IHO.CRT / IHO.PUB [Pre-installed]*
2) *PERMIT.TXT*
3) *V01X01 (Exchange Set - GB281600, GB281800, GB282000 & GB283000)*

Test data location:

D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7a\DS1

b) Data Server 2 (DS2)

Test data used:

4) *IHO.CRT / IHO.PUB [Pre-installed]*
5) *PERMIT.TXT*
6) *V01X01 (Exchange Set - GB283000, GB283100, GB283200 & GB283300)*

Test data location:

D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7a\DS2

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 must authenticate against the same installed public key. 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 GB283000 common to both. DS1 has GB283000.000 – 002 and DS2 has GB283000.000 – 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):
GB281600 (edition # 1 update # 1)
GB281800 (edition # 1 update # 0)
GB282000 (edition # 1 update # 0)
GB283000 (edition # 1 update # 2)

after installation of cells from DS2 (b):
GB281600 (edition # 1 update # 1)
GB281800 (edition # 1 update # 0)
GB282000 (edition # 1 update # 0)
GB283000 (edition # 1 update # 4)
GB283100 (edition # 1 update # 3)
GB283200 (edition # 1 update # 0)
GB283300 (edition # 1 update # 0)

2.5.7 b) Loading additional ENC cell permits and cells from a different data provider

Test Reference	2.5.7 b)	**IHO Reference**	S-63 6

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 / IHO.PUB [Pre-installed]
2) PERMIT.TXT
3) V01X01 (Exchange Set - GB255000, GB270000, GB281600, GB281800, GB282000 & GB283000)
Test data location:
D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7b

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 [GB281600 & GB281800]. The expected SENC Status 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 SENC status listed below shows the expected results against 2.5.7a [DS2].
*The permit file **only** contains new permits for cells GB255000 & GB270000. The exchange set contains the new cells and the cells from the previous test, 2.5.7a [DS1] 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:
GB255000 (edition # 3 update # 3) new cell should be installed.
GB270000 (edition # 1 update # 1) new cell should be installed.
GB281600 (edition # 1 update # 2) updated.
GB281800 (edition # 1 update # 1) updated.
GB282000 (edition # 1 update # 0)
GB283000 (edition # 1 update # 4)

installation of cells from DS2 unchanged from 2.5.7a:
GB281600 (edition # 1 update # 2)
GB281800 (edition # 1 update # 1)
GB282000 (edition # 1 update # 0)
GB283000 (edition # 1 update # 4)
GB283100 (edition # 1 update # 3)
GB283200 (edition # 1 update # 0)
GB283300 (edition # 1 update # 0)

2.5.7 c) Test that the system operates correctly in a multiple data provider environment

Test Reference	2.5.7 c)	**IHO Reference**	S-63 6

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 certificate/public key 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 / IHO.PUB [Pre-installed] PERMIT.TXT

V01X01 (Exchange Set - GB281600, GB281800, GB282000 & GB283000)

Test data location:

D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7c\DS1

b) Data Server 2 (DS2)

Test data used:

IHO.CRT / IHO.PUB [Pre-installed] PERMIT.TXT

V01X01 (Exchange Set - GB281600, GB281800, GB282000, GB283000, GB283100 & GB283200)

Test data location:

D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7c\DS2

Action

1) *Install the ENC permit file from location (a) above.*
2) *Load the ENC Exchange Set (V01X01) from (a).*
3) *Load the ENC Exchange Set (V01X01) from (b).*
4) *Install the ENC permit file from location (b)*
5) *Load the ENC Exchange Set (V01X01) from (b). This exchange set contains new base cells 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. *ENC permits at (a) shall install without error or warning.*
2. *ENC Exchange Set (V01X01) at (a) shall load without error or warning.*
3. *ENC Exchange Set (V01X01) at (b) must **not** load as there are no valid permits for data server 2 [DS2] installed in the ECDIS. A SSE 10 warning must be displayed stating "**SSE 10 – Permits not available for this data provider**".*
4. *ENC permits at (b) shall install without error or warning.*
5. *ENC Exchange Set (V01X01) 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 SENC must be the same as that described below

The system should be up to date as follows:
after installation of cells from DS1:
GB281600 (edition # 1 update # 1)
GB281800 (edition # 1 update # 0)
GB282000 (edition # 1 update # 0)
GB283000 (edition # 1 update # 2)

After installation of cells from DS2:
GB281600 (edition # 1 update # 2)
GB281800 (edition # 1 update # 1)
GB282000 (edition # 1 update # 0)
GB283000 (edition # 1 update # 4)
GB283100 (edition # 1 update # 3)
GB283200 (edition # 1 update # 0)

2.5.7 d) ECDIS management of cancelled cells

Test Reference	2.5.7 d)	**IHO Reference**	S-63 6.4.1.1 & 6.4.1.2
Test description			
To test how the system responds when a cell is cancelled in an S-63 encrypted ENC service. Confirm that the system operates correctly as defined in the S-63 standard.			
Setup			
IHO certificate/public key installed from previous test 2.5.7c. No pre-installed permits or ENCs. *Test data used:* *1) IHO.CRT / IHO.PUB [Pre-installed]* *2) PERMIT.TXT* *3) V01X01 (2 Exchange Sets - GB251200/GB255000/GB280200/GB301620)* *Test data location:* *a) D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7d* *b) D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7d\Base* *c) D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7d\Update*			
Action			
Install the ENC permits at location (a) above. Load the base exchange set at (b) and then update using the exchange set at (c). *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 GB280200 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]:* *GB251200 (edition # 1 update # 4)* *GB255000 (edition # 2 update # 2)* *GB280200 (edition # 2 update # 0)* *GB301620 (edition # 2 update # 1)* *After installation of cells from 2.5.7d [Update]:* *GB251200 (edition # 1 update # 8)* *GB255000 (edition # 3 update # 0)* *GB280200 cancelled cell (GB280200) should be reported by the system and either removed from the SENC or displayed with the appropriate warning.* *GB301620 (edition # 2 update # 4)*			

2.5.7 e) ECDIS Display of Replacement ENC Cells

Test Reference	2.5.7 e)	**IHO Reference**	S-63 6.2.3.3

Test description

To test how the system responds when a cell is cancelled and replaced in an S-63 encrypted ENC service. Confirm that the system operates correctly as defined in the S-63 standard.

GB380620 is cancelled and replaced by GB383710 & GB383720
GB380720 is cancelled and replaced by GB389320

Setup

Status as per successful completion of test 2.5.7 d)
Test data used:
1) IHO.CRT / IHO.PUB [Pre-installed]
2) PERMIT.TXT
3) V01X01 (2 Exchange Sets - GB380620, GB380720, GB40162A, GB40162B & GB40182A)
Test data location:
a) D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7e
b) D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7e\Base
c) D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7e\Update

Action

Install the ENC permits at location (a). Load the base exchange set at (b) and then update using the exchange set at (c).
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). If any replacement cells have been encoded in the PRODUCTS.TXT file then this must be presented to the user as defined in S-63 and as follows:
"Cell <name> has been cancelled and has been replaced by cell(s), <name1>; <name2>. Please contact your data supplier to obtain the additional ENC permits".

Test	Cell Name	Exchange Set Content		Expected SENC Content		Notes
		Edition N°	Update N°	Edition N°	Update N°	
2.5.7e [Base]	GB380620	2	0	2	0	All ENC cells installed without error or warning
	GB380720	2	0	2	0	
	GB40162A	8	3	8	3	
	GB40162B	1	1	1	1	
	GB40182A	1	4	1	4	
2.5.7e [Update]	GB251200	1	8	1	8	Cells from the previous test 2.5.7d (same status)
	GB255000	3	0	3	0	
	GB280200	2	1	2	1	
	GB301620	2	4	2	4	
	GB380620	2	1	cancelled		Messages should be displayed as for 2.5.7d plus message relating to replaced cells: GB380620 is cancelled and replaced by GB383710 & GB383720 GB380720 is cancelled and replaced by GB389320
	GB380720	2	1	cancelled		
	GB40162A	9	0	9	0	
	GB40162B	2	1	2	1	
	GB40182A	1	5	1	5	

2.5.7 f) ECDIS management of ENC re-issued cells

Test Reference	2.5.7 f)	IHO Reference	S-63 6.2.3
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 2.5.7e. *No pre-installed permits or ENCs.* *Test data used:* *1) IHO.CRT / IHO.PUB [Pre-installed]* *2) PERMIT.TXT* *3) Base [Exchange Set – GB303040]* *4) Update [Exchange Set – GB303040 & GB50162D]* *Test data location:* *a) D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7f* *b) D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7f\Base* *c) D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7f\Update*			
Action			
Install the ENC permits at location (a) above. Load the base exchange set at (b) and then update using the exchange set at (c).			
Results			
The system must load the base exchange set and then the re-issued cells (GB303040 & GB50162D) 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 GB303040 [Ed 11 Up10] and GB50162D [Ed 6 Up 6]. *GB50162D is a straight re-issue with no previous history, i.e. new cell. GB303040 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 SENC Content		Comments
		Edition N°	Update N°	Edition N°	Update N°	
2.5.7f [Base]	GB303040	11	9	11	9	Edition 11 of GB303040 installed with updates 1-9
2.5.7f [Update]	GB303040	11	10	11	10	GB50162D is a straight re-issue with no previous history, i.e. new cell. GB303040 is a re-issued cell with history, i.e. base cell already installed in the ECDIS.
	GB50162D	6	6	6	6	

2.5.7 g) ECDIS management of Base and Update Exchange Sets

Test Reference	2.5.7 g)	IHO Reference	S-63 6.5.1
Test description			
To confirm the user is informed when there is incompatibility between installed ENCs and the applied update exchange set.			

Setup

No permits or ENCs installed
Test data used:
1) IHO.CRT / IHO.PUB [Pre-installed from previous tests]
2) PERMIT.TXT
3) BASE 1 WK23_07, BASE 2 WK30_06 & BASE 3 WK27_07
4) UPDATE WK37_07
Test data location:
D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management\Test 7g

Action

Install permits and load the Update and Base media at the location above.

Results

The ENC bases should load without error. However when the update media set is loaded the system should install the band 3 (Coastal) and band 5 (Harbour) ENC updates without error but the system must return the following warning: ***This Update Media' is not compatible with the actual installed 'Base Media'. Please install the following 'Base Media' first and then continue with the 'Update Media' 'BASE CD 2 dated 21 June 2007'***

Note: Systems must appropriately manage the import of base data from different Data Servers and store information of installed base data. When loading new update media (either CD, DVD, etc) Data Clients should check that latest base media listed in the STATUS.LST is concurrent with those installed on the system. Users should only be prompted to install compatible base media that contains licenced ENC cells.

[The system will also display continuity errors as a result of non sequential loading when attempting to load and install the updates for GB40162A, GB40184A, GB40186D & GBGB40202A.]

Base media 2 used in this test is dated 20 July 2006 and pre dates the latest Base media 2.

Test	Cell Name	Exchange Set Content		Expected SENC Content		Comments
		Edition N°	Update N°	Edition N°	Update N°	
2.5.7g [BASE 1 WK23_07]	GB302840	22	16	22	16	
	GB303220	4	6	4	6	
	GB303420	3	9	3	9	
	GB303460	11	0	11	0	
2.5.7g [BASE 2 WK30_06]	GB40162A	9	0	9	0	Cells installed for this base but with the incompatibility warning
	GB40184A	2	3	2	3	
	GB40186D	1	1	1	1	
	GB40202A	4	0	4	0	
2.5.7g [BASE 3 WK27_07]	GB50162B	10	7	10	7	
	GB50162C	9	5	9	5	
	GB50162D	5	2	5	2	
	GB50182A	2	1	2	1	
2.5.7g [UPDATE WK37_07]	GB302840	23	4	23	4	NE installed from WK37/07 Update
	GB303220	4	7	4	7	
	GB303420	3	12	3	12	
	GB303460	11	1	11	1	
	GB40162A	9	5	9	0	Cells not updated due to incompatible BASE 2
	GB40184A	3	5	2	3	
	GB40186D	1	7	1	1	Cell not updated due to non-sequential update
	GB40202A	5	2	4	0	Cell not updated due to incompatible BASE 2
	GB50162B	11	0	11	0	NE installed from WK37/07 Update

	GB50162C					No updates for this cell
	GB50162D					No updates for this cell
	GB50182A	2	2	2	2	

2.5.7 h) ENC Update Status Report

Test Reference	2.5.7 h)	**IHO Reference**	S-63 Annex C
Test description			
Confirm that the ECDIS is capable of executing the ENC Update status report as documented in S-63 edition 1.2.0 Annex C.			
Setup			
Pre-installed permits and data from previous test (2.5.7f). IHO certificate from previous tests. ***Set system time to 10th February 2009*** *Test data used:* *1) IHO.CRT / IHO.PUB [Pre-installed]* *2) PERMIT.TXT* *3) Base [Exchange Set – GB303040]* *4) Update [Exchange Set – GB303040 & GB50162D]* *Test data location:* *D:\IHO S-64 [S-64 V 1.2.1]\7 ENC Data Management\Test 7f* *D:\IHO S-64 [S-64 V 1.2.1]\7 ENC Data Management\Test 7f\Base* *D:\IHO S-64 [S-64 V 1.2.1]\7 ENC Data Management\Test 7f\Update*			
Action			
Ensure ECDIS has S-63 data installed as per test (2.5.7f). Locate and execute the ENC Update Status Report and inspect output. If ECDIS also supports route filtering of the ENC Status Report then construct a route intersecting with the cells loaded and run the ENC Status Report with the route filtered option.			
Results			
The ECDIS should report the status of all ENCs loaded in accordance with S-63. It should use the issue date of the exchange set as the reference date and should display its reference date as 9th February *2009 (the SERIAL .ENC date of the last update loaded). The cells should show in the report as "up to date". Then reset the system time to a* 1st April 2009 *–rerun the report, all the cells should show as "not up to date".*			

2.5.7 i) ECDIS management of multiple exchange sets

Test Reference	2.5.7 i)	**IHO Reference**	S-63 6.5.1 & Sect 5 Appendix 2
Test description			
ONLY FOR SYSTEMS THAT USE THE LATEST UPDATE EXCHANGE SET TO MANAGE THE IMPORT OF ENCs ACROSS MULTIPLE BASES *This optional test checks a system's ability to use the PERMIT.TXT;PRODUCTS.TXT & STATUS.LST file to manage the efficient loading of ENCs. Confirm the system provides intuitive prompts to the user when installing the ENC update and base media.*			
Setup			
No ENC permits or ENC cells installed. *Test data used:* *1) IHO.CRT / IHO.PUB [Pre-installed from test 2.5.7g]* *2) PERMIT.TXT* *3) Update Exchange Set (UPDATE WK19_07)* *4) Base Exchange sets (BASE 1 WK28_06, BASE 2 WK30_06 & BASE 3 WK32_06)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management [Optional]\Test 7i]]*			

Action

Install the permits at the location above then load the "UPDATE WK19_07" exchange set.
Load the base exchange sets as prompted by the system. For this test this should be the following:
Base 1 dated 06 July 2006
Base 3 dated 03 August 2006
Finally re-install the UPDATE WK19_07 and bring the system fully up to date.

Results

The system should read the permit file and the full products listing from the WK19/07 Update. The system should read the product listing to determine where all licensed ENC base [EN] cells are located, then using the STATUS.LST file to prompt users to install the appropriate BASE media. The system should then prompt the user to load the appropriate base media in order. For example,
"Please load BASE media 1 dated 06 July 2006". "Please load BASE media 3 dated 03 August 2006".
When all licensed cells have been loaded from the bases the system should display a message similar to the following example:
"Please load WK19/07 Update to bring all licensed cells up to date".
Finally the system may display a message similar to the following example:
"All licensed cells are installed and up to date to WK19/07".
The system status should be the same as that described in the table below.

The permit file for this test only contains permits for Bases 1 and 3. Base 2 has no valid permits and should not be prompted for by the system.

Test	Cell Name	Exchange Set Content		Expected SENC Content		Comments
		Edition N°	Update N°	Edition N°	Update N°	
7i [BASE 1 WK28_06]	GB302840	22	0	22	0	
	GB303220	4	1	4	1	
	GB303420	3	4	3	4	
	GB303460	10	3	10	3	
7i [BASE 2 WK30_06]	GB40162A	9	0			No ENC permits
	GB40184A	2	3			
	GB40186D	1	1			
	GB40202A	4	0			
7i [BASE 3 WK32_06]	GB50162B	10	3			
	GB50162C	9	1			
	GB50162D	5	1			
	GB50182A	1	5	1	5	
7i[UPDATE WK19_07]	GB302840	22	16	22	16	
	GB303220	4	6	4	6	
	GB303420	3	9	3	9	
	GB303460	11	0	11	0	NE installed from WK19/07 Update
	GB40162A	9	3			No ENC permits
	GB40184A	3	3			
	GB40186D	1	6			
	GB40202A	5	1			
	GB50162B	10	7			
	GB50162C	9	5			
	GB50162D	5	2			
	GB50182A	2	1	2	1	NE installed from WK19/07 Update

2.5.7 j) ECDIS management of multiple exchange sets and multiple purchases

Test Reference	2.5.7 j)	IHO Reference	S-63 6.5.1 & Sect 5 Appendix 2

Test description

ONLY FOR SYSTEMS THAT USE THE LATEST UPDATE EXCHANGE SET TO MANAGE THE IMPORT OF ENCs ACROSS MULTIPLE BASES

This optional test is similar to Test 2.5.7i but covers the scenario where the user purchases additional ENC cells.

Setup

No ENC permits or ENC cells installed.
Test data used:
Purchase 1
1) IHO.CRT / IHO.PUB [Pre-installed]
2) PERMIT.TXT
3) UPDATE WK19_07
4) Base Exchange set 1
Purchase 2
1) IHO.CRT [Pre-installed]
2) PERMIT.TXT
3) UPDATE WK37_07
4) Base Exchange sets (2 & 3)

Test data location:
a) D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management [Optional]\Test 7j\Purchase 1
b) D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management [Optional]\Test 7j\Purchase 2

Results

In each instance the system should respond similar to the previous test (2.5.7i) and prompt the user to load the appropriate media and install the following ENC cells.
Purchase 1 – The system will prompt for BASE 1 WK28_06 and install four cells [GB302840, GB303220, GB303420 and GB303460].
Purchase 2 – (BASE1 has no new cells, new editions or updates. If the system maintains an up to date product listing the user should not be prompted to install this base). The system will prompt for BASE 2 WK25_07 [GB40162A & GB40184A] and finally BASE 3 WK27_07 [GB50162D].

The results should be as specified in the table below. See additional comments in table below.
Purchase 2, BASE 1 has no new cells, new editions or updates. If the system maintains an up to date product listing the user should not be prompted to install this base.

Test	Cell Name	Exchange Set Content		Expected SENC Content		Comments
		Edition N°	Update N°	Edition N°	Update N°	
7j – Purchase 1 [BASE 1 WK28_06]	GB302840	22	0	22	0	
	GB303220	4	1	4	1	
	GB303420	3	4	3	4	
	GB303460	10	3	10	3	
7j – Purchase 1 [BASE 2 WK30_06]	GB40162A	9	0			*No ENC permits*
	GB40184A	2	3			
	GB40186D	1	1			
	GB40202A	4	0			
7j – Purchase 1 [BASE 3 WK32_06]	GB50162B	10	3			*No ENC permits*
	GB50162C	9	1			
	GB50162D	5	1			
	GB50182A	1	5	1	5	

7j – Purchase 1 [UPDATE WK19_07]	GB302840	22	16	22	16	
	GB303220	4	6	4	6	
	GB303420	3	9	3	9	
	GB303460	11	0	11	0	*NE installed from WK19/07 Update*
	GB40162A	9	3			*No ENC permits*
	GB40184A	3	3			
	GB40186D	1	6			
	GB40202A	5	1			
	GB50162B	10	7			
	GB50162C	9	5			
	GB50162D	5	2			
	GB50182A	2	1	2	1	*NE installed from WK19/07 Update*
7j – Purchase 2 [BASE 1 WK23_07]	GB302840	22	16	22	16	*There are no new cells, new editions or update*
	GB303220	4	6	4	6	
	GB303420	3	9	3	9	
	GB303460	11	0	11	0	
7j – Purchase 2 [BASE 2 WK25_07]	GB40162A	9	3	9	3	*New permit*
	GB40184A	3	3	3	3	*No ENC permits*
	GB40186D	1	6			
	GB40202A	5	1			
7j – Purchase 2 [BASE 3 WK27_07]	GB50162B	10	7			
	GB50162C	9	5			
	GB50162D	5	2	5	2	*New permit*
7j – Purchase 2 [UPDATE WK37_07]	GB302840	23	4	23	4	
	GB303220	4	7	4	7	
	GB303420	3	12	3	12	
	GB303460	11	1	11	1	
	GB40162A	9	5	9	5	
	GB40184A	3	5	3	5	
	GB40186D	1	7			*No ENC permits*
	GB40202A	5	2			
	GB50162B	11	0			
	GB50162C					*No ENC permits and No updates for this cell*
	GB50162D					*No updates for this cell*
	GB50182A	2	2	2	2	

2.5.7 k) ECDIS management of multiple exchange sets

Test Reference	2.5.7 k)	IHO Reference	S-63 6.5.1 & Sect 5 Appendix 2

Test description

ONLY FOR SYSTEMS THAT USE THE LATEST UPDATE EXCHANGE SET TO MANAGE THE IMPORT OF ENCs ACROSS MULTIPLE BASES

Confirm the system displays a relevant warning when installing a base media that is newer than the latest installed update exchange set.

Setup

No ENC permits or ENC cells installed.
Test data used:
1) IHO.CRT / IHO.PUB [Pre-installed]
2) PERMIT.TXT
3) WK19_07 Update Exchange Set
4) Base Exchange sets (Bases 1-3)

Test data location:
D:\IHO S-64 [S-63 TDS v1.2.1]\7 ENC Data Management [Optional]\Test 7k

Action

Install the permits at the location above then load the "UPDATE WK19_07" exchange set.
Load the base exchange sets as prompted by the system, i.e.:
BASE Media 1 dated 06 July 2006
BASE Media 2 dated 20 July 2006
BASE Media 3 dated 03 August 2006 [Not available]
Attempt to load BASE 3 WK24_07 instead of the recommended BASE 3 (unavailable) above.
Install WK19/07 Update to bring all ENC up to date.

Results

The system should read the permit file and the full products listing from the WK19/07 Update. The system should read the product listing to determine where all licenced ENC base [EN] cells are located, then using the STATUS.LST file prompt users to install the appropriate BASE media similar to test 7h. For example, The system should report a warning message when attempting to load BASE 3 WK27_07 similar to the following example: "This base media is not compatible with the currently installed Update media. Please install "Base media 3 dated 03 August 2006".
The system can load all ENCs (base and updates) from Base 3 but when finally installing the WK19/07 update it would be useful if a message is displayed informing the user of the following: "A newer update is available not all ENCs may be up to date"

The Base 3 exchange set used in this test is dated 21 July 2007 which is newer than the latest available update exchange set.

Test	Cell Name	Exchange Set Content		Expected SENC Content		Comments
		Edition N°	Update N°	Edition N°	Update N°	
7k [BASE 1 WK28_06]	GB302840	22	0	22	0	
	GB303220	4	1	4	1	
	GB303420	3	4	3	4	
	GB303460	10	3	10	3	
7k [BASE 2 WK30_06]	GB40162A	9	0	9	0	
	GB40184A	2	3	2	3	
	GB40186D	1	1	1	1	
	GB40202A	4	0	4	0	
7k [BASE 3 WK24_07]	GB50162B	11	0	11	0	*BASE 3 is newer than the installed WK19/07 Update.*
	GB50162C	9	5	9	5	
	GB50162D	5	2	5	2	
	GB50182A	1	5	1	5	

7k [UPDATE WK19_07]	GB302840	22	16	22	16	
	GB303220	4	6	4	6	
	GB303420	3	9	3	9	
	GB303460	11	0	11	0	
	GB40162A	9	3	9	3	
	GB40184A	3	3	3	3	
	GB40186D	1	6	1	6	
	GB40202A	5	1	5	1	
	GB50162B	10	7	11	0	
	GB50162C	9	5	9	5	These ENC Cells are installed from WK24/07 Base 3
	GB50162D	5	2	5	2	
	GB50182A	2	1	2	2	

2.5.8 Data Exchange Media

2.5.8 a) Exchange Set and Media Delivery

Test Reference	2.5.8 a)	**IHO Reference**	S-63 7 & S-63 Appendix 2
Test description			
To check that the system can import a single exchange from a CD-ROM or from any other interface or data storage media that may be supplied to the ECDIS for that purpose.			
Setup			
Certificate/Public Key as installed for test 2.5.7a. No pre-installed permits or ENCs. *Test data used:* *1) IHO.CRT / IHO.PUB [Pre-installed]* *2) PERMIT.TXT* *3) V01X01 (Exchange Set - GB301620, GB301640 and GB301660)* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\8 Data Exchange Media\Test 8a*			
Action			
1. Install the permits and certificate/public key stored in the location above. *2. Copy the exchange set [formatted as described in section 7 of the standard] from the same location to the following media:* *a) Hard Drive (for example C:\)* *b) CD-ROM* *c) DVD* *d) USB Memory Stick* *e) Other [for example Bluetooth or other remote means]* 3. *Load the exchange set into the system using those options available to the ECDIS.*			
Results			
All ENCs install correctly without error regardless of media or method. *After installation without errors or warnings the system should be up to date as follows:* *GB301620 (edition # 3 update # 0)* *GB301640 (edition # 4 update # 0)* *GB301660 (edition # 5 update # 0)*			

2.5.8 b) Single Media containing Multiple Exchange Sets

Test Reference	2.5.8 b)	**IHO Reference**	S-63 7 & S-63 Appendix 2
Test description			
To check that the system can import a multiple exchange sets from the media defined in test 2.5.8a. Confirm that the system imports all test exchange sets without error or omission.			
Setup			
Certificate/Public Key as installed for test 2.5.8a. No pre-installed permits or ENCs. *Test data used:* *1) IHO.CRT / IHO.PUB [Pre-installed]* *2) PERMIT.TXT* *3) M01X01 - Media Exchange Set containing the following:* *Base Exchange Set 1 [B1]: GB100001, GB100002 & GB100004* *Base Exchange Set 2 [B2]: GB281600, GB281800, GB282000 & GB283000* *Base Exchange Set 3 [B3]: GB301620, GB301640 & GB301660* *Test data location:* *D:\IHO S-64 [S-63 TDS v1.2.1]\8 Data Exchange Media\Test 8b*			
Action			
Install permits and load all exchange sets contained on the media. Uninstall and repeat for all media types.			

Results
All three exchange sets and their associated ENC cells shall be loaded into the ECDIS without error or omission. *The system should be up to date as follows:* *After installation of 8b [B1]:* *GB100001 (edition # 3 update # 6)* *GB100002 (edition # 13 update # 5)* *GB100004 (edition # 7 update # 1)* *After installation of 8b [B2]:* *GB281600 (edition # 1 update # 1)* *GB281800 (edition # 1 update # 0)* *GB282000 (edition # 1 update # 0)* *GB283000 (edition # 1 update # 4)* *After installation of 8b [B3]:* *GB301620 (edition # 3 update # 0)* *GB301640 (edition # 4 update # 0)* *GB301660 (edition # 5 update # 0)*

2.5.8 c) Multiple exchange sets across multiple media sets

Test Reference	2.5.8 c)	**IHO Reference**	S-63 7 & S-63 Appendix 2

Test description
To test how the system manages multiple exchanges sets across several media sets. Confirm that the system is intuitive and guides the user through the cell loading process as defined in S-63.
Setup
Certificate/Public Key as installed for test 2.5.8b. No pre-installed permits or ENCs. *Test data used:* *1) IHO.CRT / IHO.PUB [Pre-installed]* *2) PERMIT.TXT (Valid cell permits for GB100001, GB100002, GB100004, GB281600, GB281800, GB301660, GB40162A & GB61021B)* *3) M01X01 – Update Media set containing various NE & updates for cells below.* *4) M01X02 – Base Media Sets containing the following:* *Base Exchange Set 1 [B1]: GB100001, GB100002 & GB100004* *Base Exchange Set 2 [B2]: GB281600, GB281800, GB282000 & GB283000* *Base Exchange Set 3 [B3]: GB301620, GB301640 & GB301660* *M02X02 - Media Exchange Set containing the following:* *Base Exchange Set 1 [B4]: GB40162A, GB40162B & GB40162C* *Base Exchange Set 1 [B5]: GB58911B, GB58913A, GB58932A & GB58932B* *Base Exchange Set 1 [B6]: GB61011A, GB61021A, GB61021B & GB61032A* *Test data location:* *a) D:\IHO S-64 [S-63 TDS v1.2.1]\8 Data Exchange Media\Test 8c* *b) D:\IHO S-64 [S-63 TDS v1.2.1]\8 Data Exchange Media\Test 8c\UPDATE MEDIA* *c) D:\IHO S-64 [S-63 TDS v1.2.1]\8 Data Exchange Media\Test 8c\BASE MEDIA*
Action
Install permits from the location at (a) above and then insert the update media set at (b). The system should then guide the user through the rest of the ENC installation process. The base media is held in (c).

Results
The system shall read the MEDIA.TXT file on the update media and prompt the user to install the appropriate media based on installed valid permits. All licenced ENCs and updates shall be installed (see the expected system status below). *(BASE MEDIA 1 was re-issued in WK 40/07 (20071004) containing a re-issue of "Base Exchange Set 1"). Licenced permits are only a subset of ENC cells contained within the base exchange sets across both media.* *The system should be up to date as follows:* *After installation of 8c [B1]:* *GB100001 (edition # 3 update # 6)* *GB100002 (edition # 13 update # 5)* *GB100004 (edition # 7 update # 1)* *After installation of 8c [B2]:* *GB281600 (edition # 1 update # 1)* *GB281800 (edition # 1 update # 0)* *GB282000 (no permit).* *GB283000 (no permit)* *After installation of 8c [B3]:* *GB301620 (no permit)* *GB301640 (no permit)* *GB301660 (edition # 5 update 0)* *After installation of 8c [B4]:* *GB40162A (edition # 9 update # 3)* *GB40162B (no permit)* *GB40162C (no permit)* *After installation of 8c [B5]:* *GB58911B (no permit)* *GB58913A (no permit)* *GB58932A (no permit)* *GB58932B (no permit)* *After installation of 8c [B6]:* *GB61011A (no permit)* *GB61021A (no permit)* *GB61021B (edition # 1 update # 1)* *GB61032A (no permit)* *After installation of 8c [U1]:* *GB100001 (edition # 3 update # 7)* *GB100002 (edition # 13 update # 7)* *GB100004 (edition # 8 update # 0). New edition is installed from update media.* *GB281600 (edition # 1 update # 2)* *GB281800 (edition # 1 update # 1)* *GB301660 (edition # 5 update # 1)* *GB40162A (edition # 9 update # 5)* *GB61021B (edition # 1 update # 2)*

2.5.8 d) Media validation of encrypted ENC service status

Test Reference	2.5.8 d)	**IHO Reference**	S-63 7 & S-63 Appendix 2

Test description

To confirm that the system performs a check of the update media to establish whether the system has the latest base data installed. Check that the system displays an appropriate warning when identifying a base exchange set that is newer than the installed version.

Setup

All data installed from the previous test (2.5.8c).
Test data used:
M01X01 (WK48/07 Update Media) & M01X02 (new WK40/07 Base Media)
Test data location:
D:\IHO S-64 [S-63 TDS v1.2.1]\8 Data Exchange Media\Test 8d

Action

1) Load the UPDATE media from the location above.
2) When the warning message is displayed proceed to install available updates.
3) Load the correct BASE media as prompted by the ECDIS at the same location.
4) Load the UPDATE media again to bring all licenced cells up to date.

Results

1) *The system must return a warning stating that that one of the base exchange sets has been re-issued as follows:*
   This 'Update Media' is not compatible with the actual installed 'Base Media'. Please install the following 'Base Media' first and then continue with the 'Update Media'
2) ***BASE MEDIA 1 – Week 40/07 – dated 04 October 2007*** *When continuing the following errors must be reported:*
   Updates '9' cannot be installed for cell ***GB100002*** *(sequential error reported) [Edition 13, Updates 1 to 8 issued on the new B1].*
   Update '2-10' cannot be installed for cell ***GB100004*** *(sequential error reported) [Edition 8, Update 1-7 issued on the new B1].*
   GB40162A.006 *must update without error.*
3) *Additional updates load from 'Base Exchange Set 1'*
4) *All licenced ENC cells are updated without errors as described in the expected SENC status below.*

The system should be up to date as follows:

After installation of 8d [U1] initial load:
GB100002 (edition # 13 update # 7). Data set (edition # 13 update # 9).
GB100004 (edition # 8 update # 0). Data set (edition # 8 update # 10).
GB40162A (edition # 9 update # 6)

After installation of 8d [New Media 1of2 – New B1 Exchange Set]:
GB100001 (edition # 3 update # 7)
GB100002 (edition # 13 update # 8)
GB100004 (edition # 8 update # 7)

After installation of 8d [B2]:
GB281600 (edition # 1 update # 2)
GB281800 (edition # 1 update # 1)
GB282000 (no permit).
GB283000 (no permit)

After installation of 8d [B3]:
GB301620 (no permit)
GB301640 (no permit)
GB301660 (edition # 5 update # 1)

After installation of 8d [U1] final update:
GB100001 (edition # 3 update # 7)
GB100002 (edition # 13 update # 9)
GB100004 (edition # 8 update # 10)
GB281600 (edition # 1 update # 2)
GB281800 (edition # 1 update # 1)
GB301660 (edition # 5 update # 1)
GB40162A (edition # 9 update # 6)
GB61021B (edition # 1 update # 2)

3 Chart Display

3.1 Display of ENC data

3.1.1 Display Base category

Test Reference	3.1.1	IHO Reference	S-52 14.3

Test description

The purpose of the test is to verify by observation that ECDIS correctly displays all ENC objects included in the IMO Display Base category. The test is performed by loading to ECDIS test S-57 cell and checking display against graphical plots. The test ENC cell AA5DDBASE.000 contains all ENC objects belonging to Display Base according to the IHO S-52 Presentation Library.

Setup

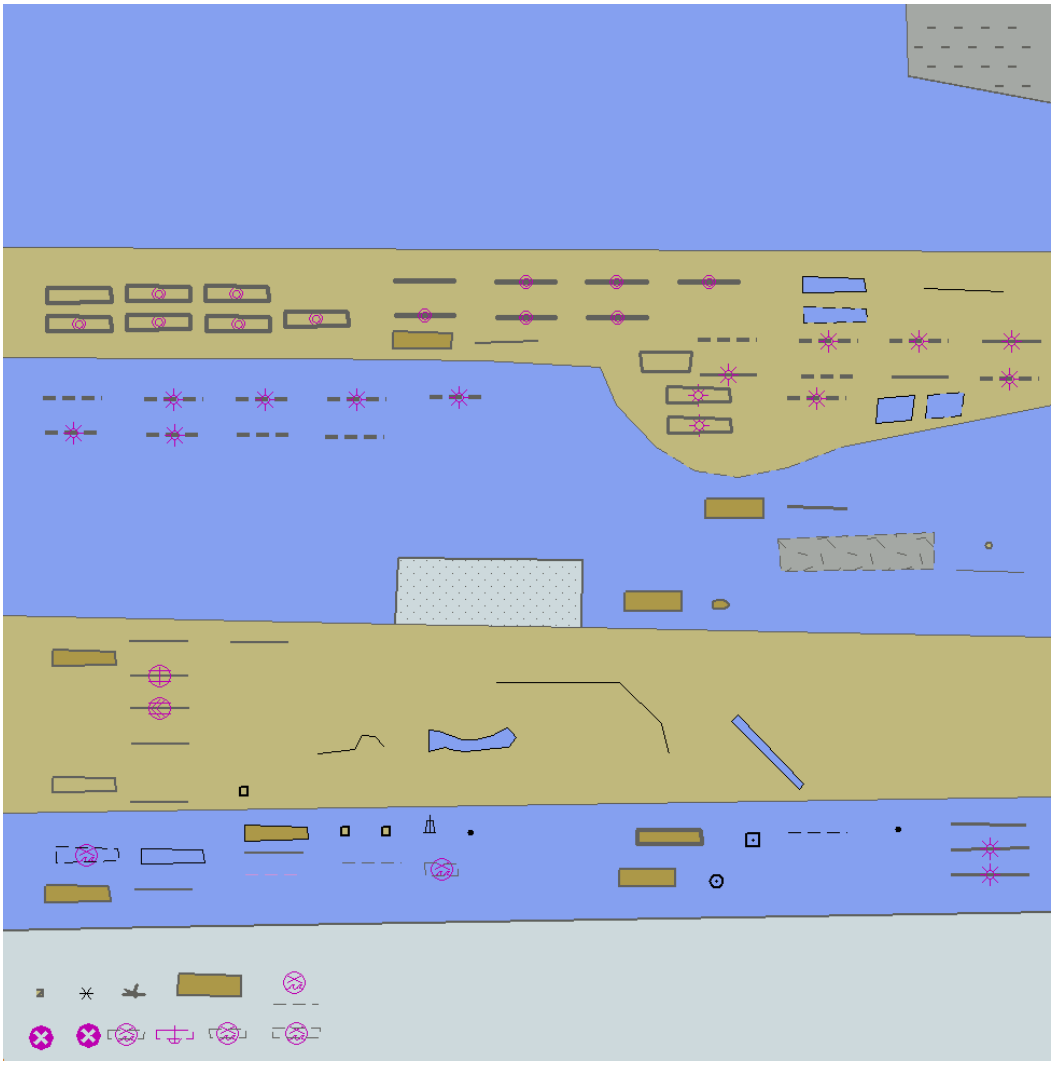
Load cell AA5DBASE.000 from 3.1 ENC Display\Base\ENC_ROOT with the following settings:
Select Display Category Base
Set the Safety Contour value to 10 m
Set the Safety Depth value to 10 m
Select Symbolized Boundaries

Action

Check ENC 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	3.1.2	IHO Reference	S-52 14.3

Test description

The purpose of the test is to verify by observation that ECDIS correctly displays all ENC objects included in the IMO Standard Display category. The test is performed by loading to ECDIS test S-57 cell and checking display against graphical plots.
The test ENC cell AA5STNDR.000 contains depth and land areas from Display Base plus all ENC objects belonging to Standard Display according to the IHO S-52 Presentation Library. The objects belonging to Standard Display are to be shown if Standard Display is selected in ECDIS HMI and should be disappearing in the Display Base mode.

Setup

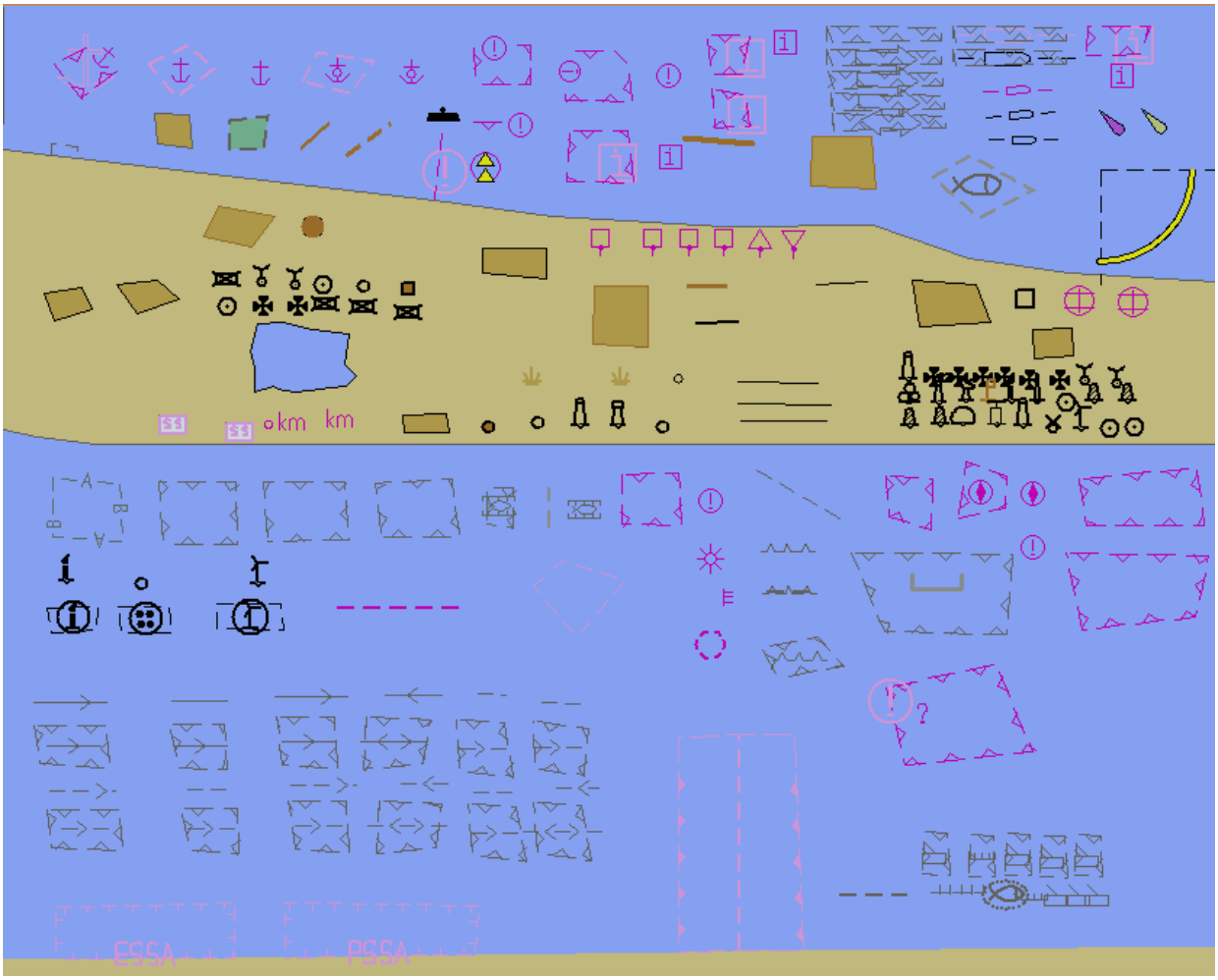
Load cell AA5STNDR.000 from 3.1 ENC Display\Standard\ENC_ROOT with the following settings:
Select Display Category Standard Display
Set the Safety Contour value to 10 m
Set the Safety Depth value to 10 m
Select Symbolized Boundaries
Select Simplified Points

Action

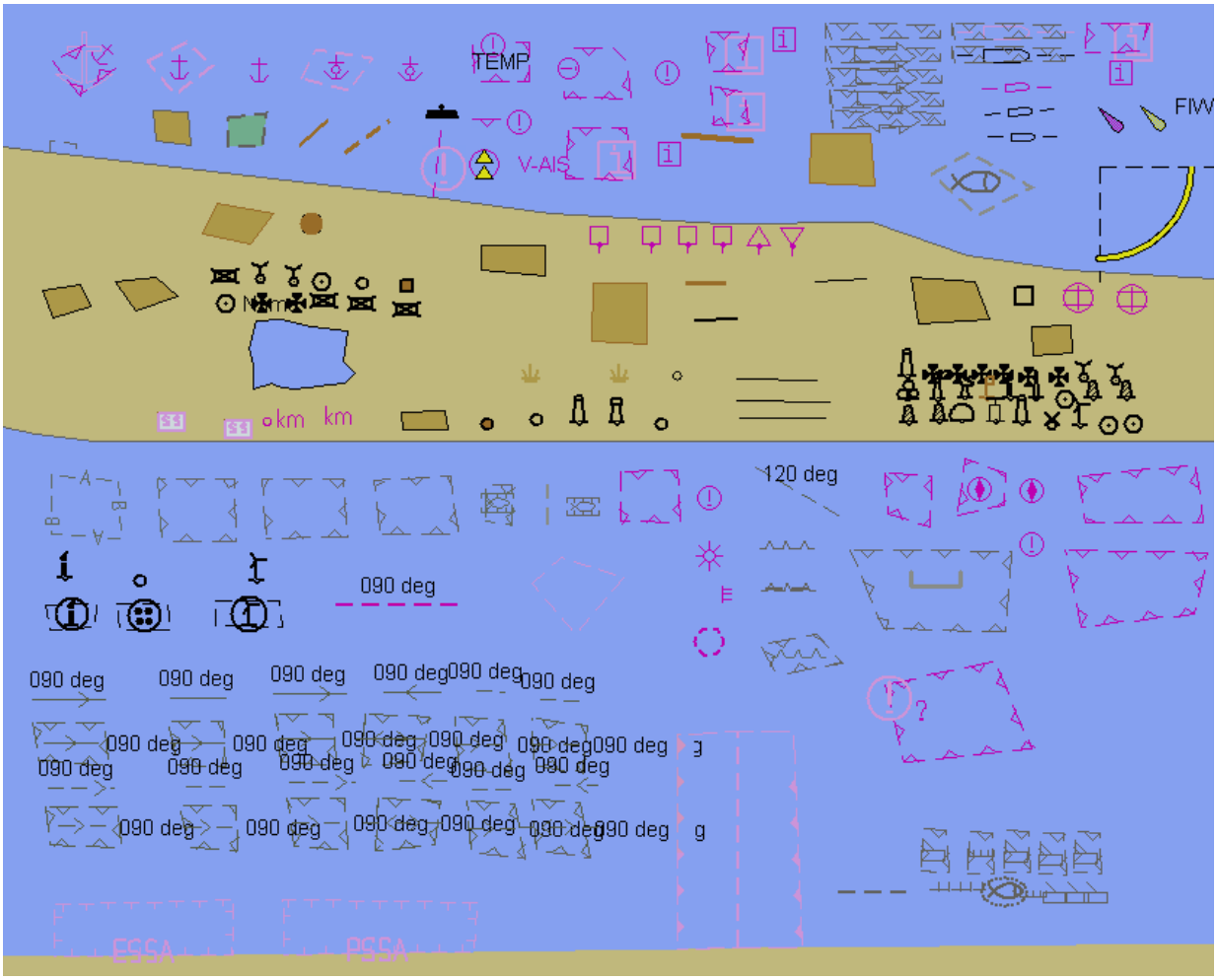
Switch on Standard Display. Check ENC symbols shown in ECDIS against graphical plot.

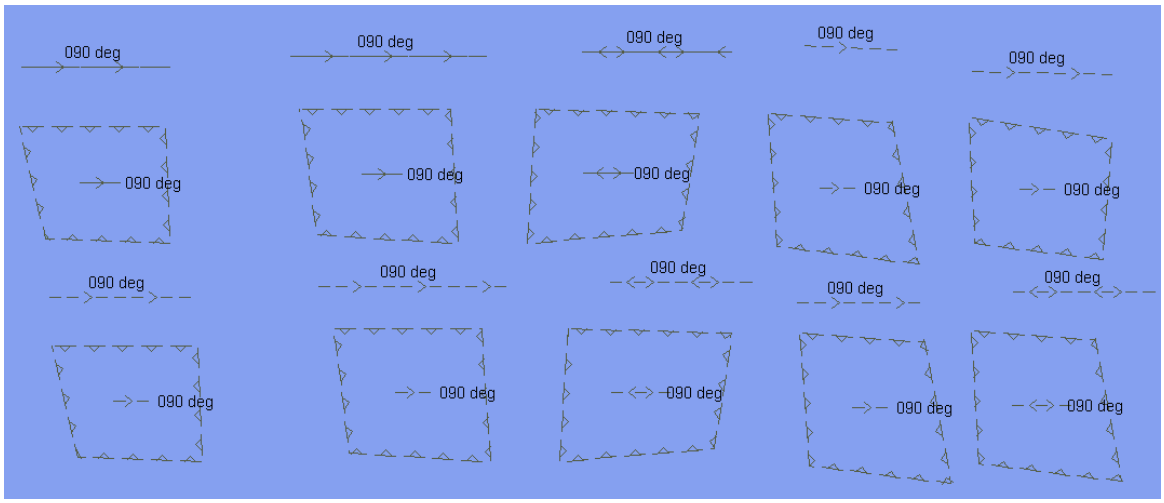
Results

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).



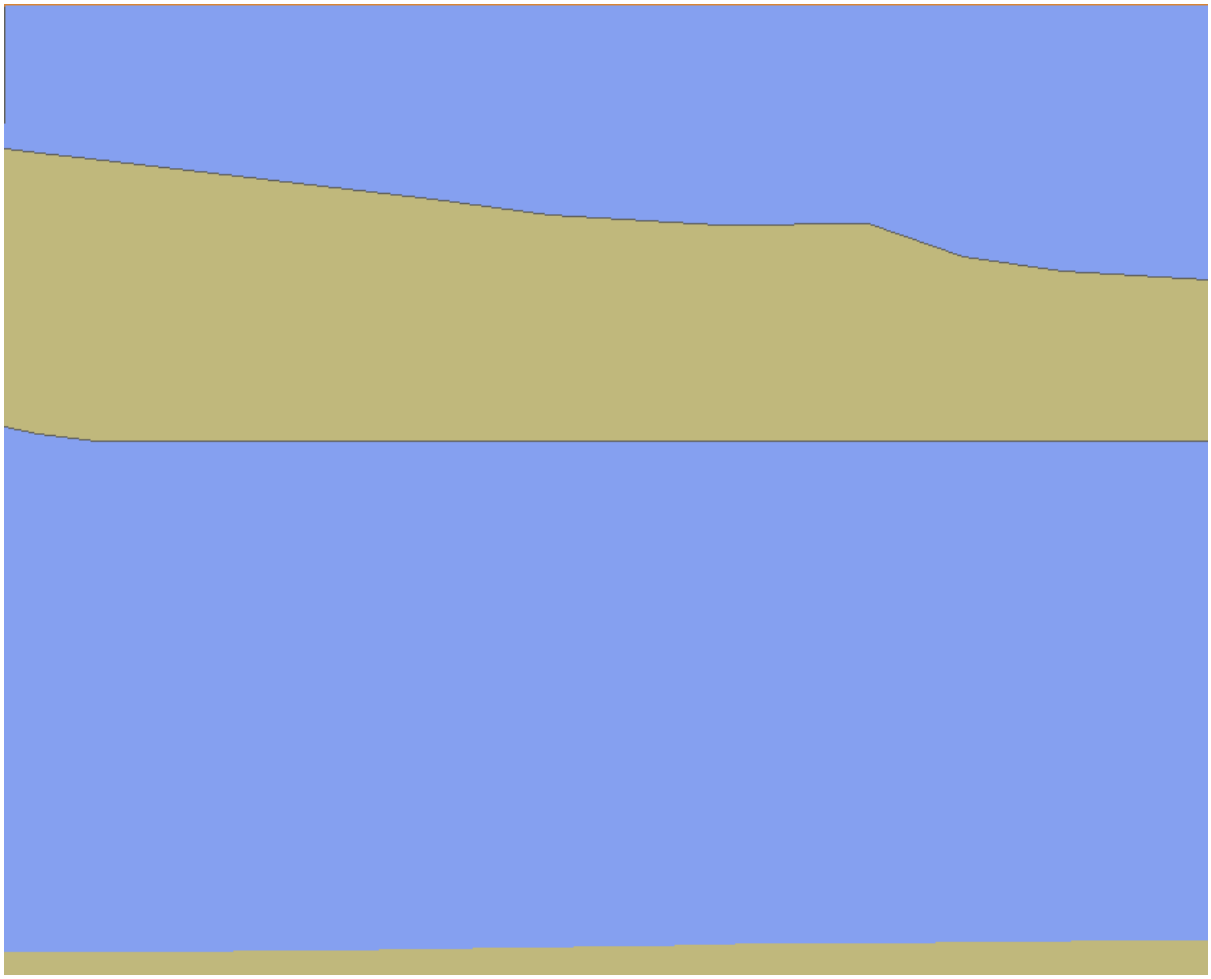
Action
Select all Text groups. Check ENC symbols shown in ECDIS against graphical plot.
Results
The ENC in the ECDIS should be shown as in the picture below.





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	3.1.3	IHO Reference	S-52 14.3

Test description

The purpose of the test is to verify by observation that ECDIS correctly displays all ENC objects included in the IMO Other Display category. The test is performed by loading to ECDIS test S-57 cell and checking display against graphical plots.
The test ENC cell AA5OTHER.000 contains depth and land areas from Display Base plus all ENC objects belonging to Other Display according to the IHO S-52 Presentation Library.
The objects belonging to Other Display are to be shown if Other (or All) display is selected in ECDIS HMI and should be disappearing in the Display Base or Standard Display Category's.

Setup

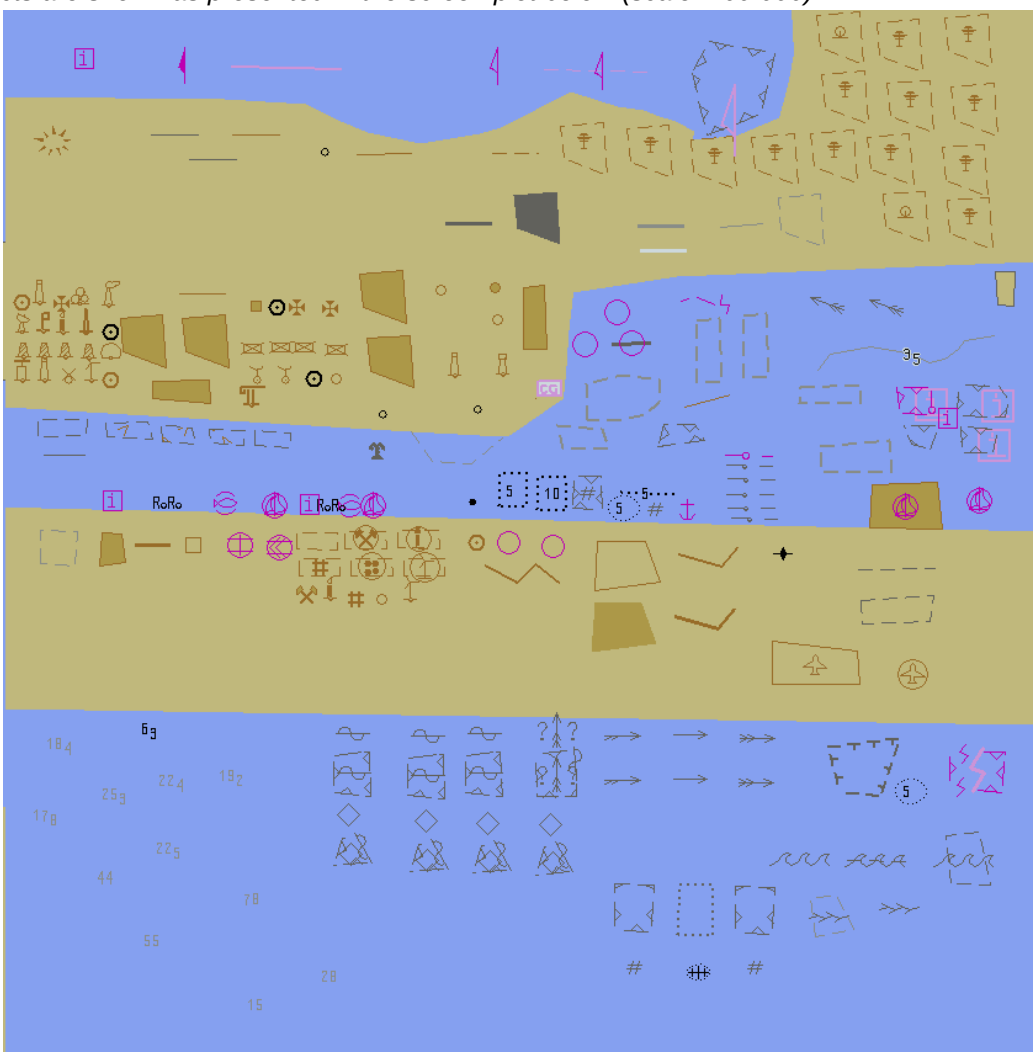
Load cell AA5OTHER.000 from 3.1 ENC Display\Other\ENC_ROOT with the following settings:
Select Display Category Other
Set the Safety Contour value to 10 m
Set the Safety Depth value to 10 m
Select Symbolized Boundaries
If provided, select optional Contour label

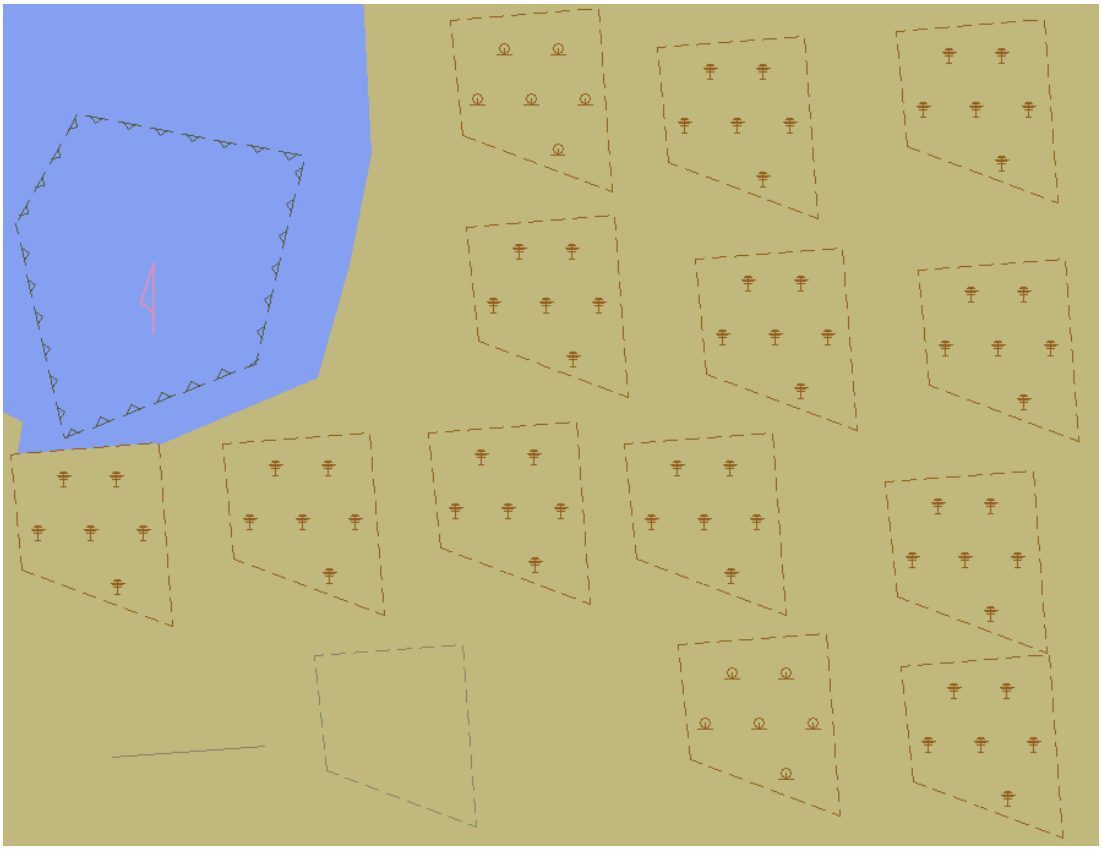
Action

Switch on Other Display. Check every ENC symbol shown in ECDIS against graphical plot.

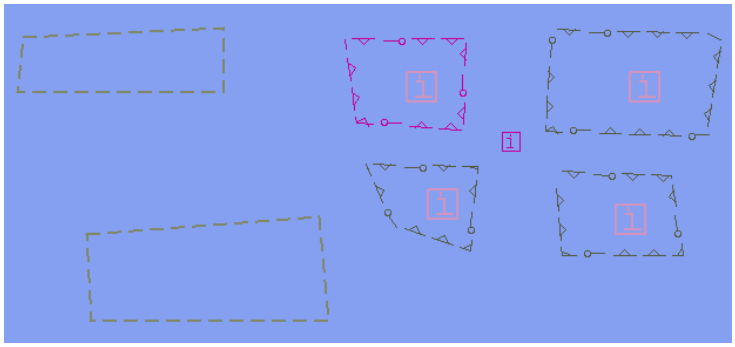
Results

The objects are shown as presented in the screen plot below (scale 1:60 000)



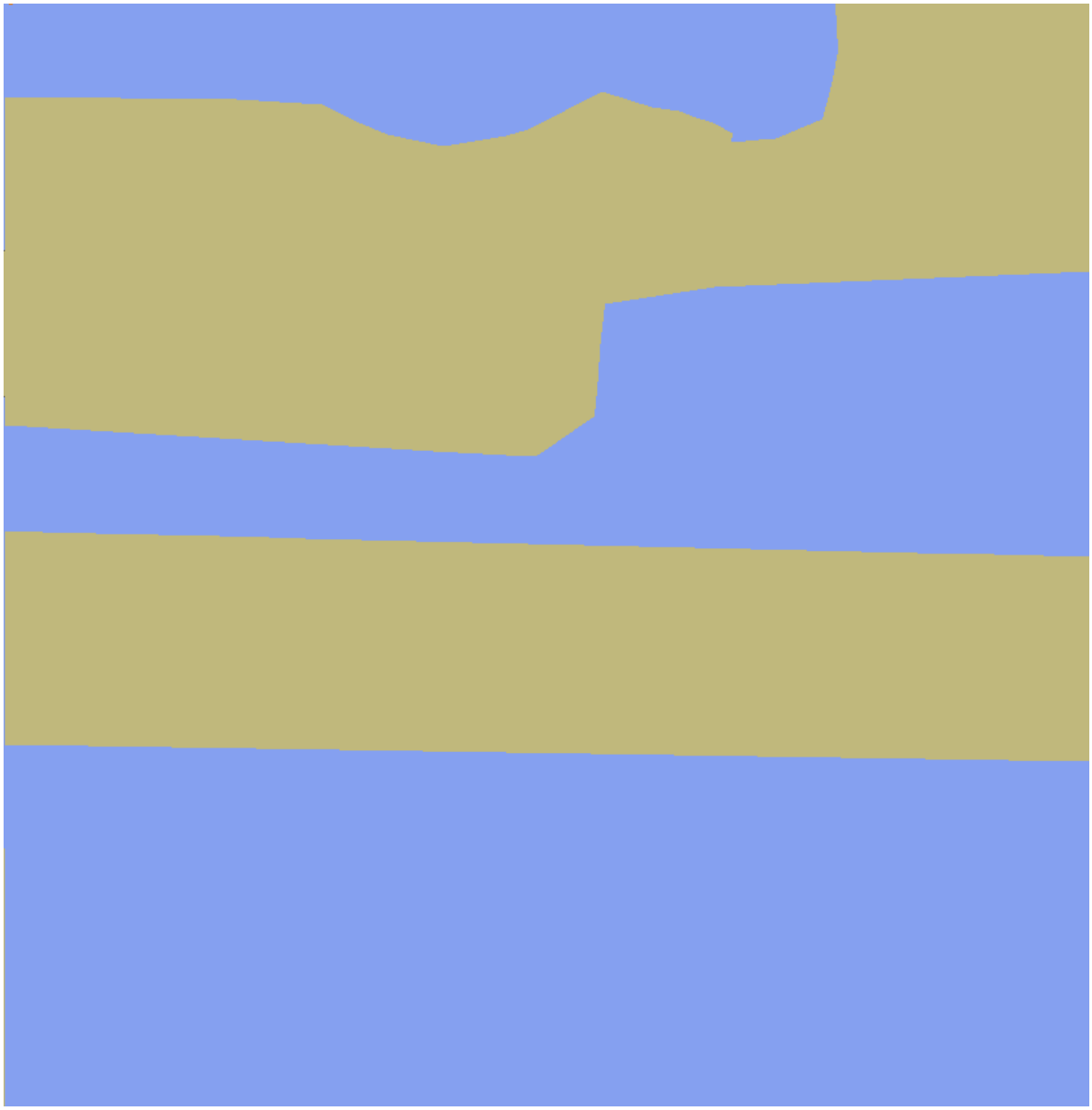


A part of above chart at scale 1:20 000



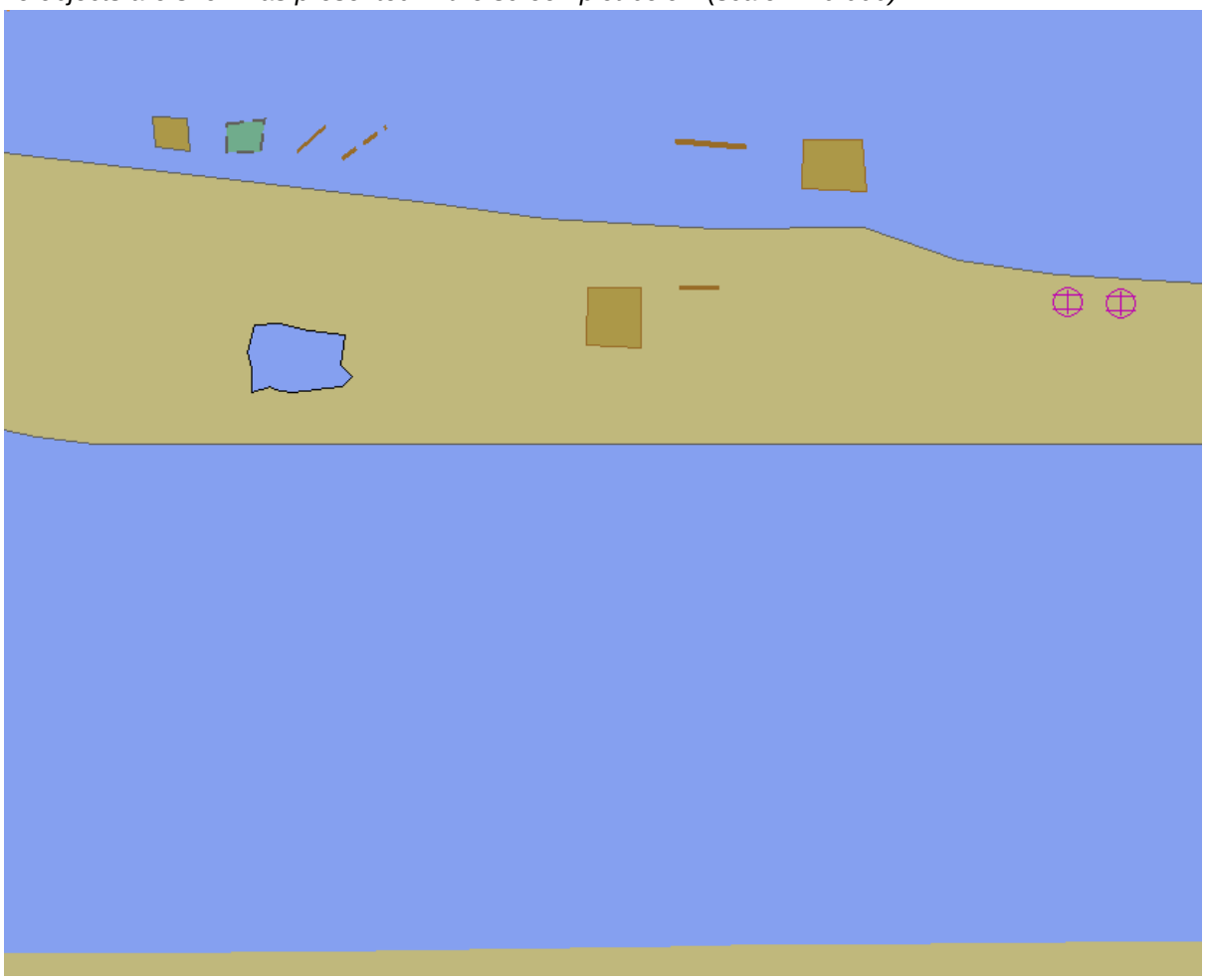
Another part of above chart at scale 1:20 000

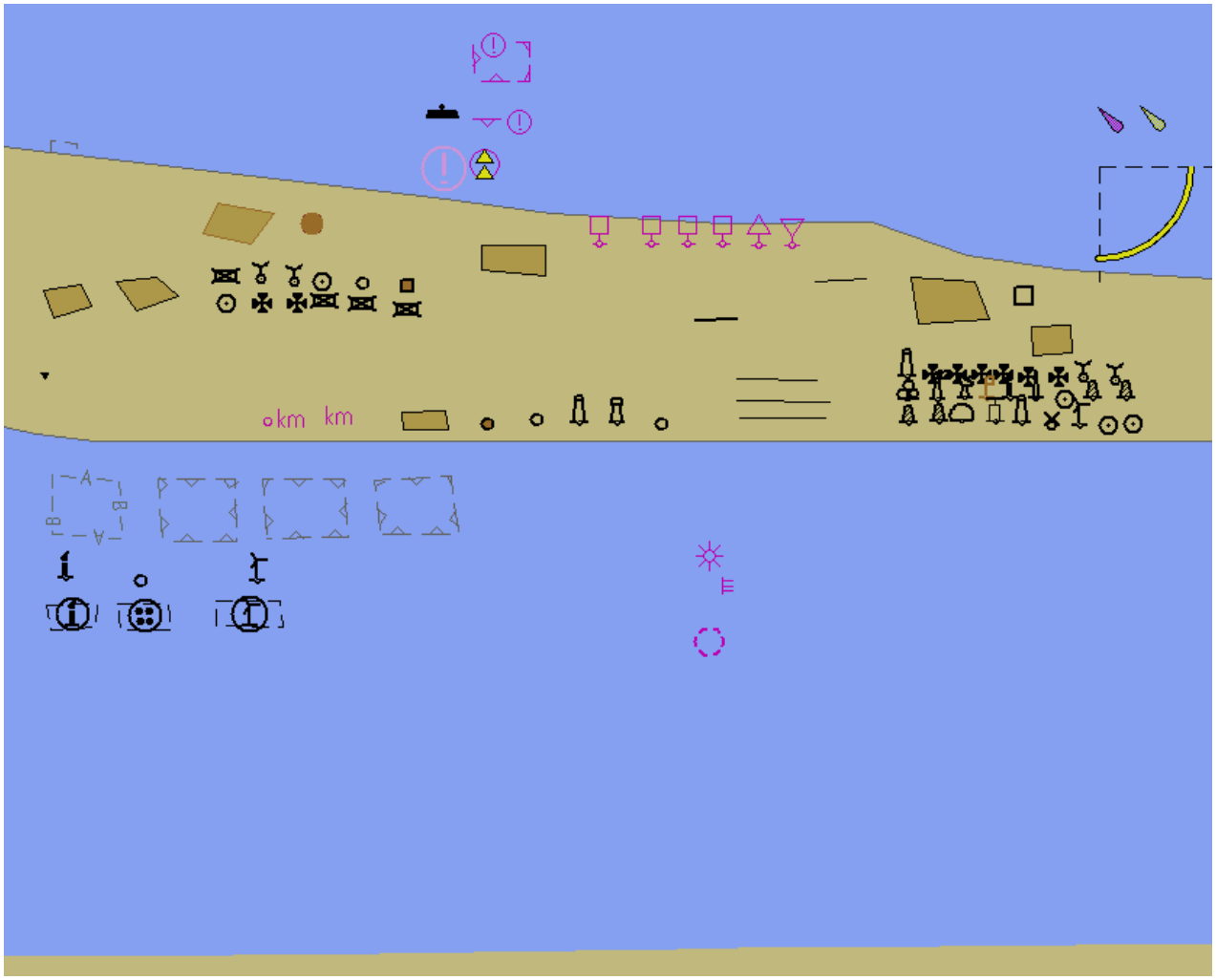
Action
Switch on Display Base. Check ENC display in ECDIS against graphical plot
Results
The ENC in the ECDIS should be shown as in the picture below.

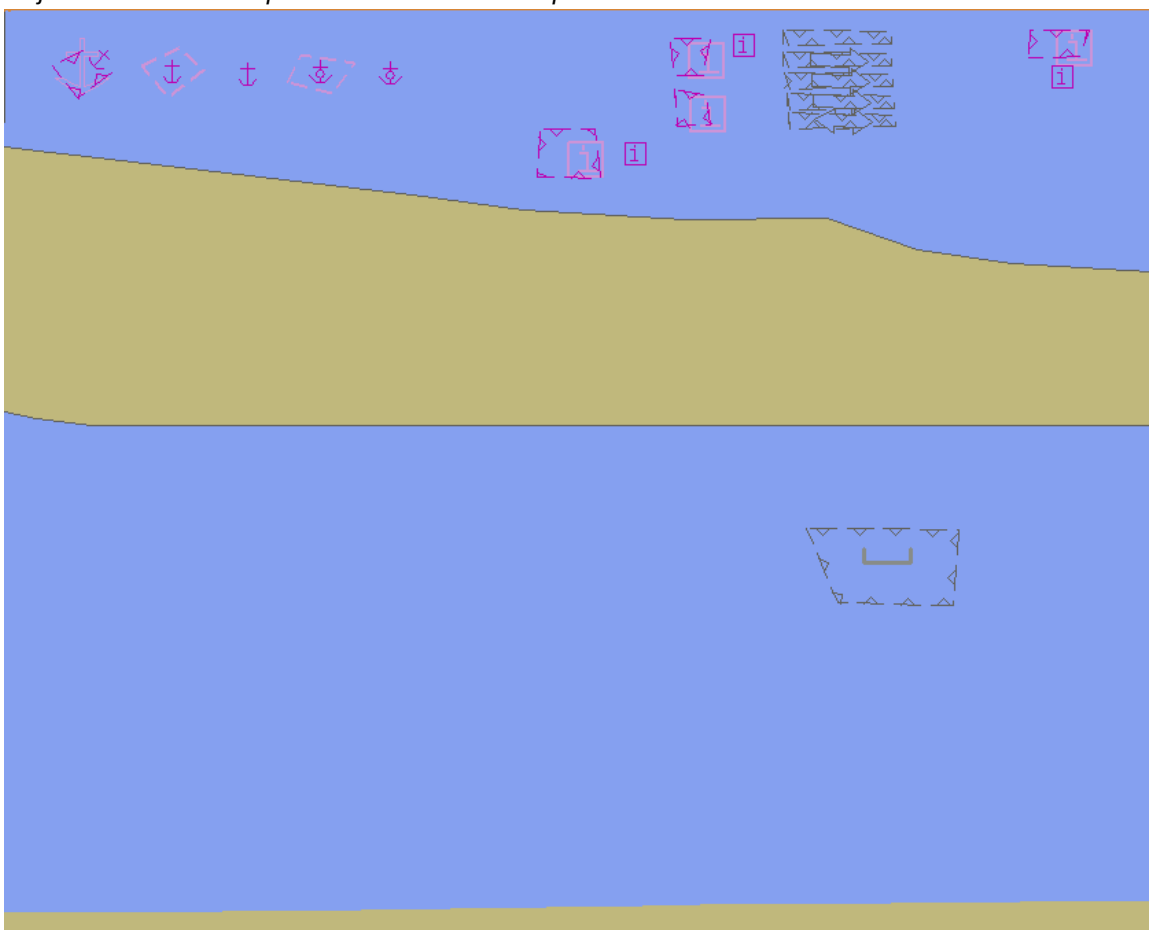


3.1.4 ECDIS Viewing groups names. Standard Display

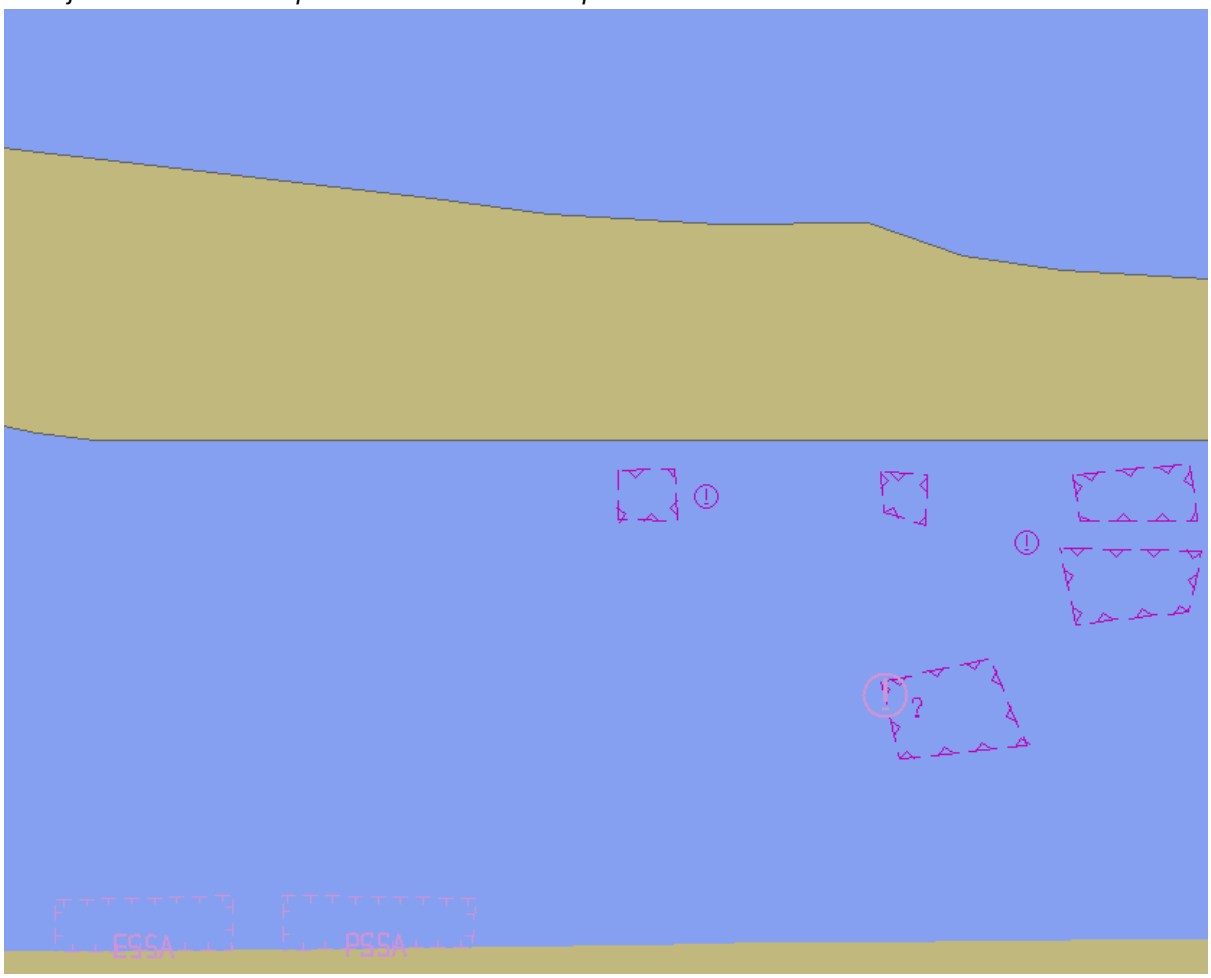
Test Reference	3.1.4	**IHO Reference**	S-52 14.3
Test description			
The purpose of the test is to verify that ECDIS is able to change ENC display settings by standardized controls. Names of the controls, located under the Standard Display section of ECDIS should switch on and off certain viewing layers and should comply with requirements of IHO S-52 Presentation Library Edition 4.0.			
Setup			
Load cell AA5STNDR.000 from 3.1 ENC Display\Standard\ENC_ROOT 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 Paper chart point symbols.*			
Action			
Switch on Standard Display. Check that ECDIS HMI contains standardized controls that can switch on and off certain objects 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*			

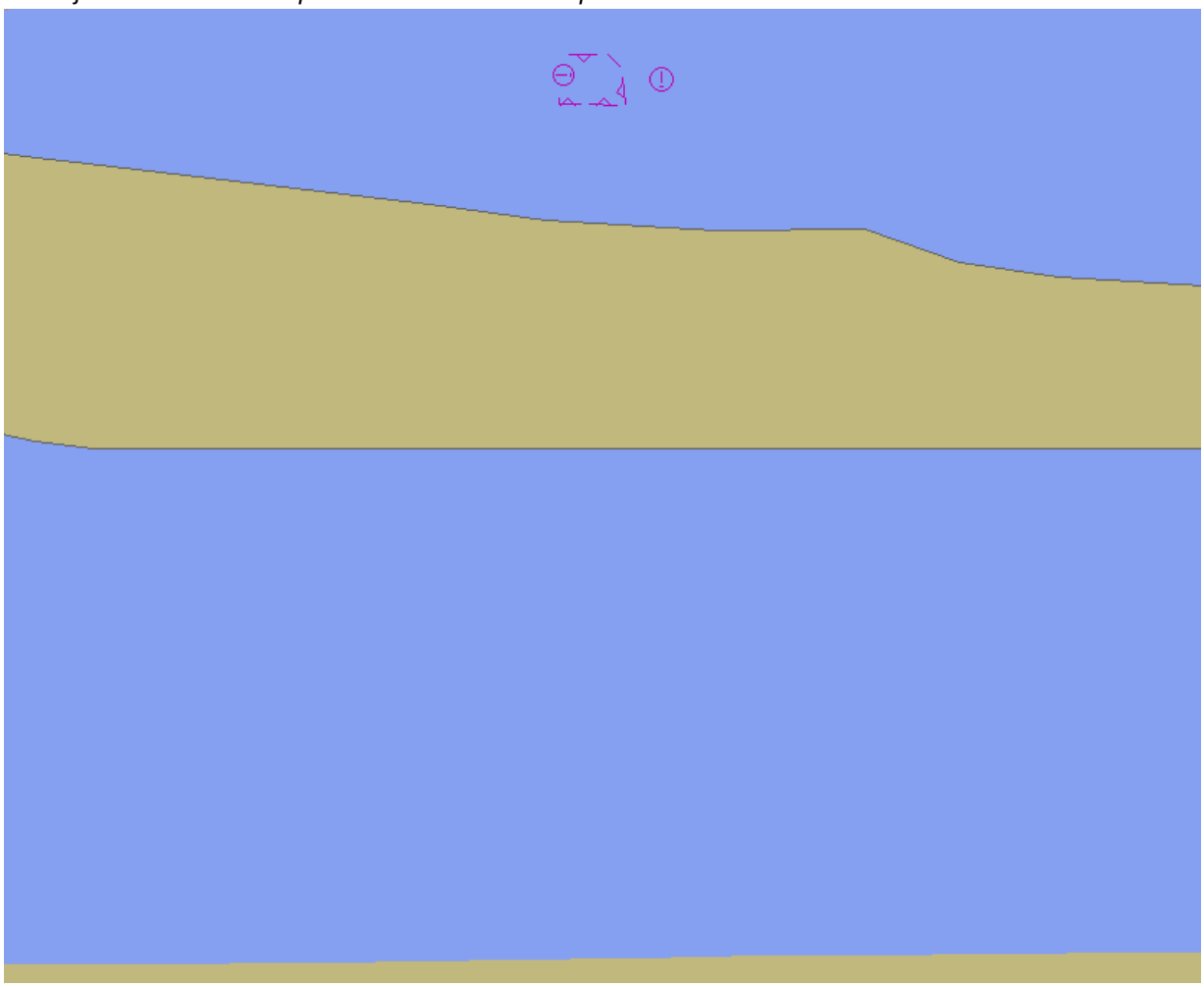
Action
*Switch off all controls and switch on only the "**Drying line**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below (scale 1:70 000) 

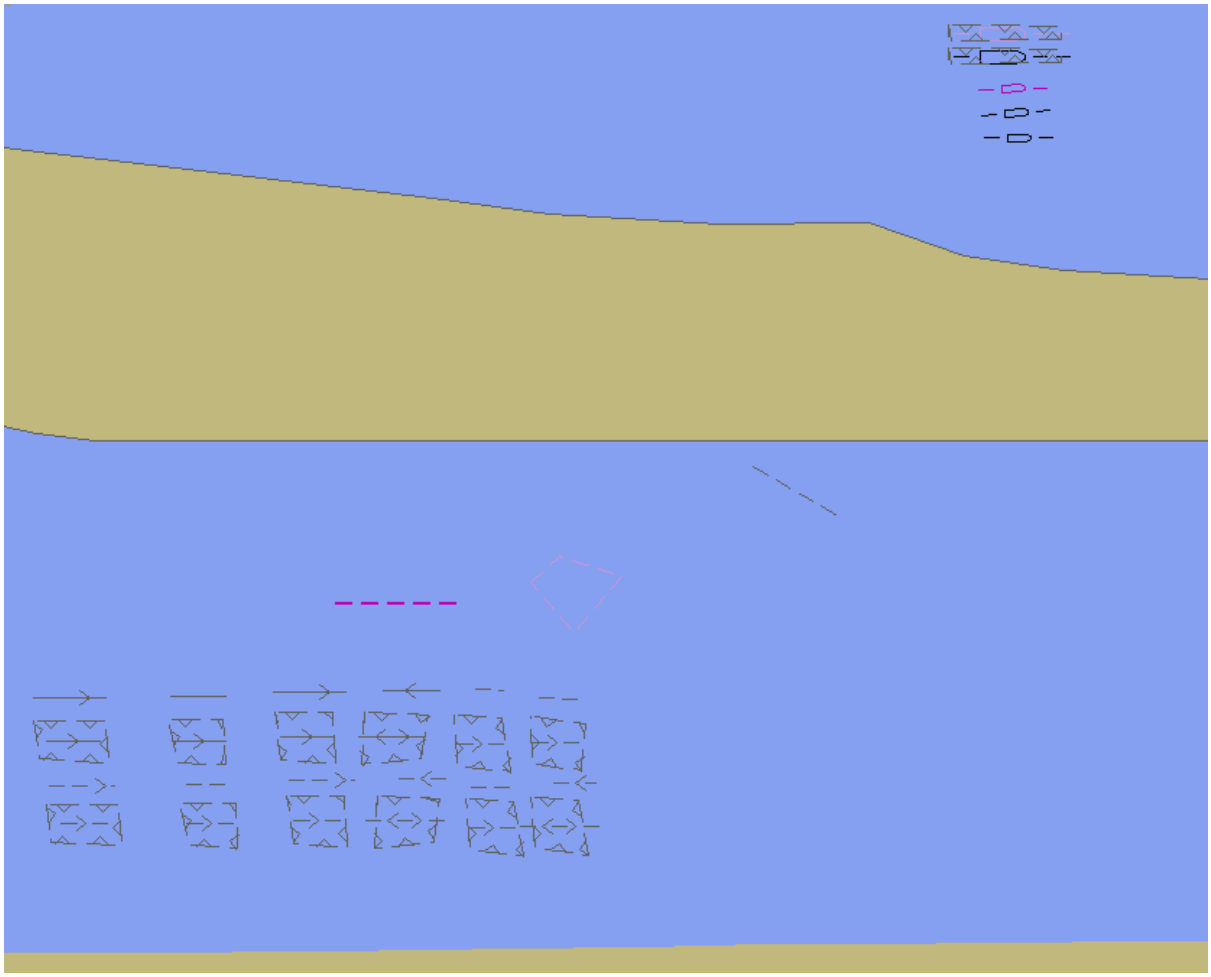
Action
*Switch off all controls and switch on only the "**Buoys, beacons, aids to navigation**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below 

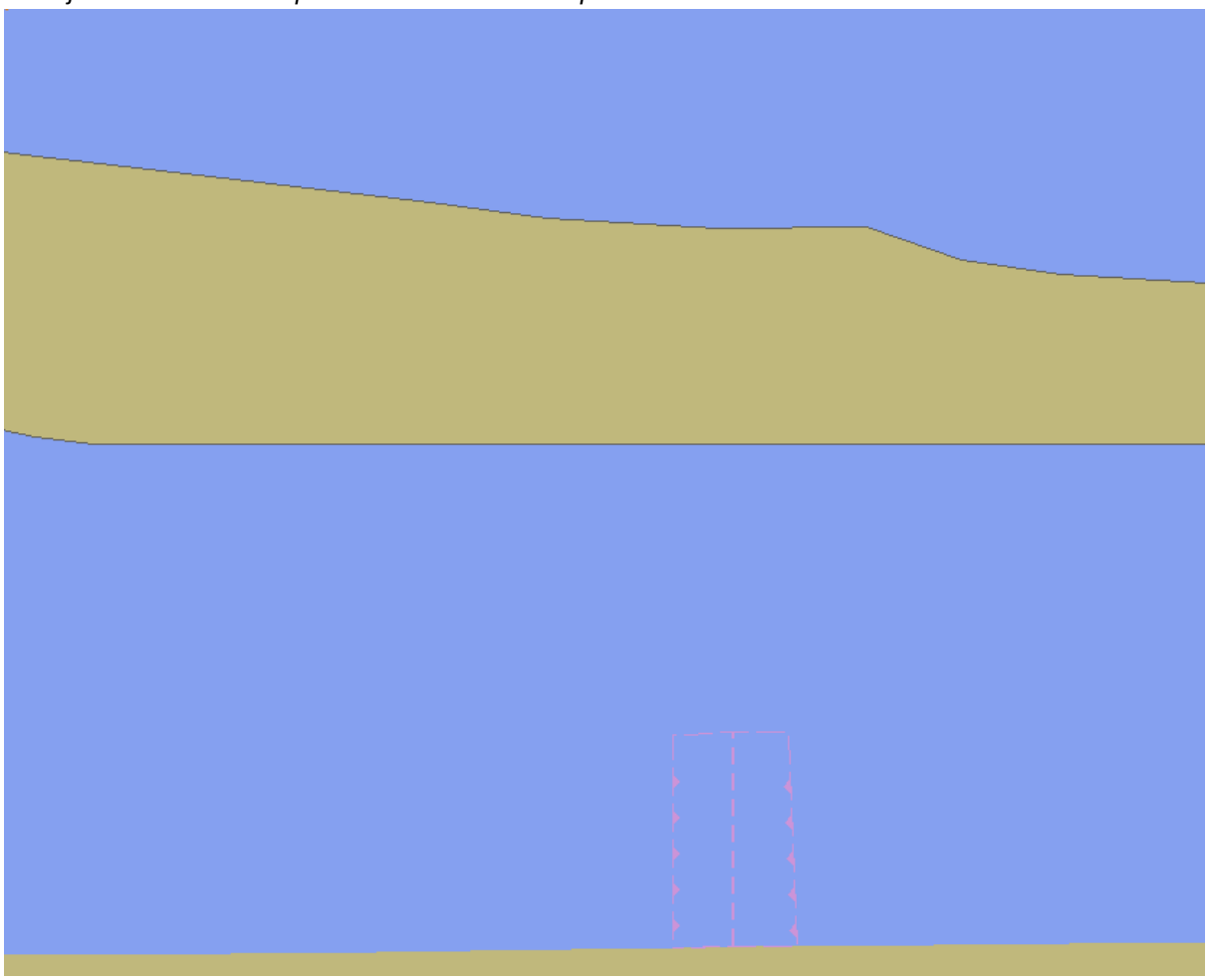
Action
*Switch off all controls and switch on only the "**Boundaries and limits**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below 

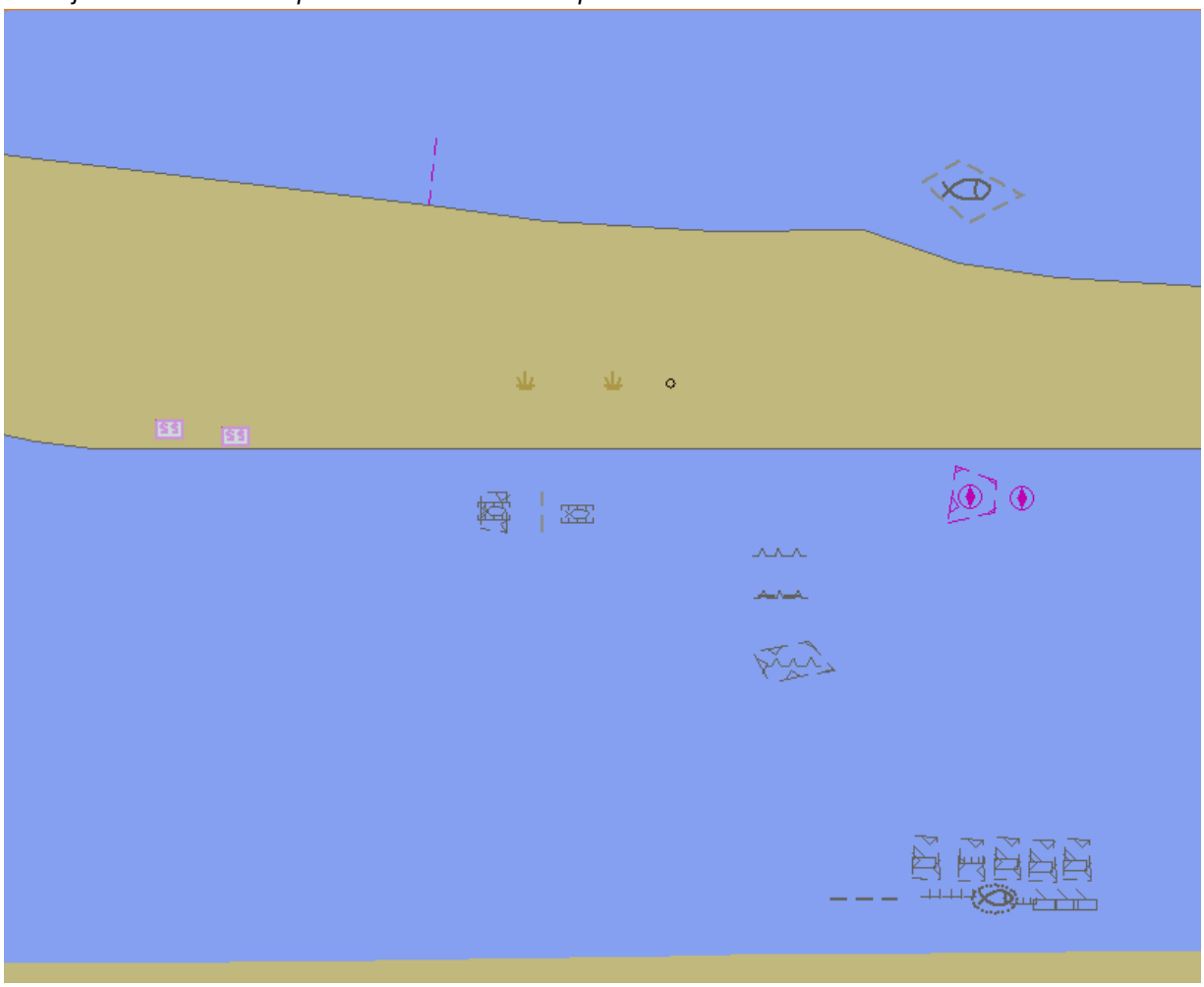
Action
*Switch off all controls and switch on only the "**Prohibited and restricted areas**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below

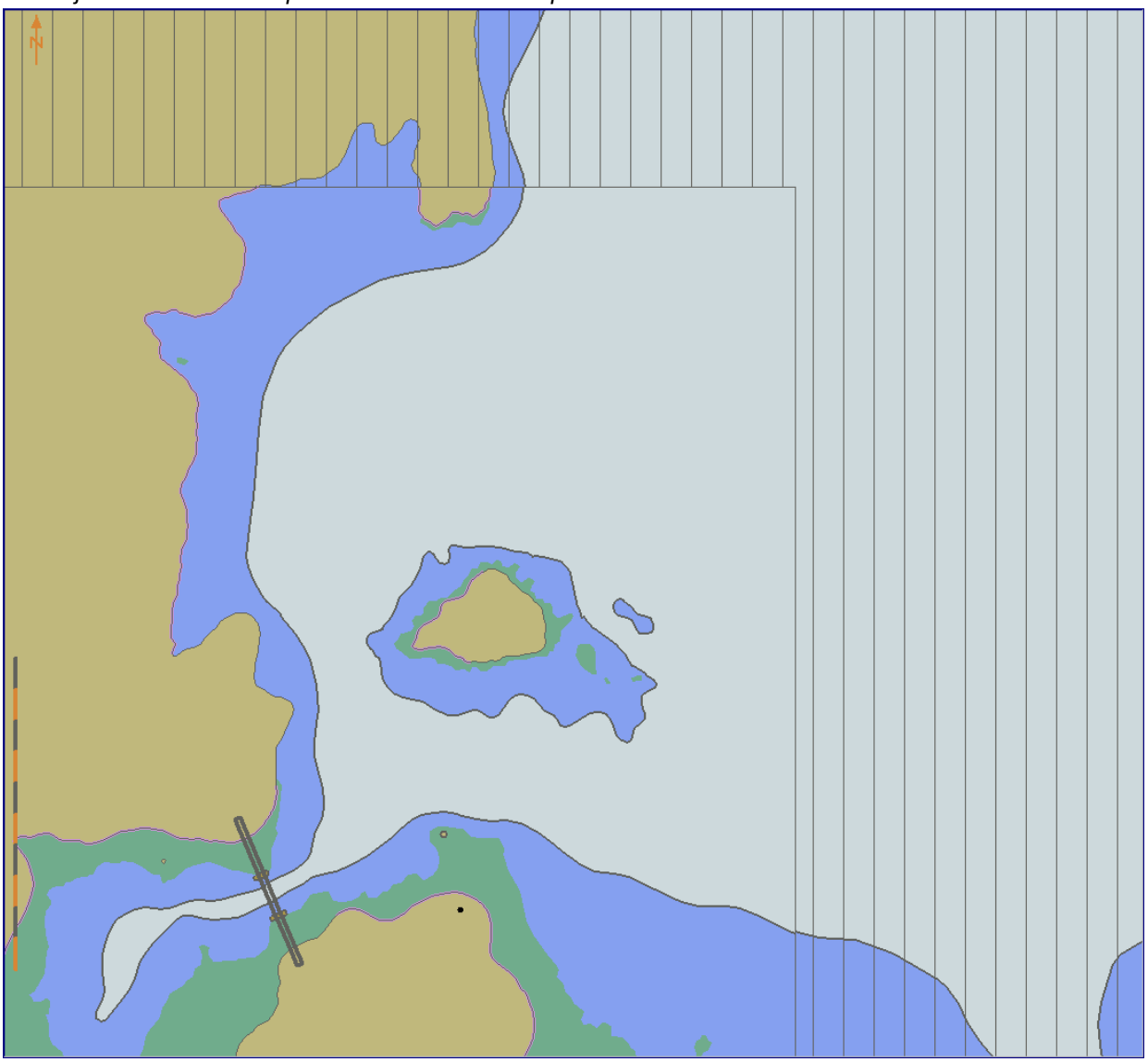


Action
*Switch off all controls and switch on only the "**Cautionary notes**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below 

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

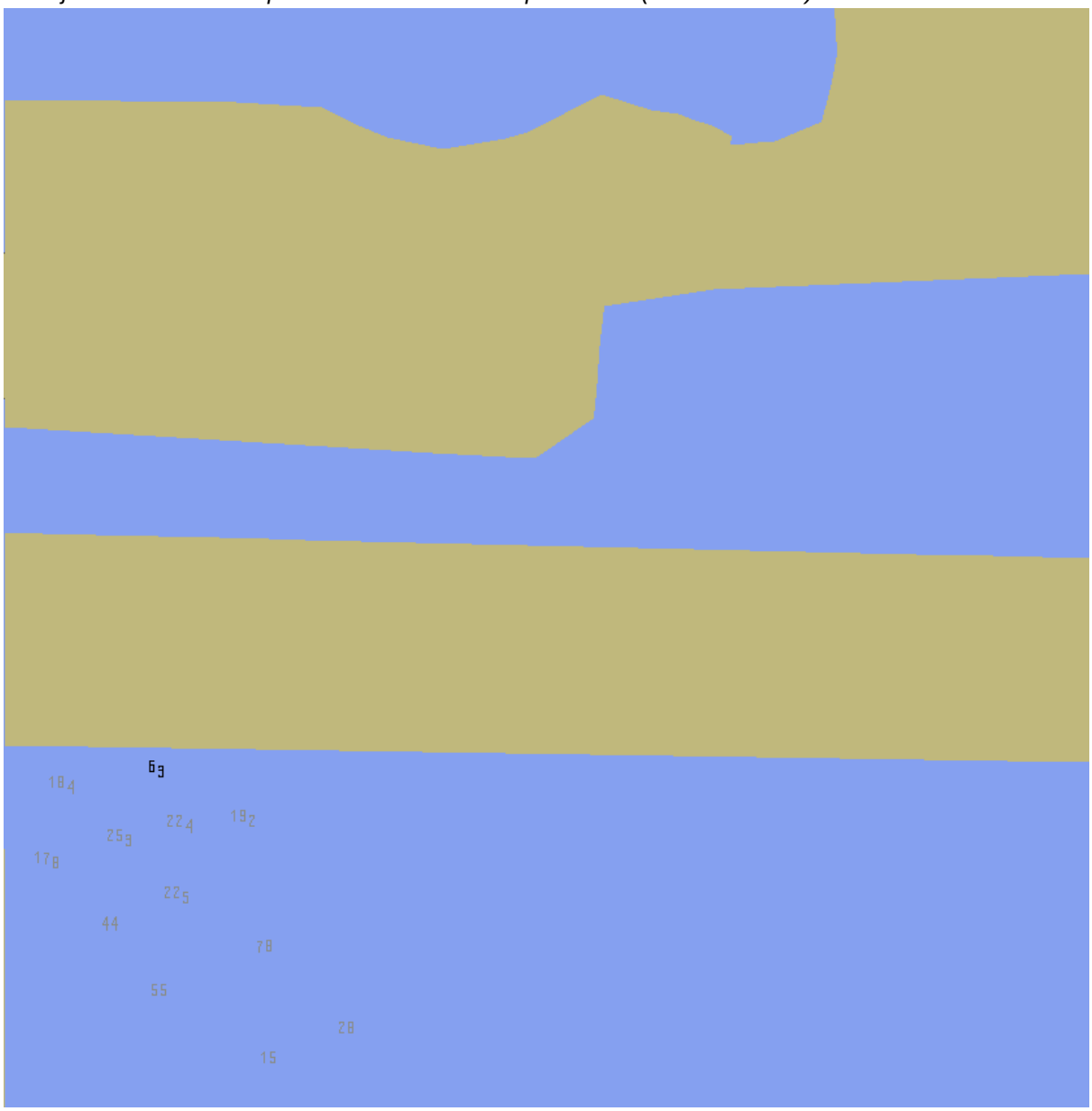
Action
*Switch off all controls and switch on only the "**Archipelagic sea lanes**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below. 

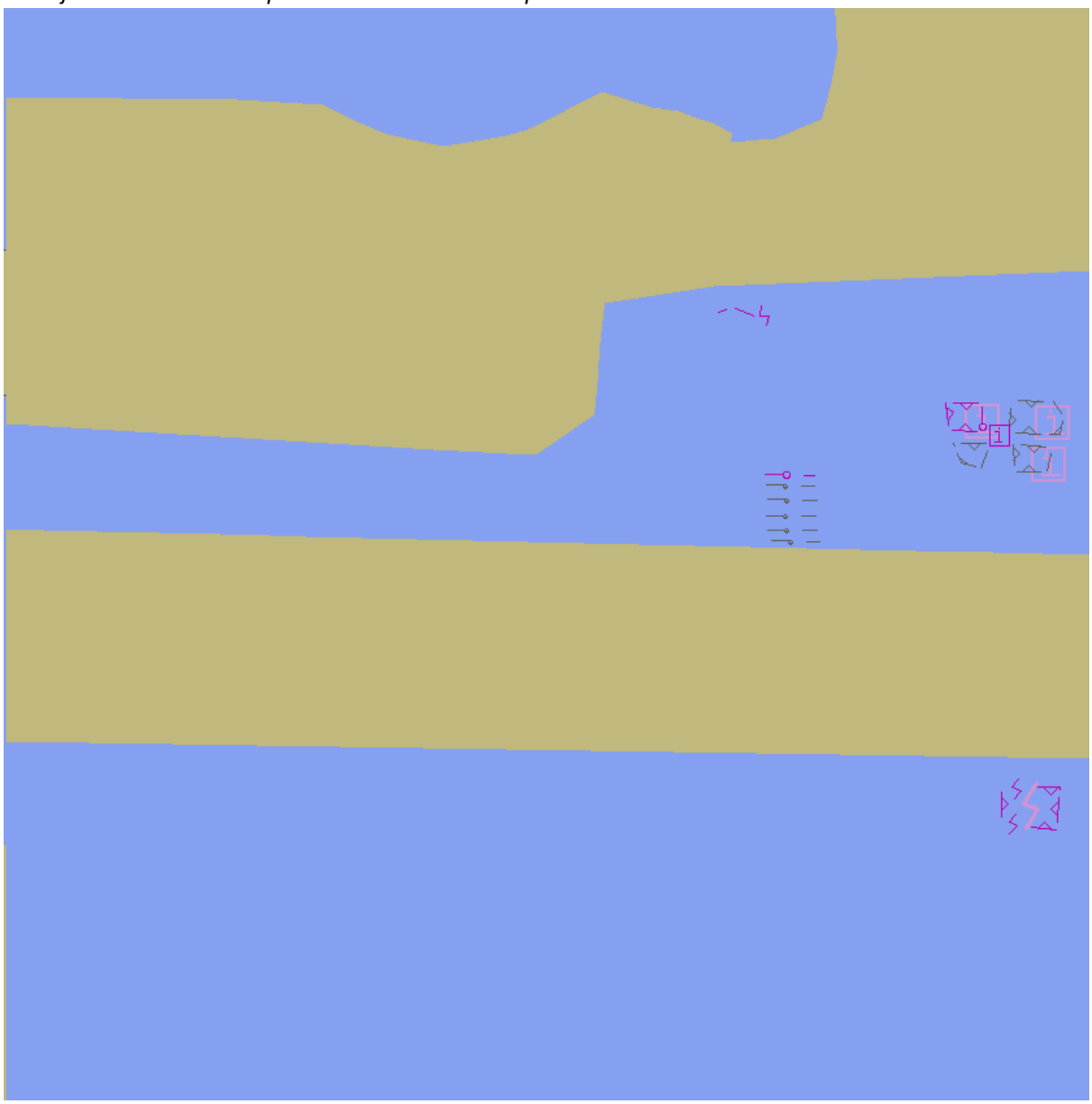
Action
*Switch off all controls and switch on only the "**Miscellaneous**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below. 

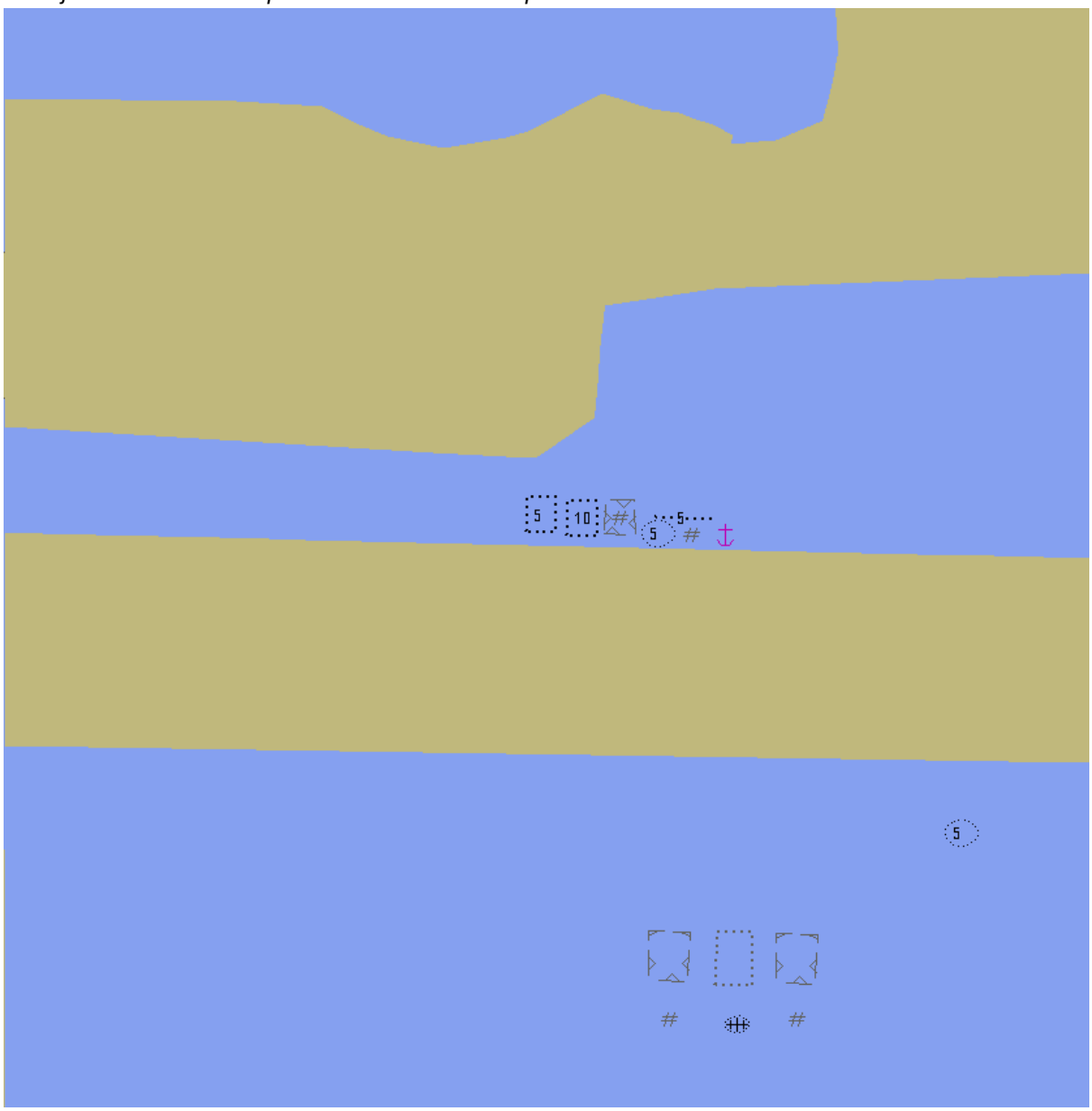
Action
Load all cells from 2.1.1 Power Up\ENC_ROOT *Centre the display on position 32°28.500' S 60°59.000' E and then zoom in to a scale of 1:20,000* *Switch off all controls and switch on only the "**Chart scale boundaries**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below 

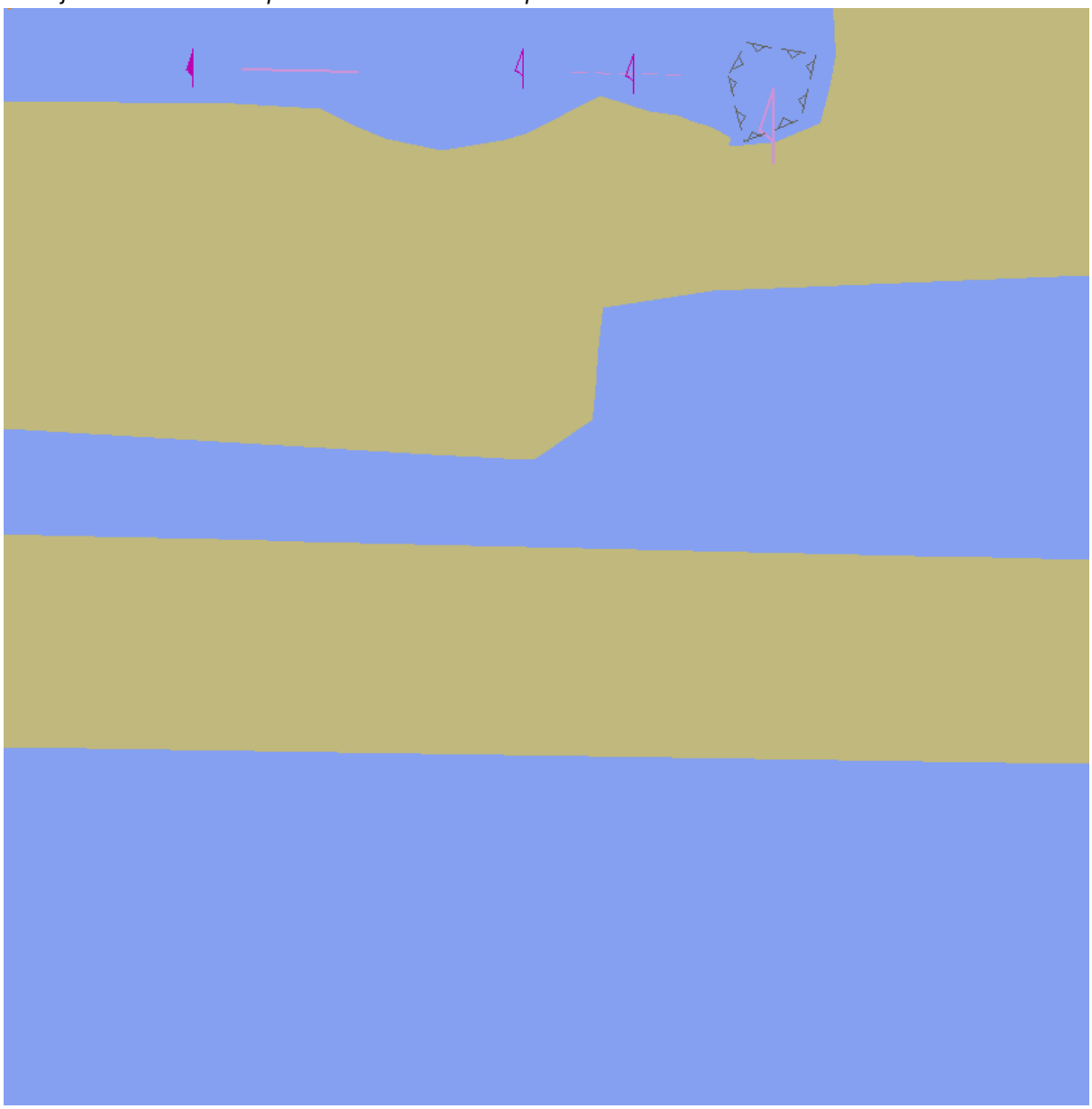
3.1.5 ECDIS Viewing Layers. Other Display

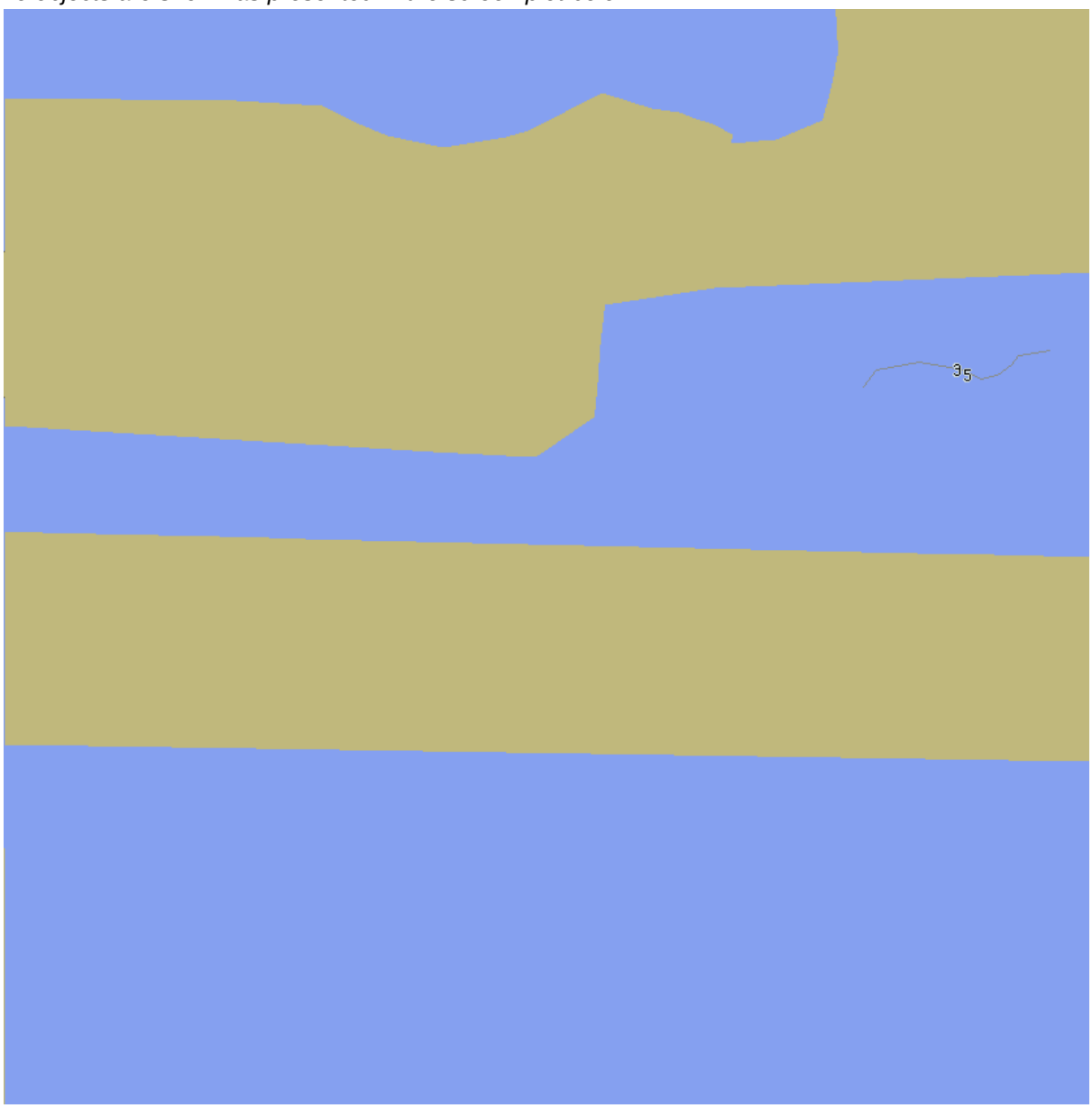
Test Reference	3.1.5	**IHO Reference**	S-52 14.3
Test description			
The purpose of the test is to verify that ECDIS is able to change ENC display settings by standardized controls. Names of the controls, located under the Other Display section of ECDIS should switch on and off certain viewing layers and should comply with requirements of IHO S-52 Presentation Library Edition 4.0.			
Setup			
Load cell AA5OTHER.000 from 3.1 ENC Display\Other\ENC_ROOT 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 Paper chart symbols*			
Action			
Switch on Other Display Check that ECDIS HMI contains standardized controls that can switch on and off certain objects 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 objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below (scale 1:60 000) 

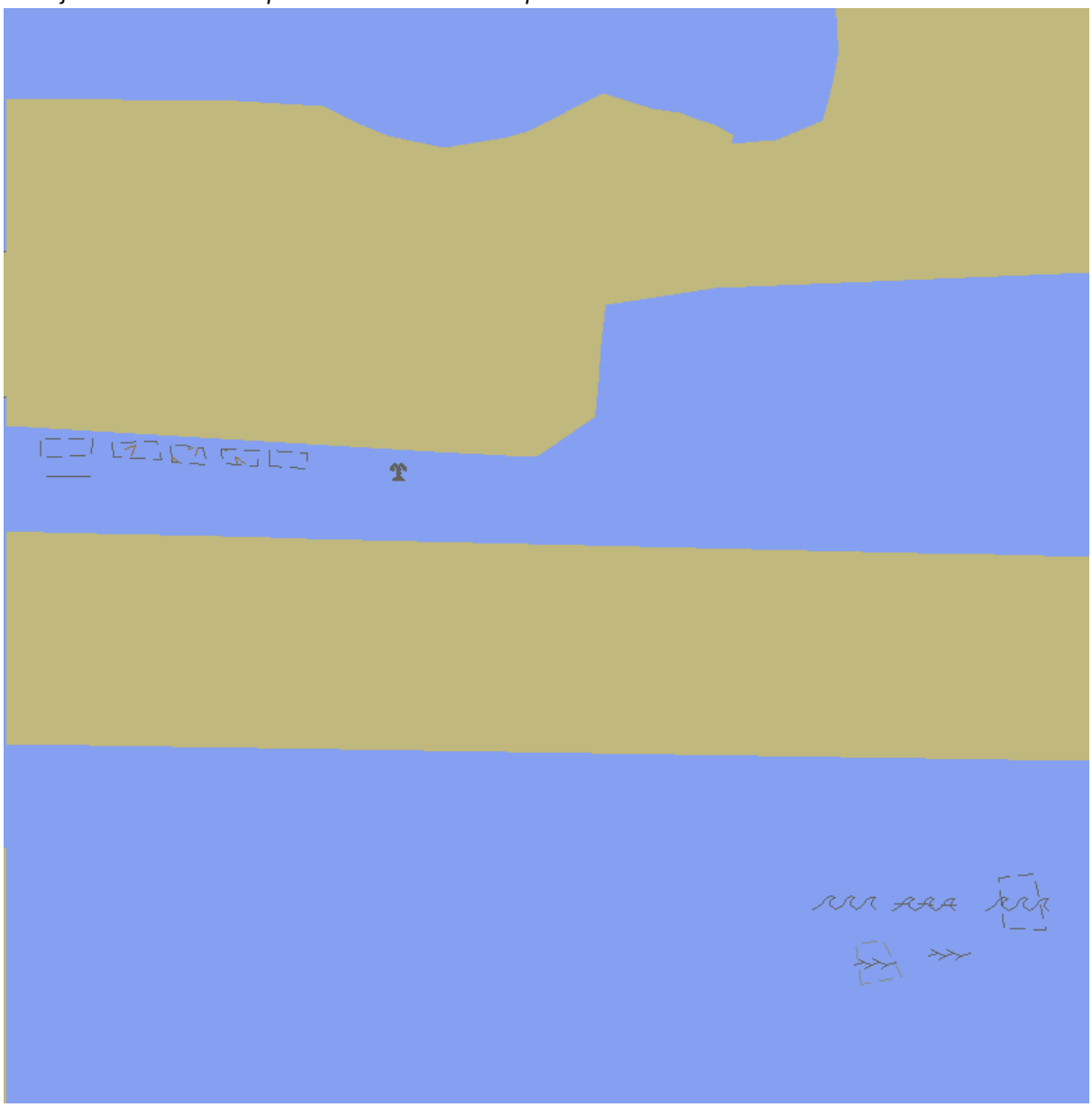
Action
*Switch off all controls and switch on only the "**Submarine cables and pipelines**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below 

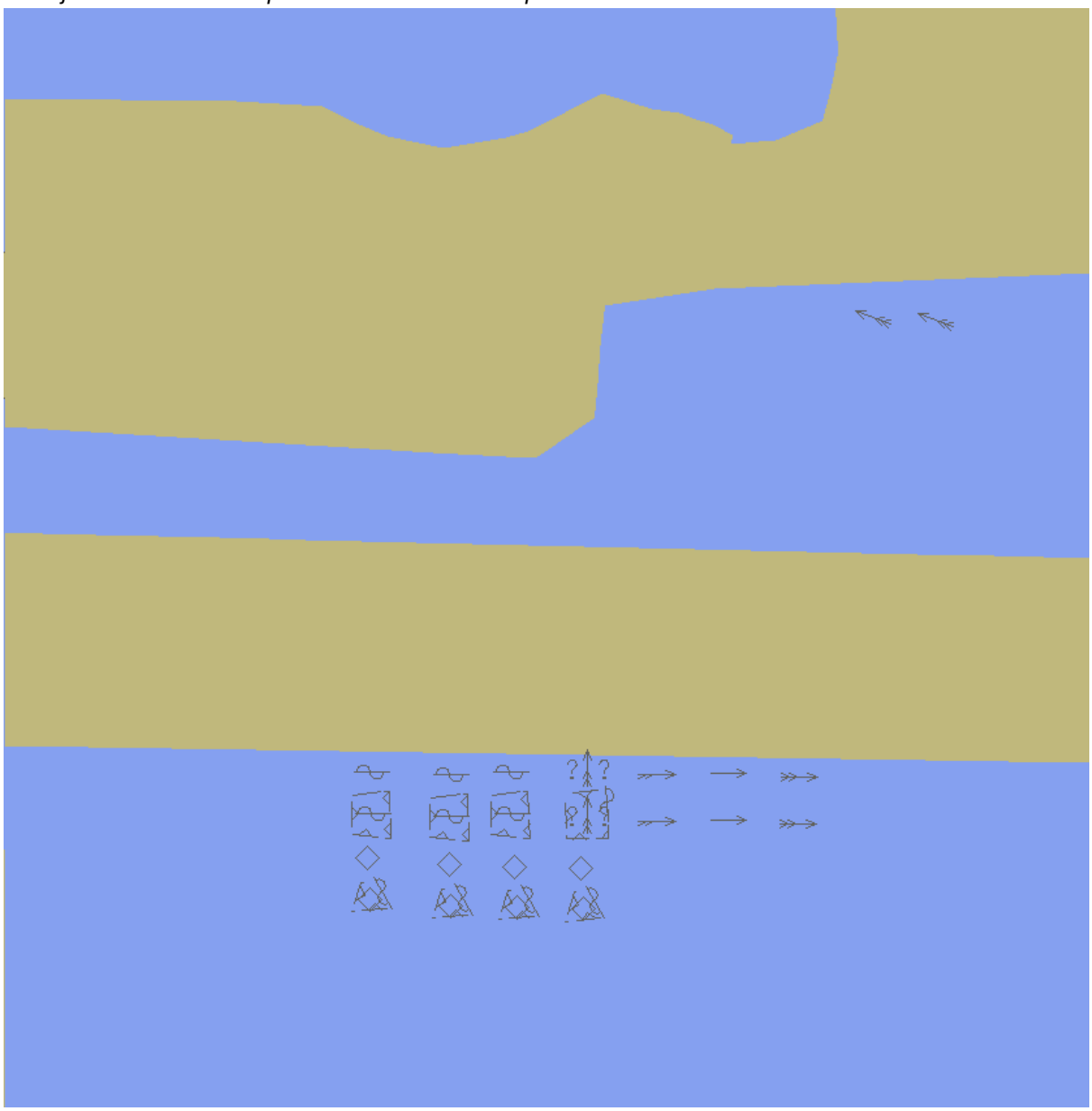
Action
*Switch off all controls and switch on only the "**All isolated danger**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below 

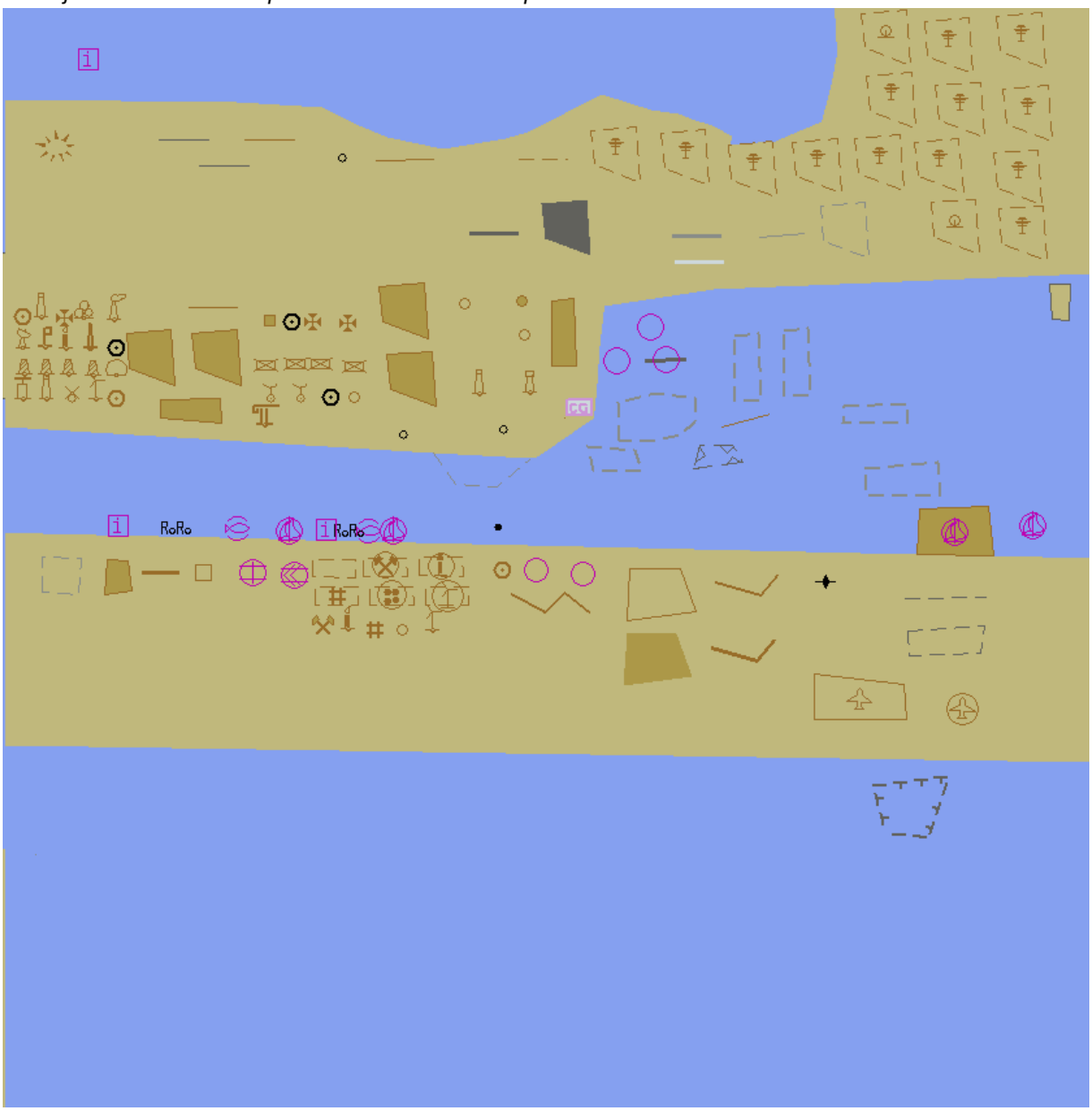
Action
*Switch off all controls and switch on only the "**Magnetic variation**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below 

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

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

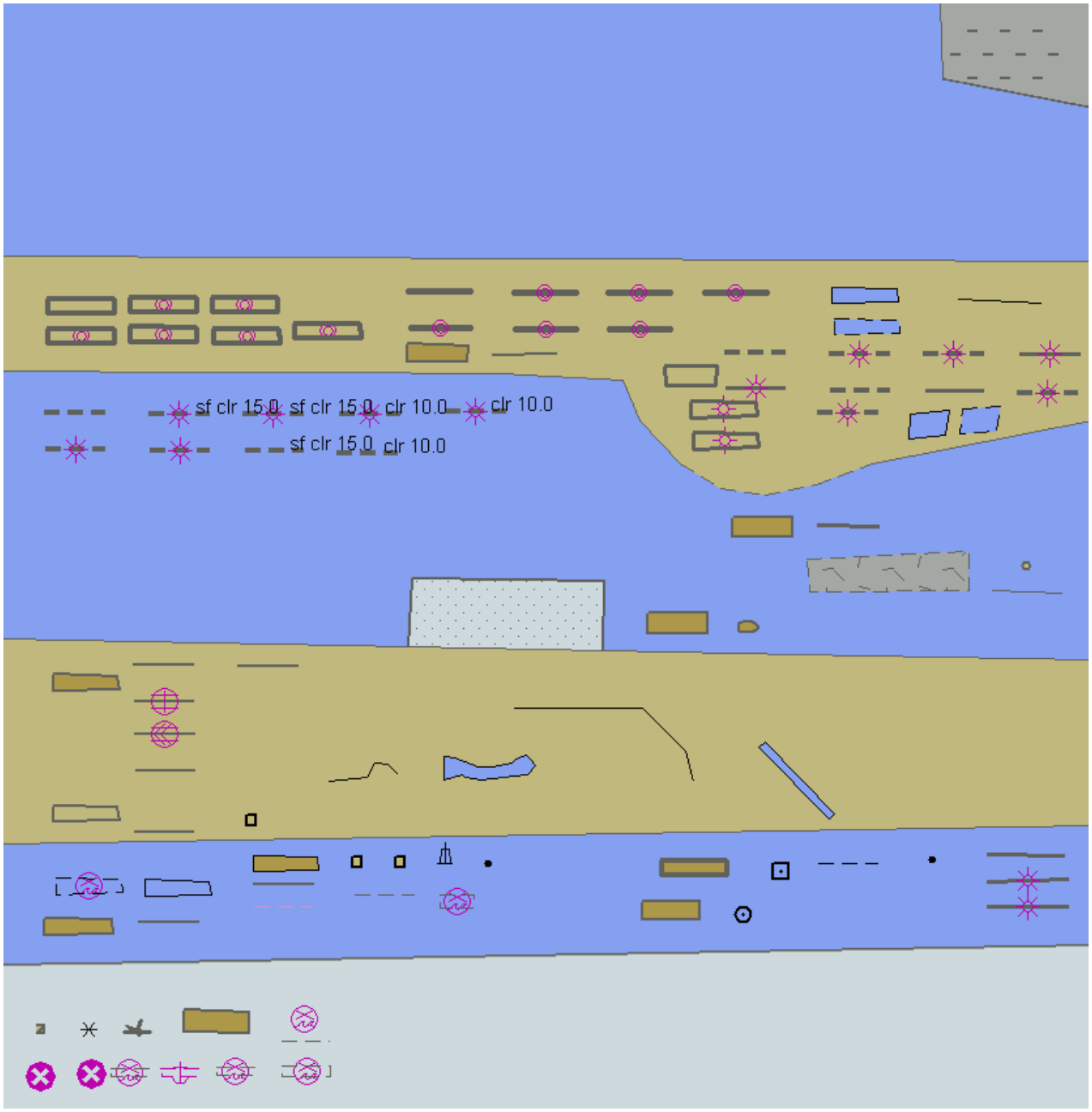


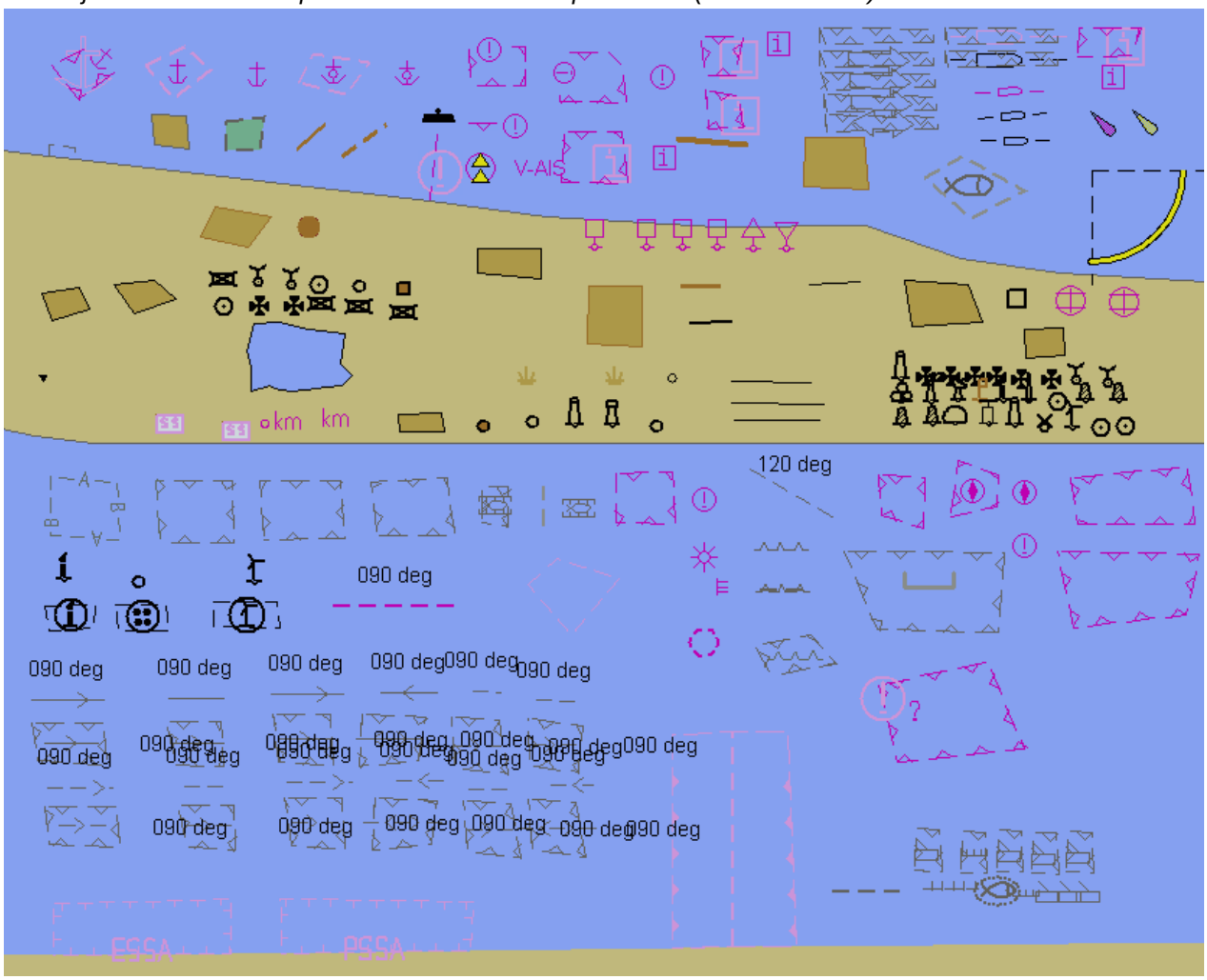
Action
*Switch off all controls and switch on only the "**Tidal**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below 

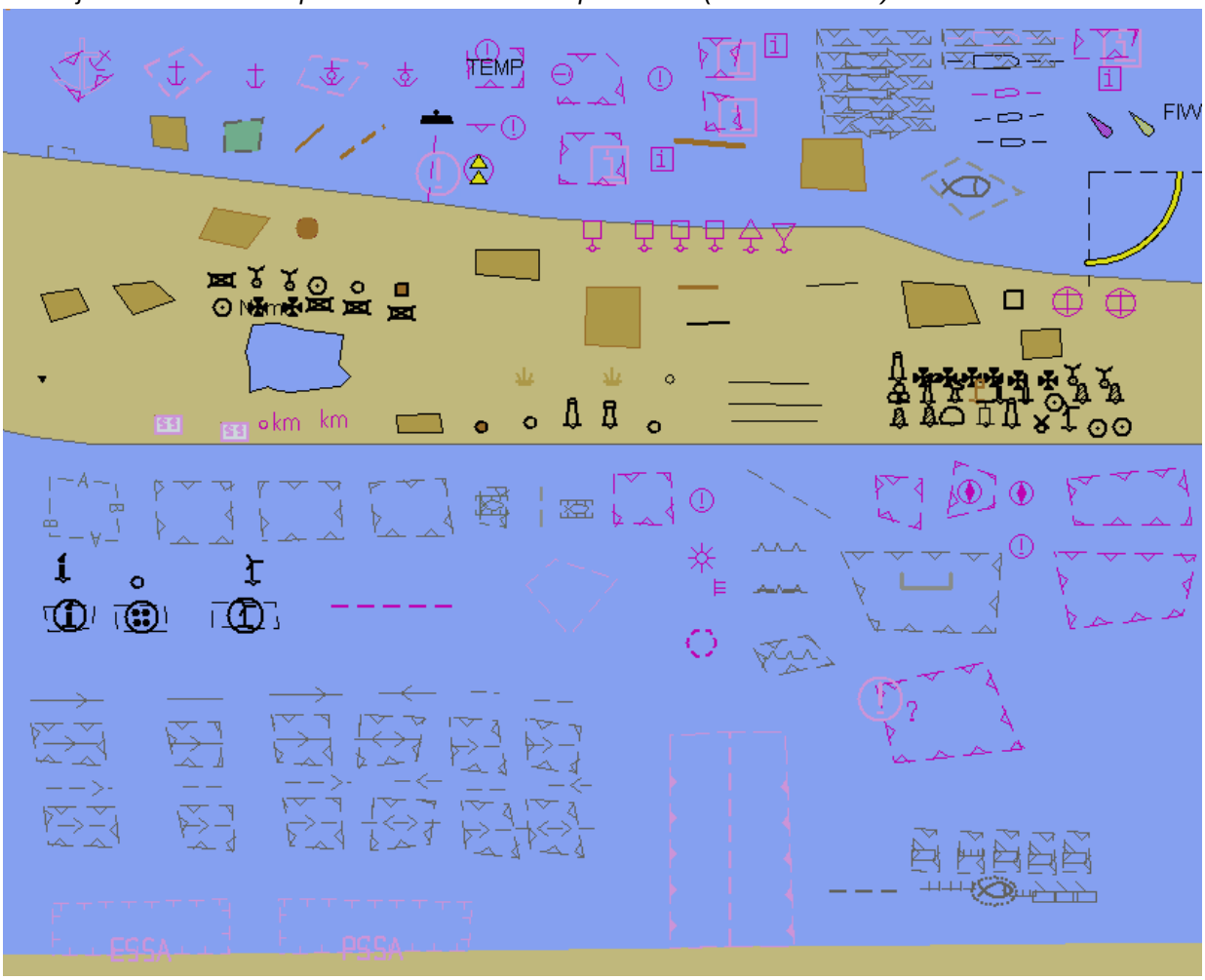
Action
*Switch off all controls and switch on only the "**Miscellaneous**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below 

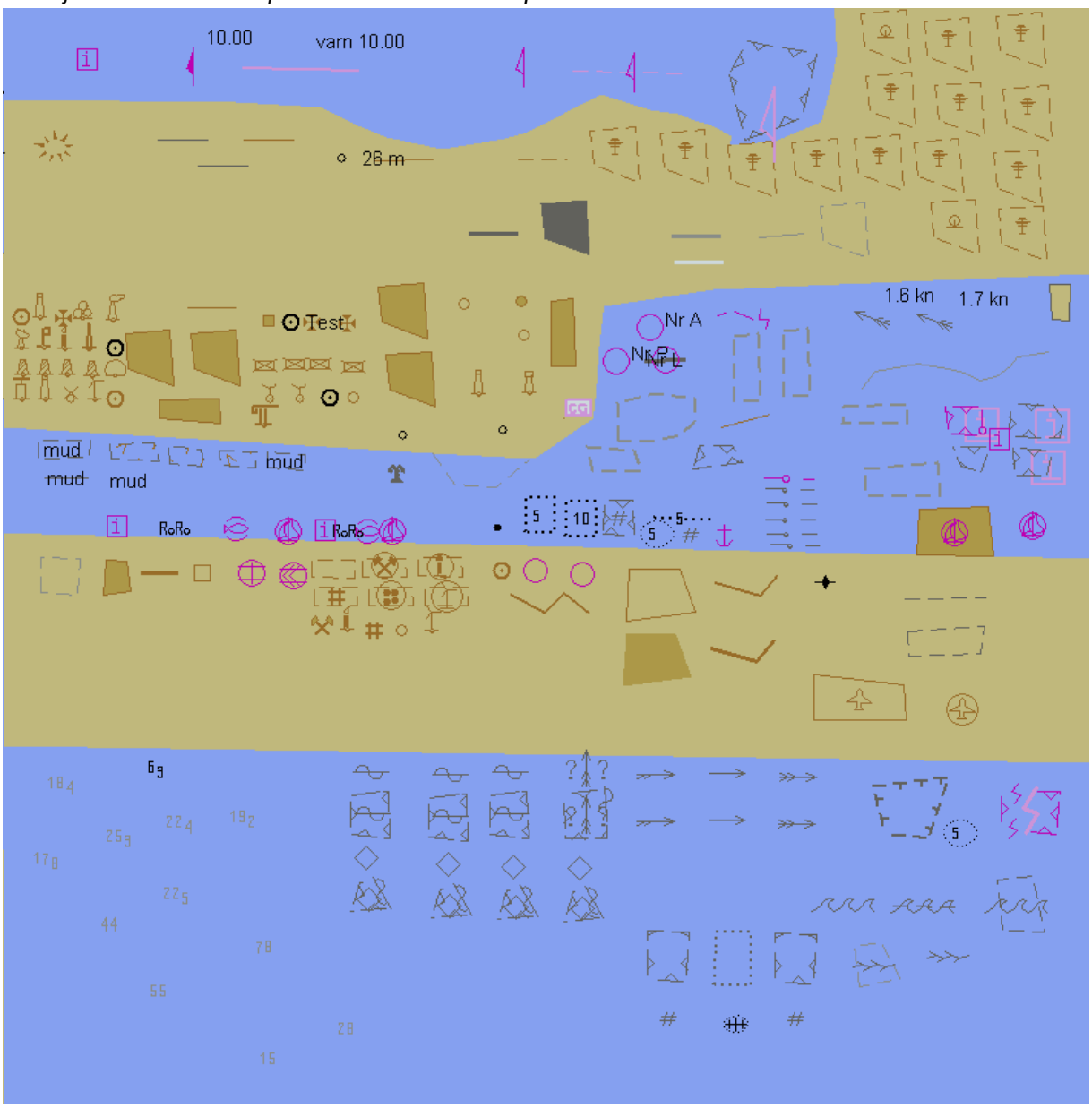
3.1.6 Text Grouping

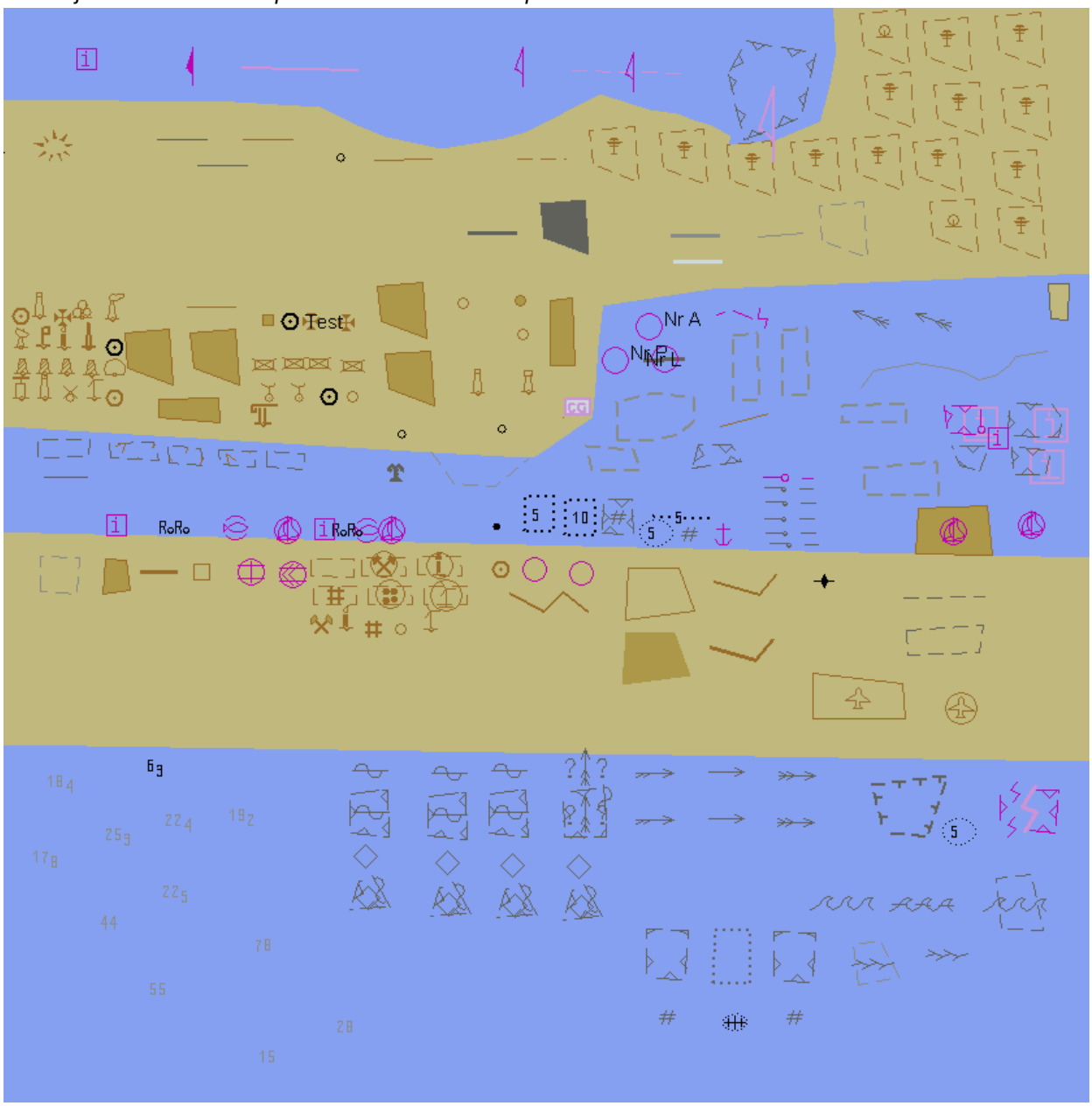
Test Reference	3.1.6	**IHO Reference**	S-52 14.4, 14.5
Test description			
The purpose of the test is to verify that ECDIS is able to change text display settings and display text in accordance with the requirements of IHO S-52 Presentation Library Edition 4.0. Minimum two text display categories should be available in the ECDIS HMI			
Setup			
Load cells AA5DBASE.000, AA5STNDR.000 and AA5OTHER.000 from 3.1 ENC Display 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*			
Action			
Switch on Other Display. Check that ECDIS HMI contains standardized controls that can switch on and off certain objects 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*			

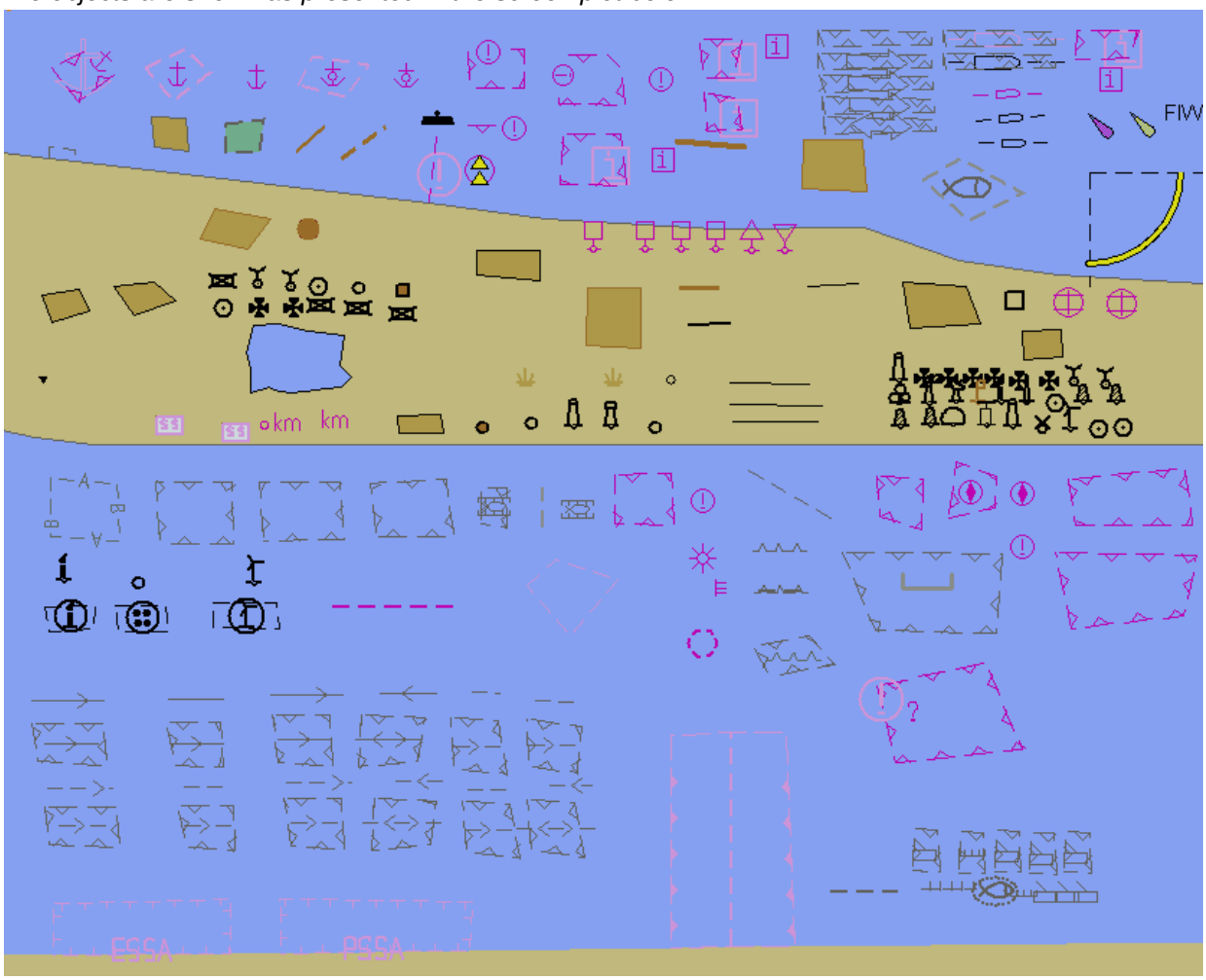
Action
View cell AA5DBASE.000 *Select Display Category Display Base* *Switch off all text group controls and switch on only the "**Important Text**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below (scale 1:60 000) 

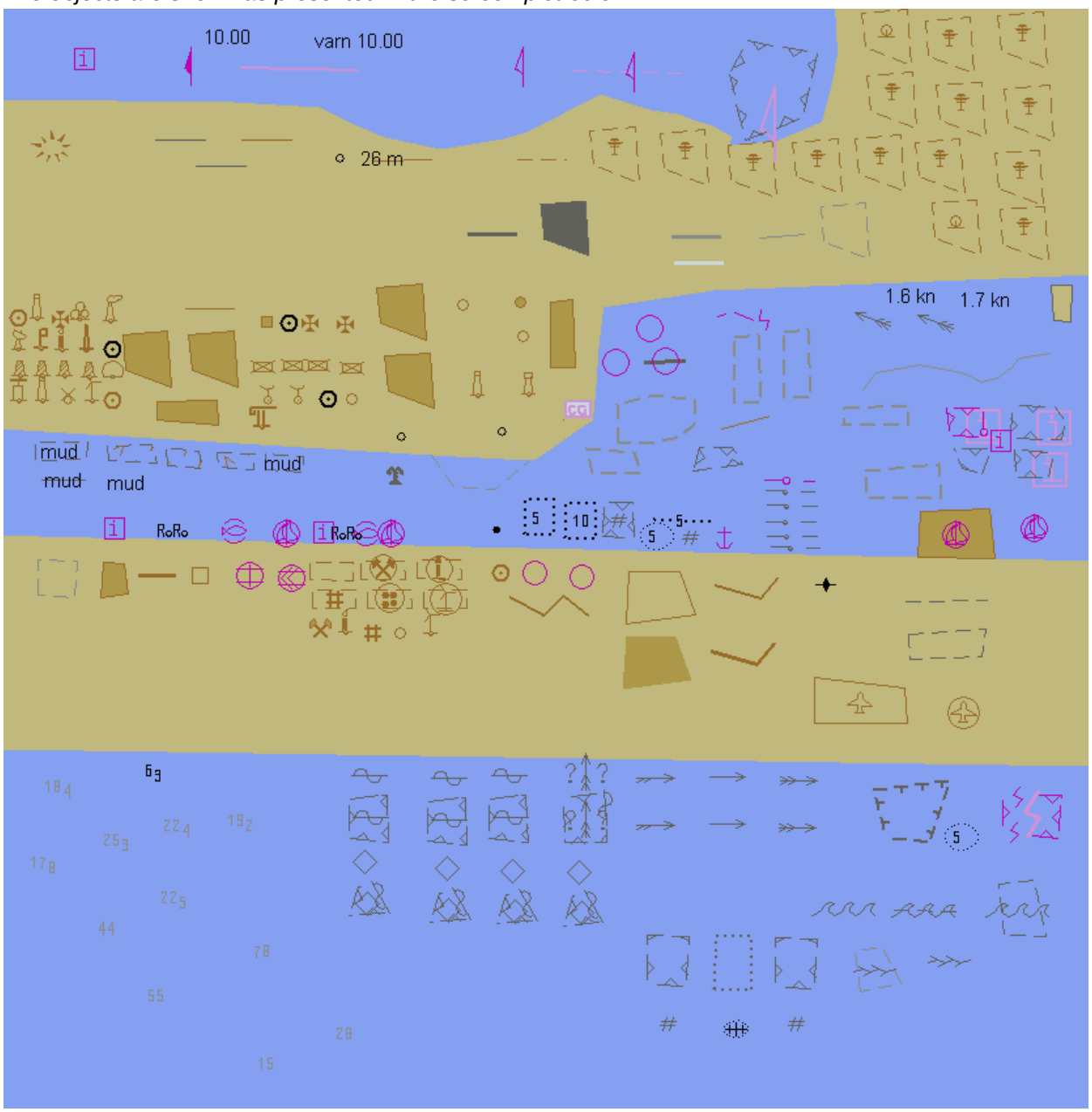
Action
View cell AA5STNDR.000 *Select Display Category Standard* *Switch off all text group controls and switch on only the "**Important Text**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below (scale 1:70 000) 

Action
View cell AA5STNDR.000 *Select Display Category Other* *Switch off all text group controls and switch on only the "**Other Text**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below (scale 1:60 000) 

Action
View cell AA5OTHER.000 *Select Display Category Other* *Switch off all text group controls and switch on only the "**Other Text**" control.* *Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below 

Action
View cell AA5OTHER.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 objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below 

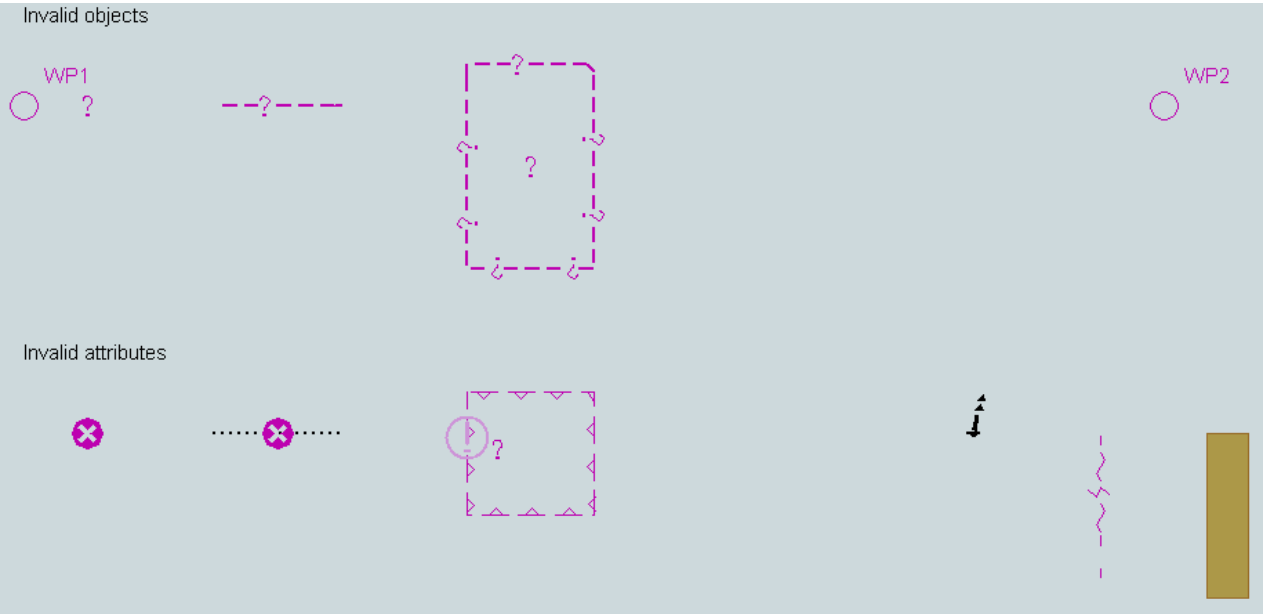
Action
View cell AA5STNDR.000 *Switch off all text group controls and switch on only the "**Light description**" control located under the "**Other Text**" control. Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below     A part of above chart at scale 1:20 000

Action
View cell AA5OTHER.000 *Switch off all text group controls and switch on only the "**All other**" control located under the "**Other Text**" control. Verify that the objects are displayed correctly as presented in the plot.*
Results
The objects are shown as presented in the screen plot below 

3.2 Invalid objects

3.2.1 Display of Invalid Objects

Test Reference	3.2.1 a)	IHO Reference	S-52 10.3.3.4
Test description			
Display of objects with unknown object class or display of objects for which available or not available attribute(s) cause special presentation.			
Setup			
Load the following cell 3.2 Invalid Object\ENC_ROOT\AA3INVOB.000 *Set the Safety Contour value to 0 m* *Select Display Category Other* *Select Colour Palette DAY* *Select Symbolized Boundaries* *Select Paper chart symbols* *Select Unknown*			
Action			
View chart at scale 1:50 000			
Results			
Confirm that the symbol SY(QUESMRK1) is displayed as below for following cases: *a) unknown object class, point geometry* *b) unknown object class, line geometry* *c) unknown object class, area geometry* *d) known object class for which missing attribute cause presentation of additional symbol SY(QUESMRK1)*			



Test Reference	3.2.1 b)	IHO Reference	S-52 10.3.3.4

Test description

Display of objects with unknown object class or display of objects for which available or not available attribute(s) cause special presentation.

Setup

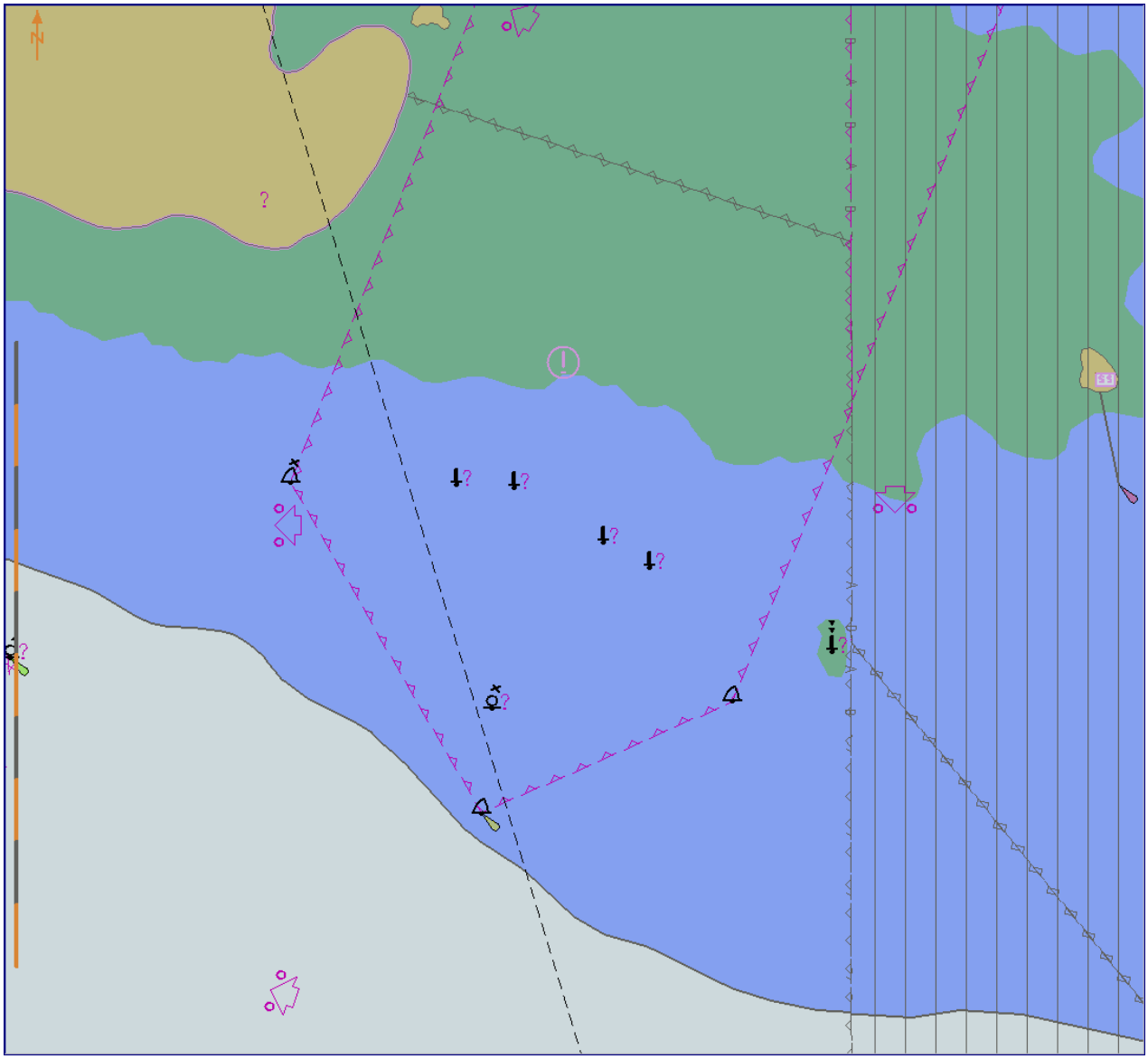
Load the following cell:
3.2 Invalid Object\Invalid Base\ENC_ROOT\GB5X01NE.000
2.1.1 Power Up\ENC_ROOT\GB4X0000.000
Set the Safety Contour value to 10 m
Select Display Category Standard
Select Colour Palette DAY
Select Symbolized Boundaries
Select Paper chart symbols

Action

View chart at scale 1:10 000

Results

Confirm that all objects display as shown in the following screenshot



3.2.2 Invalid Object Pick Report Display

Test Reference	3.2.2 a)	**IHO Reference**	S-52 10.8.6
Test description			
Display of pick report information for objects with unknown object class.			
Setup			
As for test 3.2.1 a)			
Action			
1. Select the following objects: *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 object is displayed only when object 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 object is removed from the display.*			

Test Reference	3.2.2 b)	**IHO Reference**	S-52 10.8.6
Test description			
Display of pick report information for objects with unknown object class.			
Setup			
As for test 3.2.1 b)			
Action			
1. Select the following object 32°30.924'S, 60°58.719'E *2. Remove pick report information from display.*			
Results			
1a. Pick report associated with chart object is displayed only when object is selected. *1b. This example has no attributes. Only unknown object and its position is available in the pick report.* *2. Pick report associated with chart object is removed from the display.*			

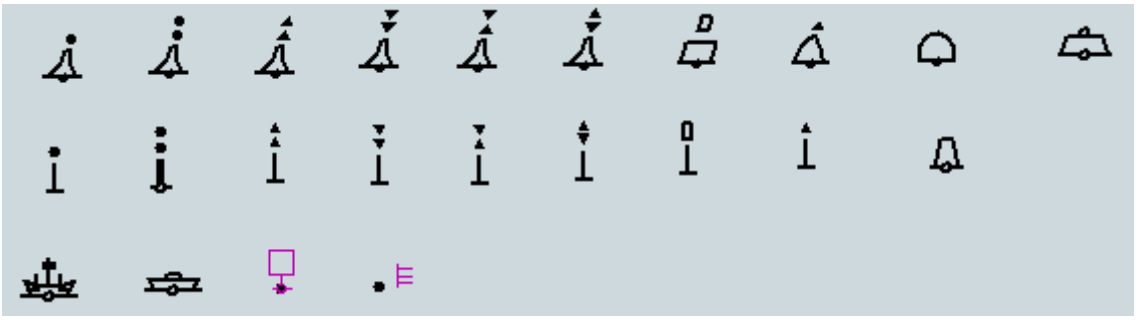
Test Reference	3.2.2 c)	**IHO Reference**	S-52 10.8.6
Test description			
Display of pick report information for known objects which has unknown attribute(s).			
Setup			
As for test 3.2.1 a)			
Action			
1. Select the following objects: *- 39°29.000'N, 104°44.000'W* *- 39°29.000'N, 104°43.000'W* *- 39°28.000'N, 104°41.000'W* *2. Remove pick report information from display.*			

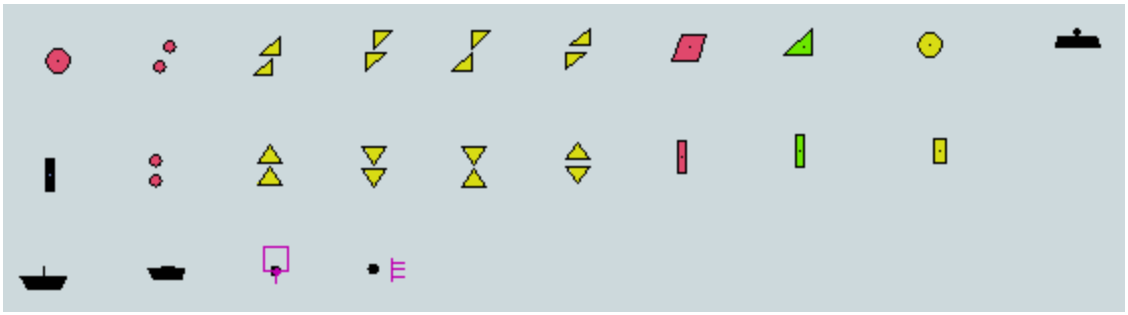
Results
1a. Pick report associated with chart object is displayed only when object is selected. *1b. First example is a wreck and it has 1 unknown attribute and 1 known attributes (Water level effect is Covers and uncovers).* *1c. Second example is an obstruction and it has 1 unknown attribute and 1 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 object is removed from the display.*

Test Reference	3.2.2 d)	**IHO Reference**	S-52 10.8.6
Test description			
Display of pick report information for known objects for which available or not available attribute(s) cause special presentation.			
Setup			
As for test 3.2.1 b)			
Action			
1. Select the following objects: *- 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 object is displayed only when object 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 object is removed from the display.*			

3.3 Independent Mariner Selections

3.3.1 Paper chart and simplified symbols

Test Reference	3.3.1 a)	**IHO Reference**	S-52 App B-F
Test description			
Display of objects with paper chart symbols.			
Setup			
Load the following cell 3.3 Settings\ENC_ROOT\GB4X0001.000 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 Paper chart symbols*			
Action			
View the objects 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 objects display as follows: 			

Test Reference	3.3.1 b)	**IHO Reference**	S-52 App B-F
Test description			
Display of objects with paper chart symbols.			
Setup			
As for test 3.3.1 a) *Select Simplified Symbols*			
Action			
View the objects 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 objects display as follows: 			

3.3.2 Symbolized and plain boundaries

Test Reference	3.3.2 a)	IHO Reference	S-52 App B-F

Test description

Display of objects with plain boundaries.

Setup

Load the following cell 3.3 Settings\ENC_ROOT\GB4X0001.000 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 Paper chart symbols
Select all Text groups

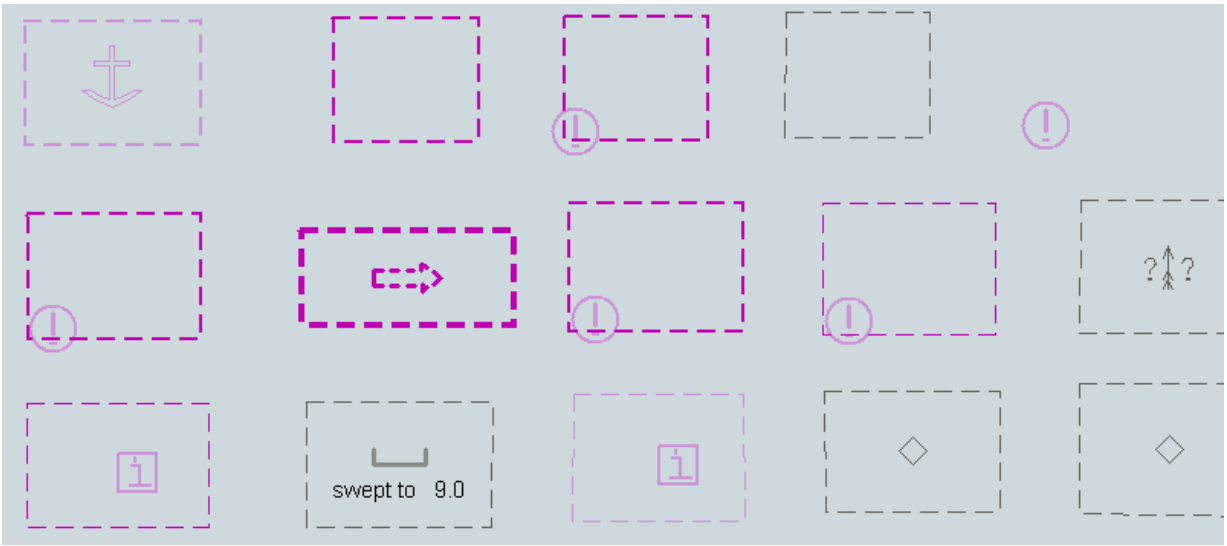
Action

Zoom into 1:5 000 and View the objects 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

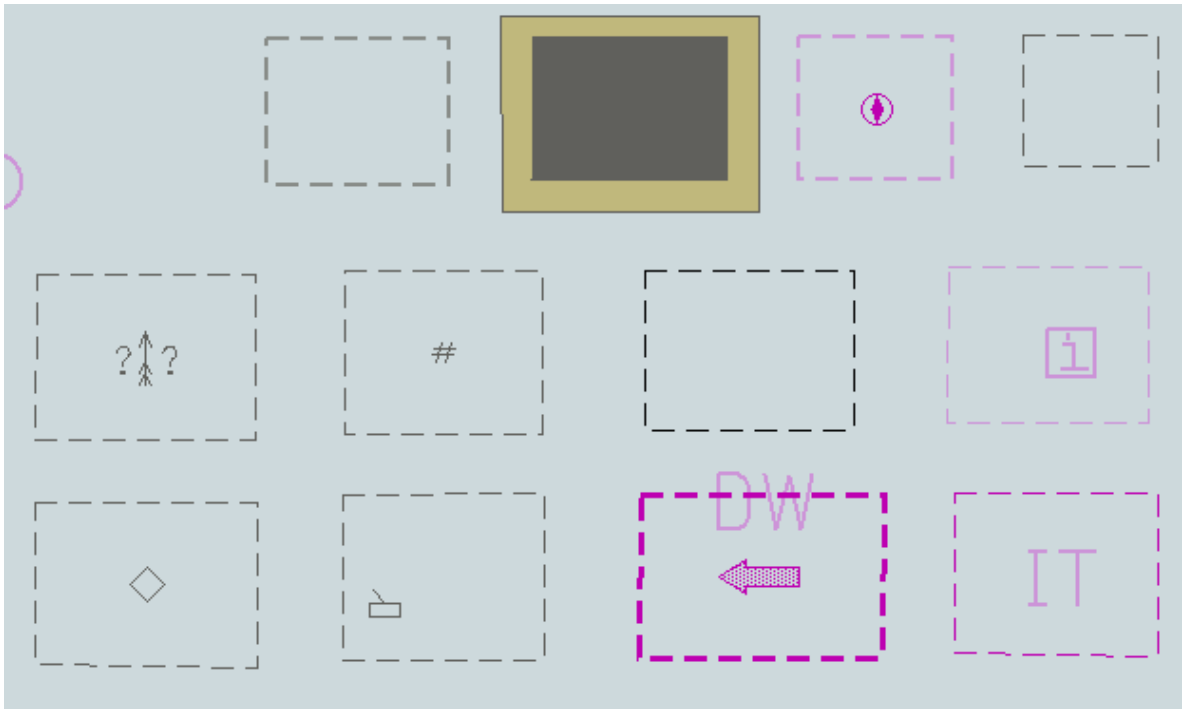
Results

Confirm that the objects display as follows:

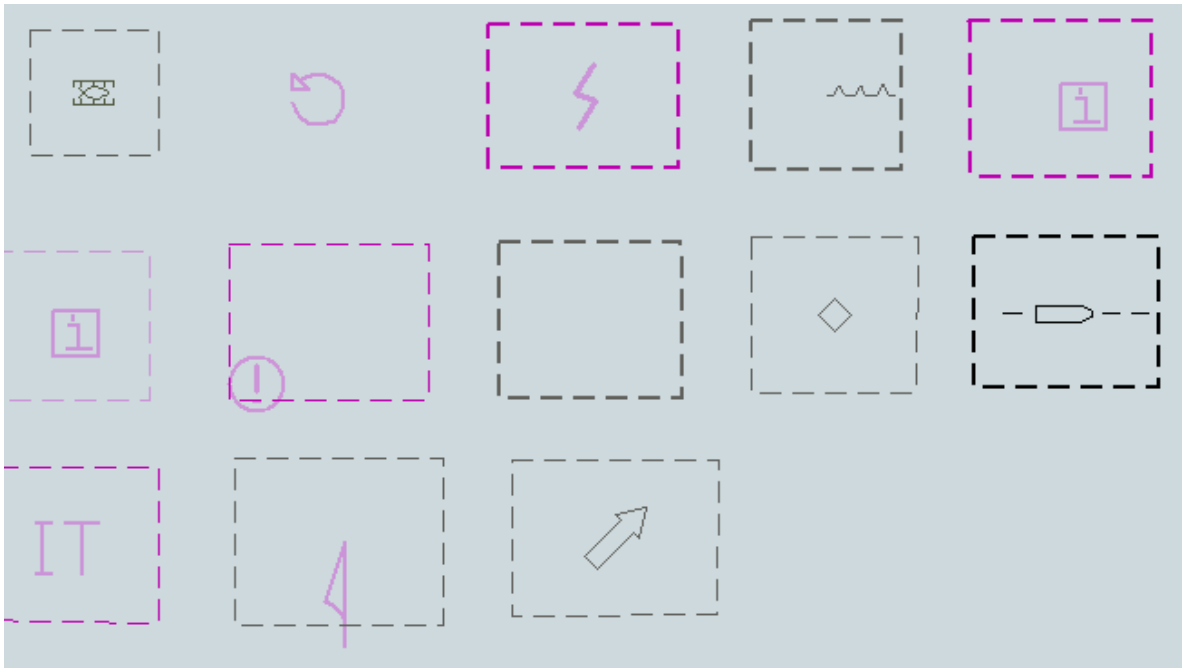
1) at position 32°36.900'S 61°20.840'E:



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



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



Test Reference	3.3.2 b)	IHO Reference	S-52 App B-F

Test description

Display of objects with symbolized boundaries.

Setup

As for test 3.3.2 a) and Select Symbolized Boundaries

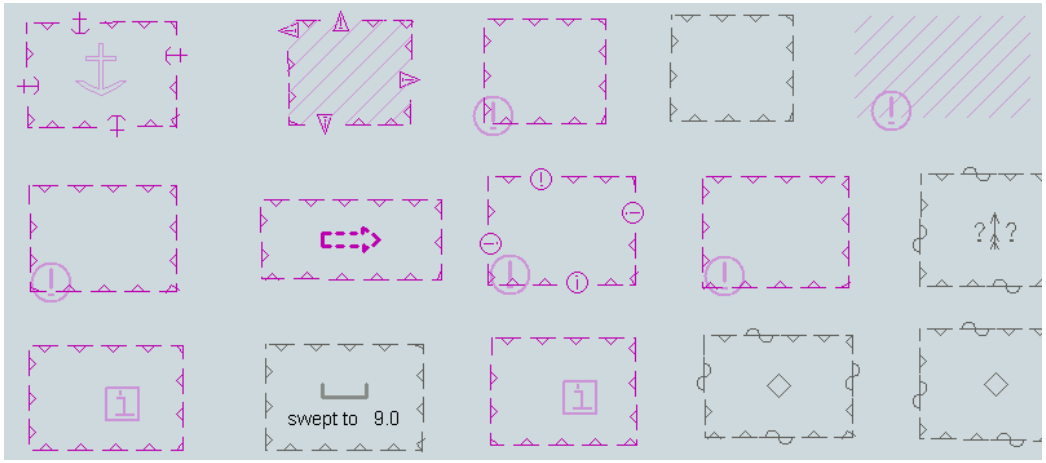
Action

Zoom into 1:5 000 and View the objects 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

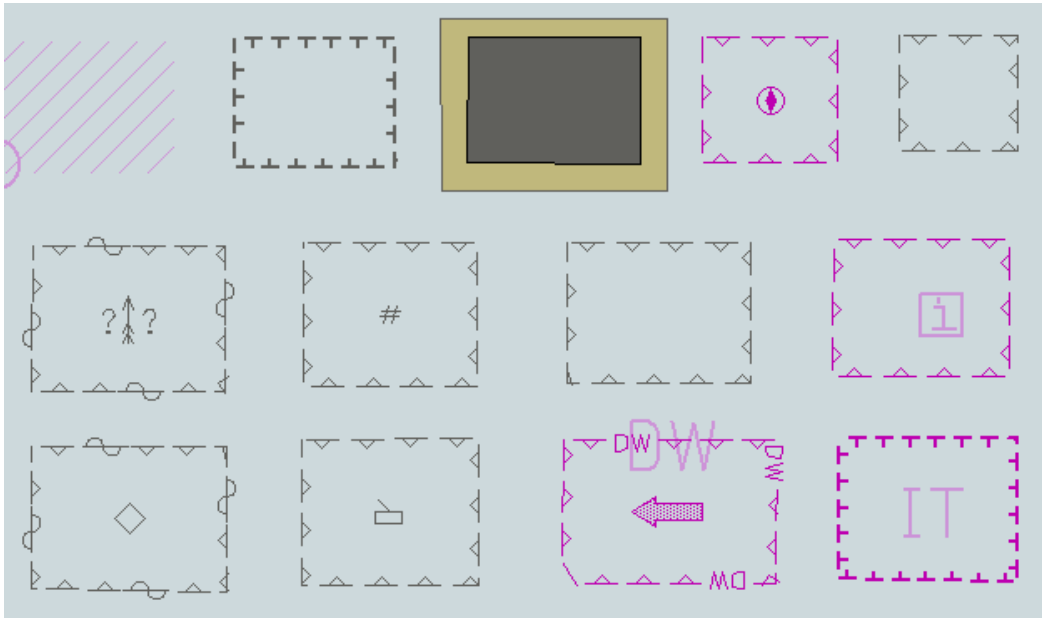
Results

Confirm that the objects display as follows:

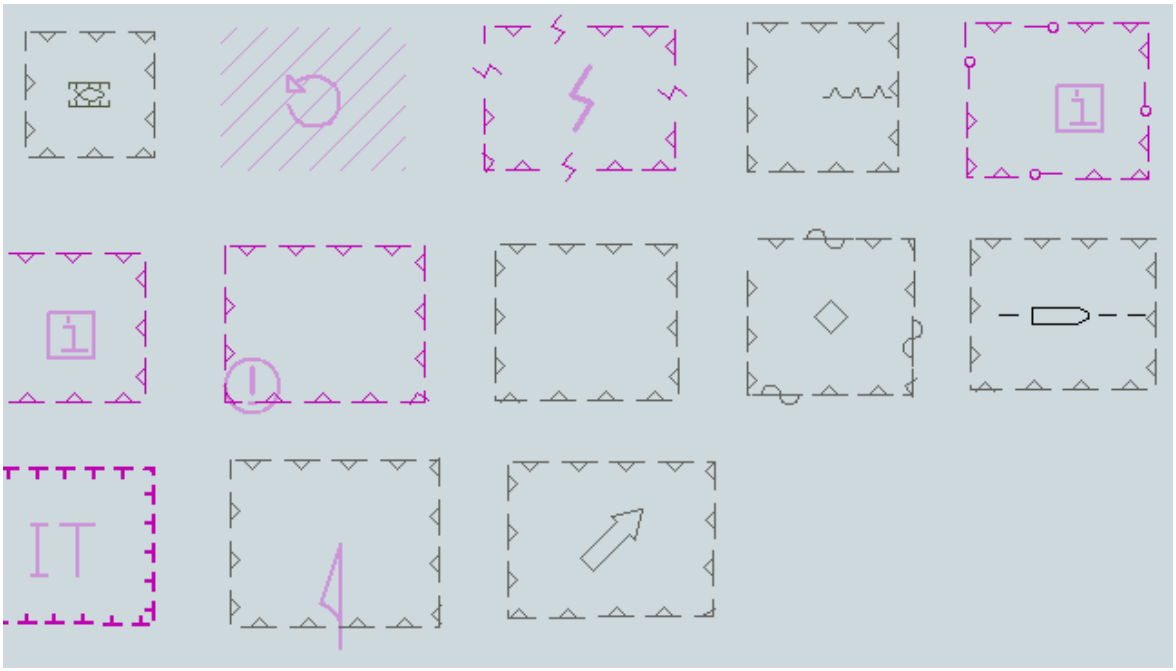
1) at position 32°36.900'S 61°20.840'E:



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

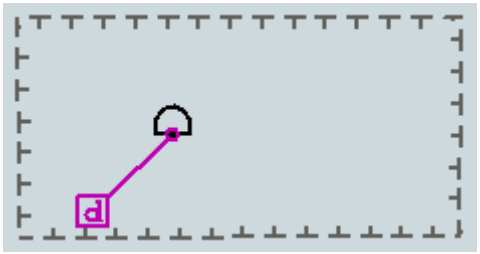


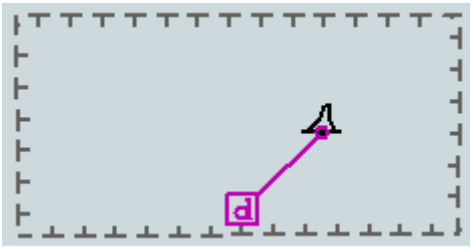
3) at position 32°36.900'S 61°21.950'E:

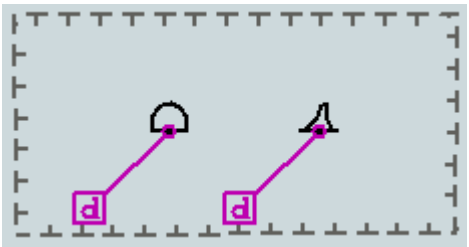


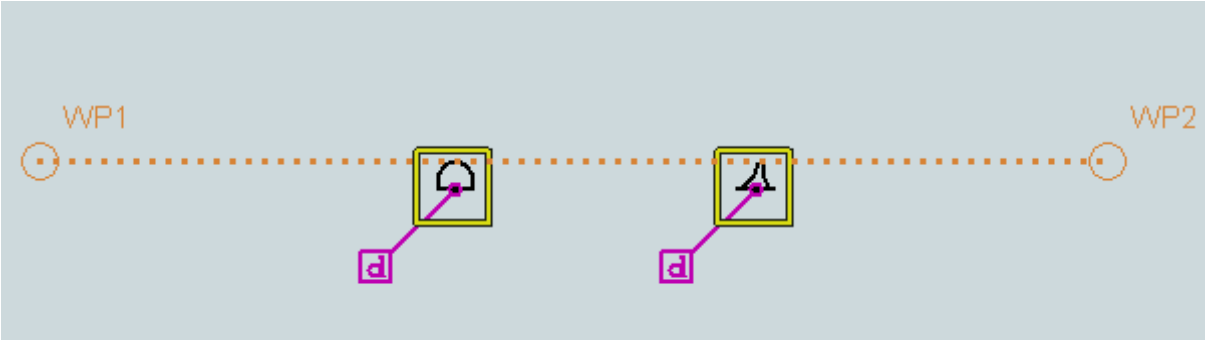
3.3.3 Date Dependent Display and Functionality

3.3.3.1 DATSTA/DATEND on buoys

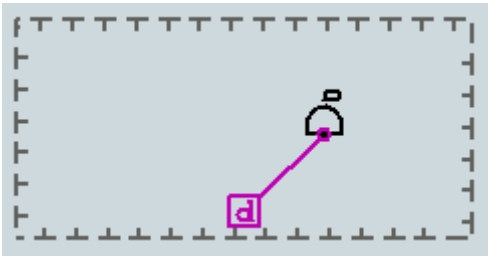
Test Reference	3.3.3.1 a)	**IHO Reference**	S-52 10.4.1
Test description			
Display of date dependent objects, current date. (DATSTA and DATEND)			
Setup			
Load the following cell 3.3 Settings\ENC_ROOT\GB4X0001.000 with the following settings: *Select Display Category Other* *Select Symbolized Boundaries* *Select Paper chart symbols* *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 after20131201).*			
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 object displays as in the image below: 			

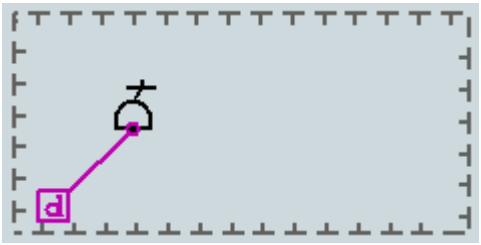
Test Reference	3.3.3.1 b)	IHO Reference	S-52 10.4.1
Test description			
Display of date dependent objects, set date. (DATSTA and DATEND)			
Setup			
As for test 3.3.3.1 a) *Select Highlight date dependent* *Ensure that the viewing date is set to 18.02.2012*			
Action			
As for test 3.3.3.1 a)			
Results			
Confirm that the object displays as in the image below and that a permanent indication is shown as specified in S-52 10.4.1:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-52 10.4.1.*			

Test Reference	3.3.3.1 c)	IHO Reference	S-52 10.4.1
Test description			
Display of date dependent objects, date range. (DATSTA and DATEND)			
Setup			
As for test 3.3.3.1 b) *Set the viewing date range as follows:* *Start viewing date= 01.02.2012* *End viewing date= 01.12.2012*			
Action			
As for test 3.3.3.1 a)			
Results			
Confirm that the object displays as in the image below and that a permanent indication is shown as specified in S-52 10.4.1:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-52 10.4.1.*			

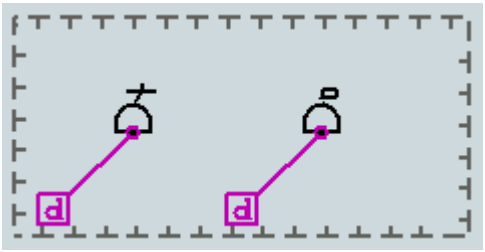
Test Reference	3.3.3.1 d)	IHO Reference	S-52 10.4.1
Test description			
Route checking of date dependent objects, date range. (DATSTA and DATEND)			
Setup			
As for test 3.3.3.1 c) *Select scale 1:10 000*			
Action			
As for test 3.3.3.1 a) *Create a route from 32°36.425'S 61°20.335'E to 32°36.425'S 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-52 10.4.1.*			

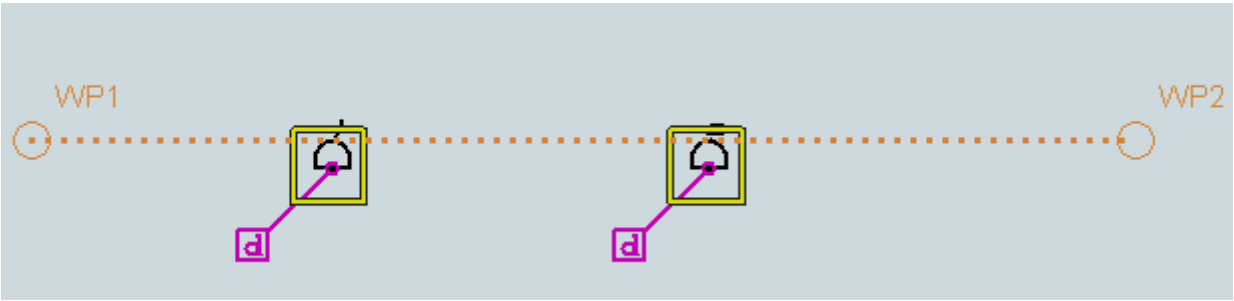
3.3.3.2 PERSTA/PEREND on buoys

Test Reference	3.3.3.2 a)	IHO Reference	S-52 10.4.1
Test description			
Display of date dependent objects, current date. (PERSTA and PEREND)			
Setup			
Load the following cell 3.3 Settings\ENC_ROOT\GB4X0001.000 with the following settings: *Select Display Category Other* *Select Symbolized Boundaries* *Select Paper chart symbols* *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 01.11.2013*			
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 object displays as in the diagram below:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-52 10.4.1.*			

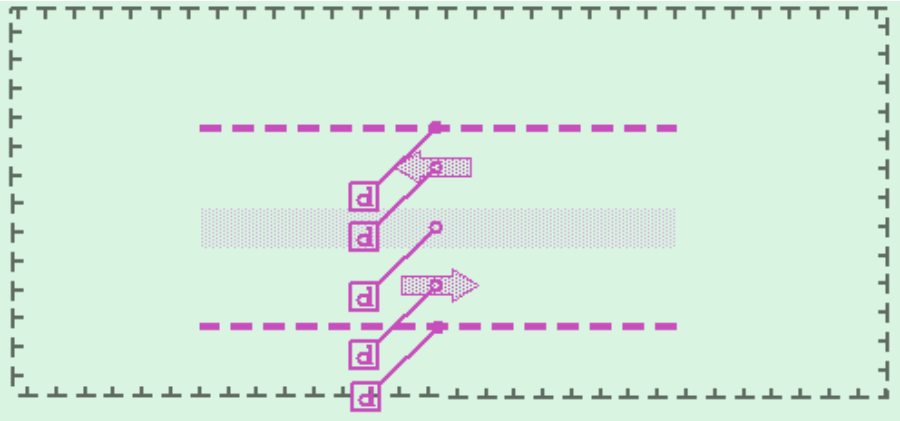
Test Reference	3.3.3.2 b)	IHO Reference	S-52 10.4.1
Test description			
Display of date dependent objects, set date. (PERSTA and PEREND)			
Setup			
As for test 3.3.3.2 a) *Select Highlight date dependent* *Ensure that viewing date is set to 18.03.2013*			
Action			
As for test 3.3.3.2 a)			
Results			
Confirm that the object displays as in the image below and that a permanent indication is shown as specified in S-52 10.4.1:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-52 10.4.1.*			

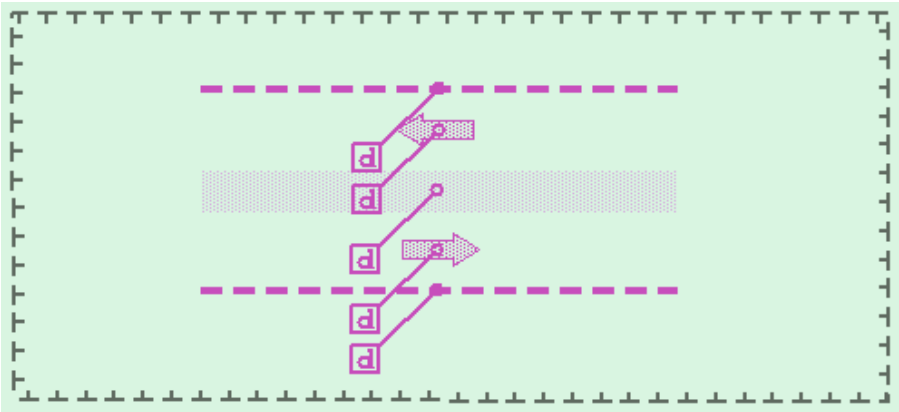
Test Reference	3.3.3.2 c)	IHO Reference	S-52 10.4.1
Test description			
Display of date dependent objects, date range. (PERSTA and PEREND)			

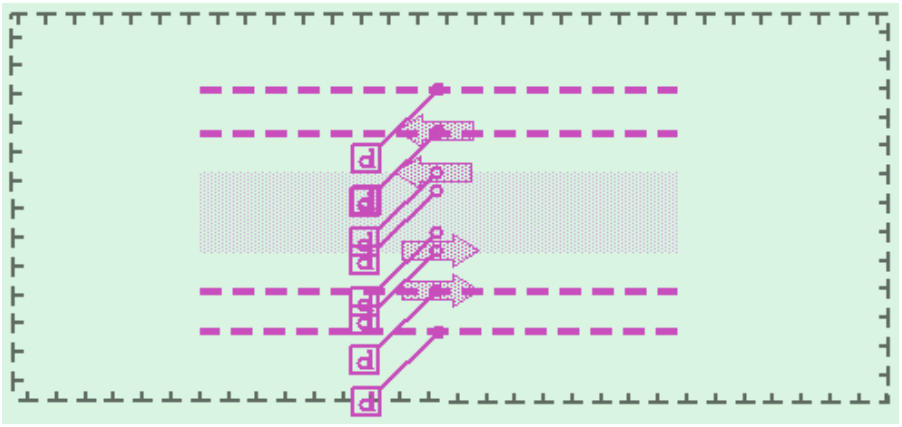
Setup
As for test 3.3.3.2 b) *Set the viewing date range as follows:* *Start viewing date = 01.02.2012* *End viewing date = 01.11.2012*
Action
As for test 3.3.3.2 a)
Results
Confirm that the object displays as in the image below and that a permanent indication is shown as specified in S-52 10.4.1:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-5210.4.1.*

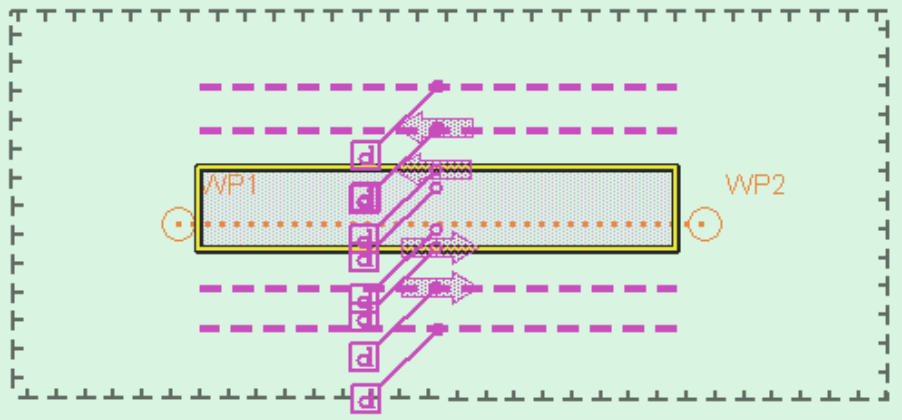
Test Reference	3.3.3.2 d)	**IHO Reference**	S-52 10.4.1
Test description			
Route checking of date dependent objects, date range. (PERSTA and PEREND)			
Setup			
As for test 3.3.3.2 c) *Select scale 1:10 000*			
Action			
As for test 3.3.3.2 a) *Create a route from 32°36.425'S 61°21.400'E to 32°36.425'S 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-52 10.4.1.*			

3.3.3.3 DATSTA/DATEND on Traffic Separation Schemes (TSS)

Test Reference	3.3.3.3 a)	**IHO Reference**	S-52 10.4.1
Test description			
Display of date dependent objects, current date. (DATSTA and DATEND)			
Setup			
Load the following cell 3.3 Settings\ENC_ROOT\GB4X0001.000 with the following settings: *Select Display Category Other* *Select Symbolized Boundaries* *Select Paper chart symbols* *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 20131201).*			
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 object displays as in the image below: 			

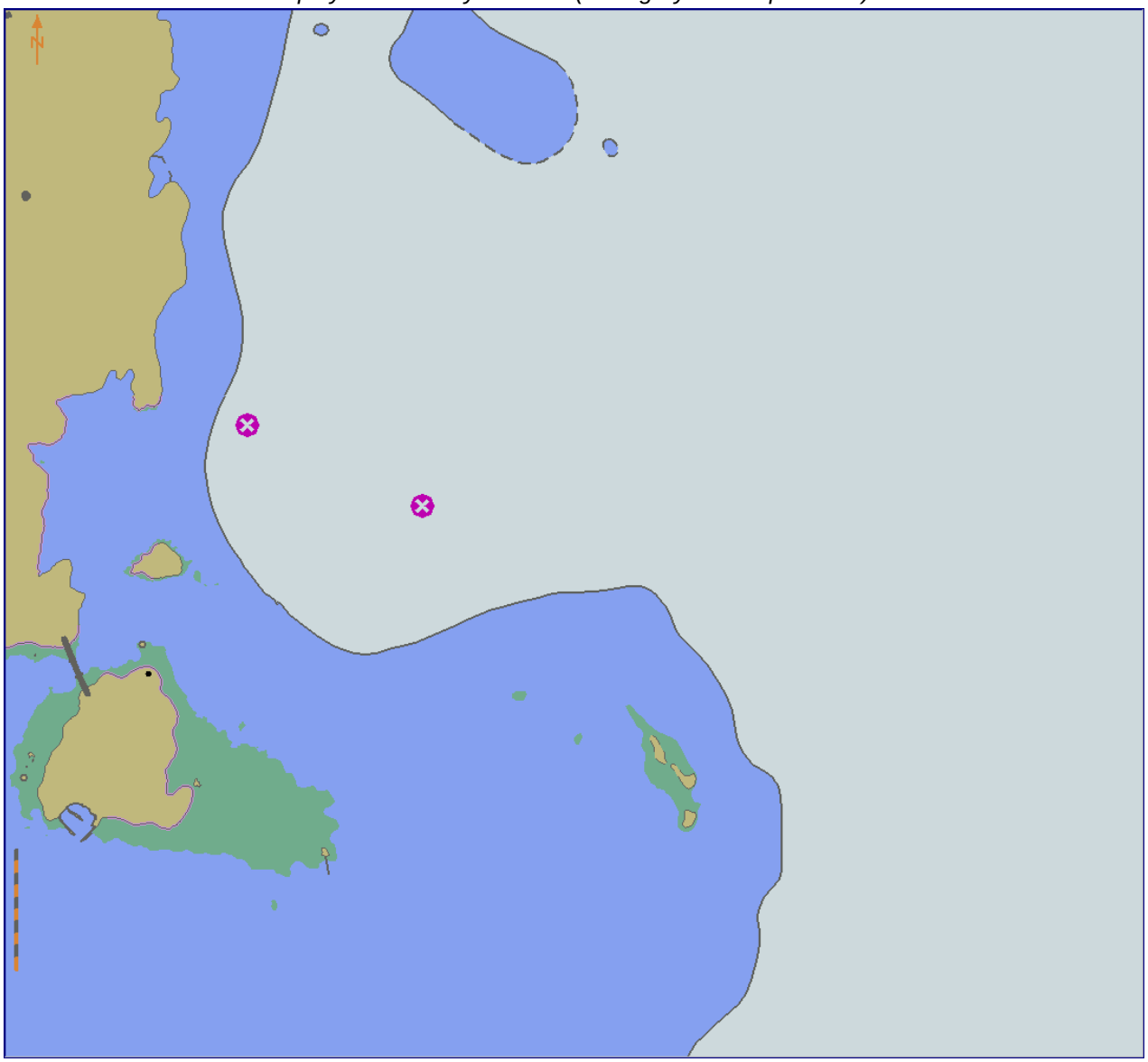
Test Reference	3.3.3.3 b)	**IHO Reference**	S-52 10.4.1
Test description			
Display of date dependent objects, set date. (DATSTA and DATEND)			
Setup			
As for test 3.3.3.3 a) *Select Highlight date dependent* *Ensure that viewing date is set to 30.11.2013*			
Action			
As for test 3.3.3.3 a)			
Results			
Confirm that the object displays as in the image below and that a permanent indication is shown as specified in S-52 10.4.1:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-52 10.4.1.*			

Test Reference	3.3.3.3 c)	IHO Reference	S-52 10.4.1
Test description			
Display of date dependent objects, date range. (DATSTA and DATEND)			
Setup			
As for test 3.3.3.3 b) *Set the viewing date range as follows:* *Start viewing date = 01.11.2013* *End viewing date = 01.12.2013*			
Action			
As for test 3.3.3.3 a)			
Results			
Confirm that the object displays as in the image below and that a permanent indication is shown as specified in S-52 10.4.1:  *Note: A permanent indication that the date has been adjusted should be shown as specified in S-52 10.4.1.*			

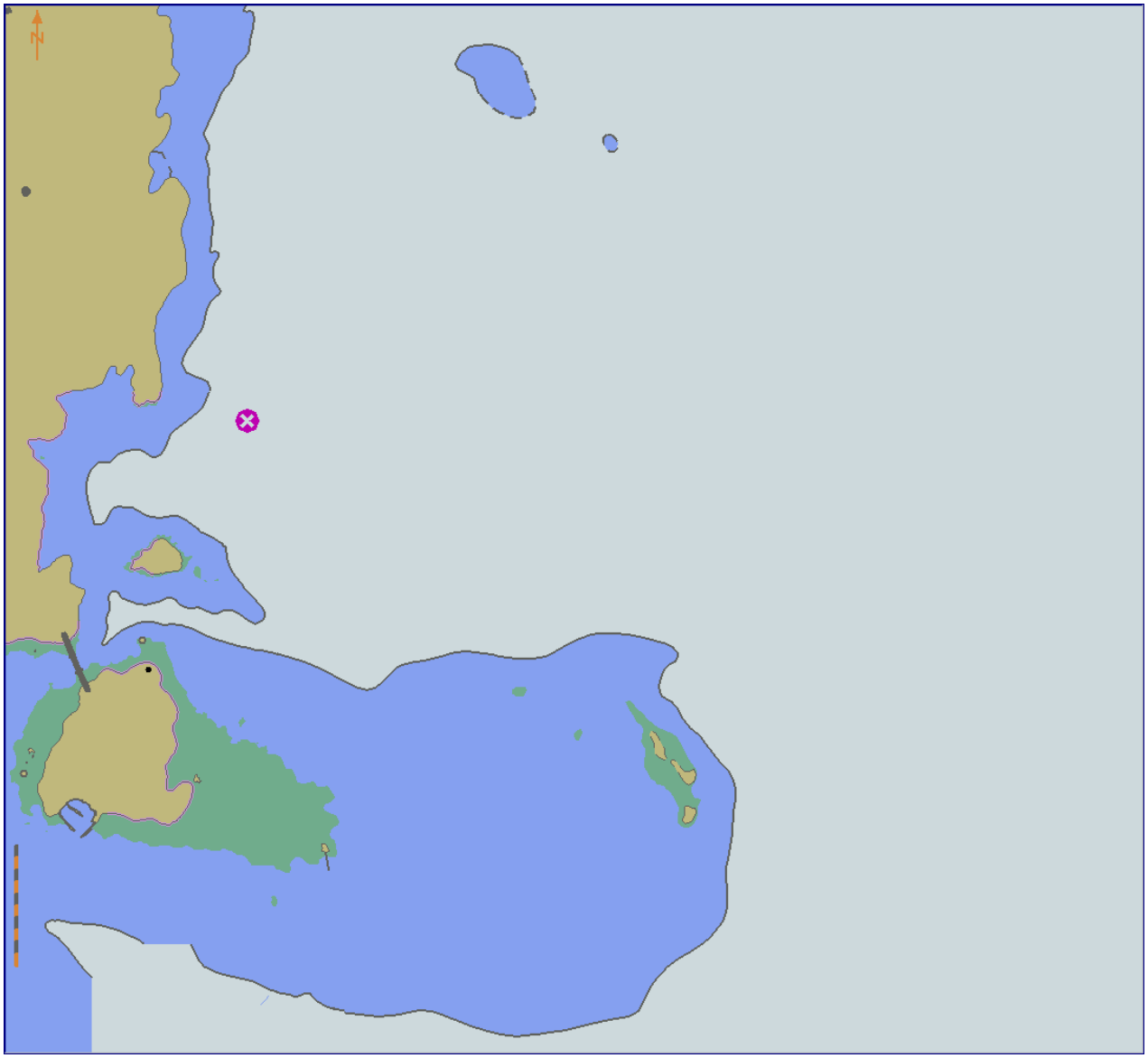
Test Reference	3.3.3.3 d)	IHO Reference	S-52 10.4.1
Test description			
Route checking of date dependent objects, date range. (PERSTA and PEREND)			
Setup			
As for test 3.3.3.3 c)			
Action			
As for test 3.3.3.3 a) *Create a route from 32°35.325'S 61°20.800'E to 32°35.325'S 61°21.960'E with a cross 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-52 10.4.1.*			

3.3.4 Safety contour

Test Reference	3.3.4 a)	IHO Reference	S-52 10.6.2 S-52 10.13.2
Test description			
Display of default safety contour			
Setup			
Switch on EUT without setting Safety Contour value (factory default setting). *Load all cells from 2.1.1 Power Up\ENC_ROOT*			
Action			
Display loaded cell GB4X0000.000 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 GB4X0000.000 must be displayed as Safety Contour (thick grey line as per S-52).			



Test Reference	3.3.4 b)	IHO Reference	S-52 10.6.2 S-52 10.13.2
Test description			
Display of safety contour			
Setup			
As for test 3.3.4 a)			
Action			
1. Select a Safety Contour value of 15 m. None of the ENCs (with the exception of GB5X01SE.000) have a 15 m contour. *2. Other values should also be investigated. The harbour charts (i.e. GB5*****.000) contain 0, 2, 5, 10, 20m contours, and the contour intervals on the approach chart (i.e. GB4X0000.000 are 0, 2, 5, 10, 20, 30, 50, 100, 200, 300, and 400m.*			
Results			
1. In cell GB5X01SE.000 the 15 m contour and in the other cells 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.*			



Test Reference	3.3.4 c)	IHO Reference	S-52 13.2.19 S-52 10.3.4.4 S-52 13.2.24

Test description

Display of Safety Contour and isolated dangers within the safe water enclosed by the ship's safety contour.

Setup

As for test 3.3.4 a)

Action

Select Shallow water dangers for display

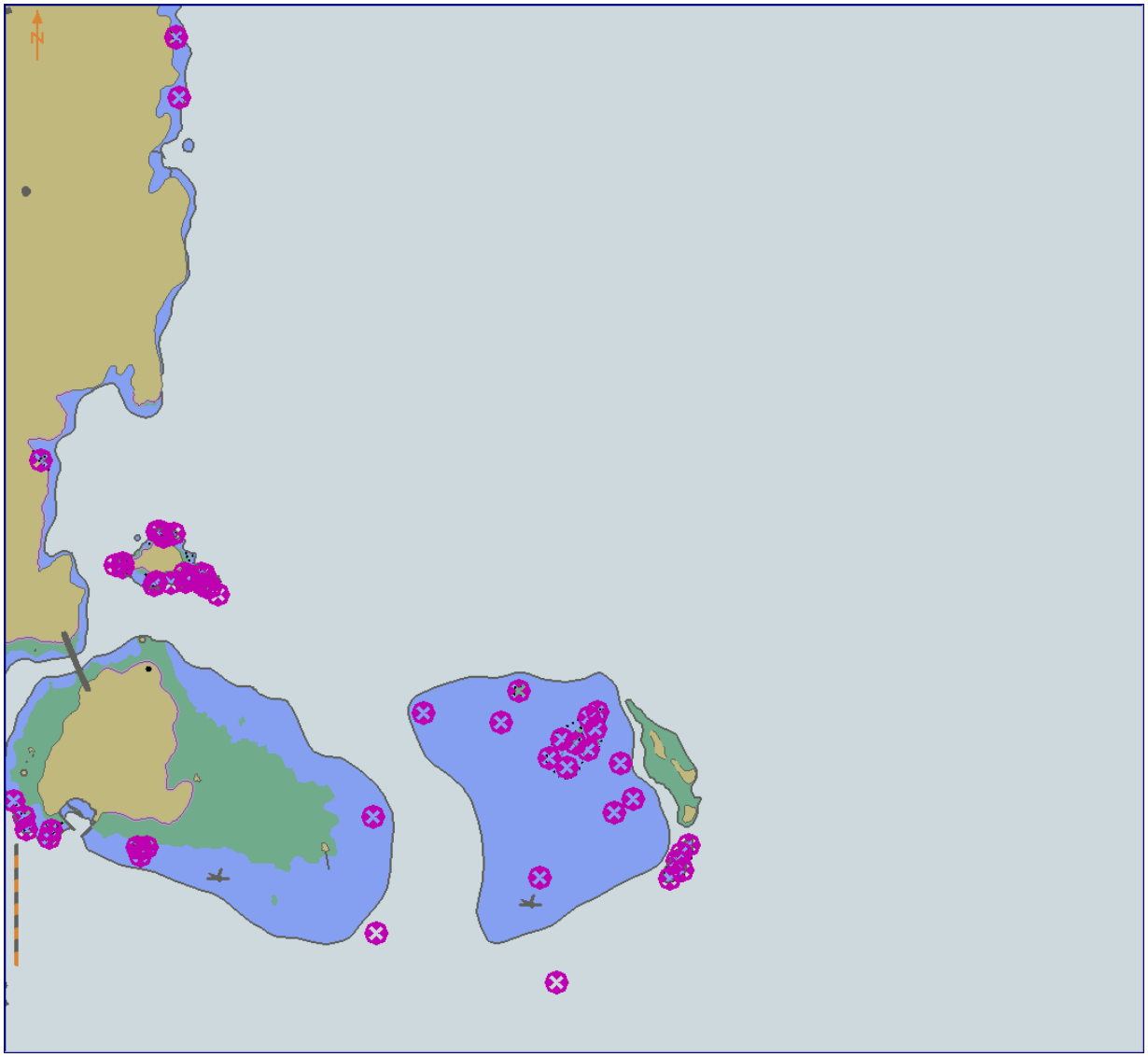
1. Set the Safety Contour value to 5 m

2. Set the Safety Contour value to 10 m.

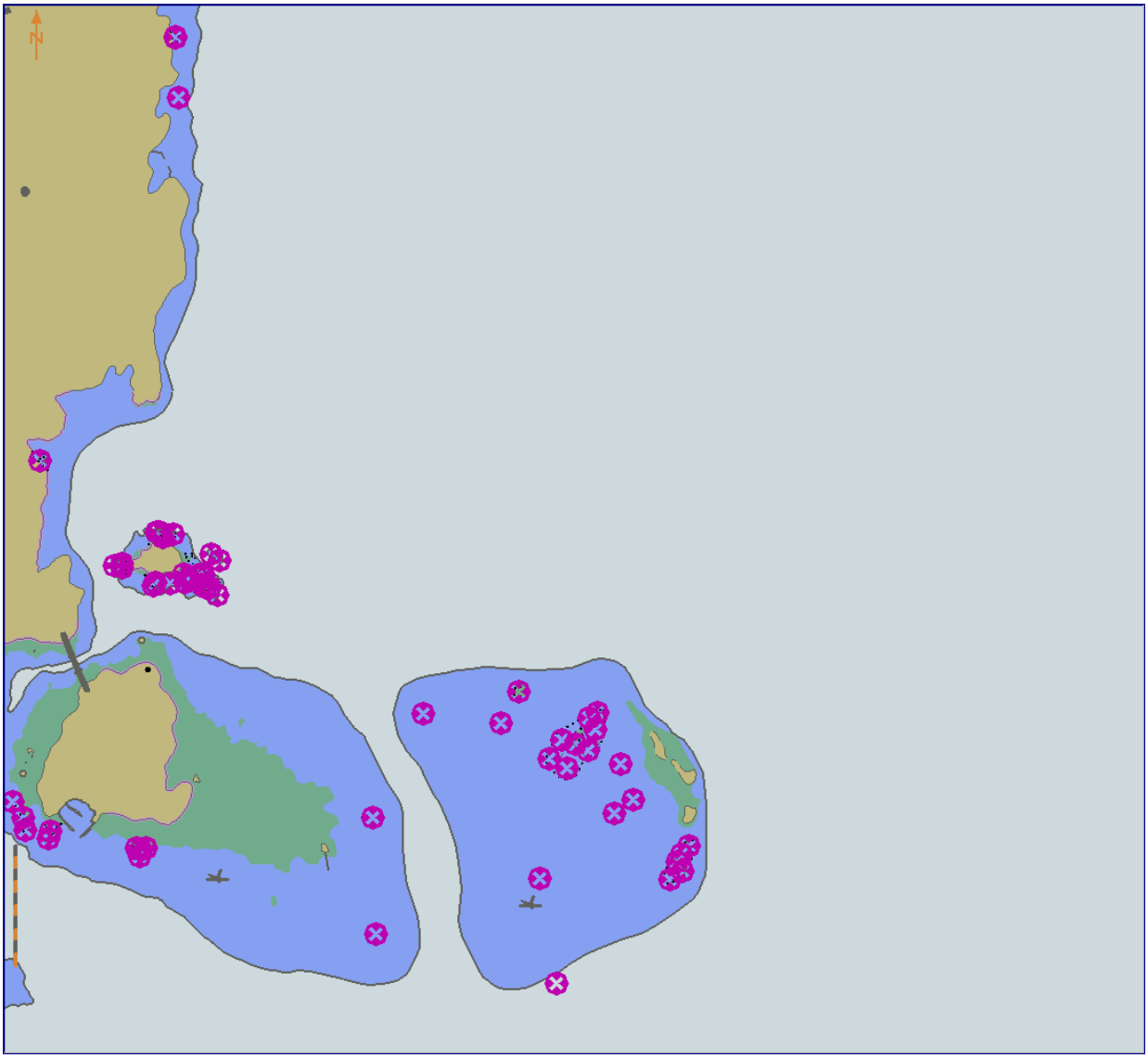
Results

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



2. Safety Contour set as 10 m



Test Reference	3.3.4 d)	IHO Reference	S-52 13.2.19 S-52 10.3.4.4 S-52 13.2.24 S-52 14.2

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 3.3.4 a)

Action

Select Shallow water dangers for display

Select Four shades

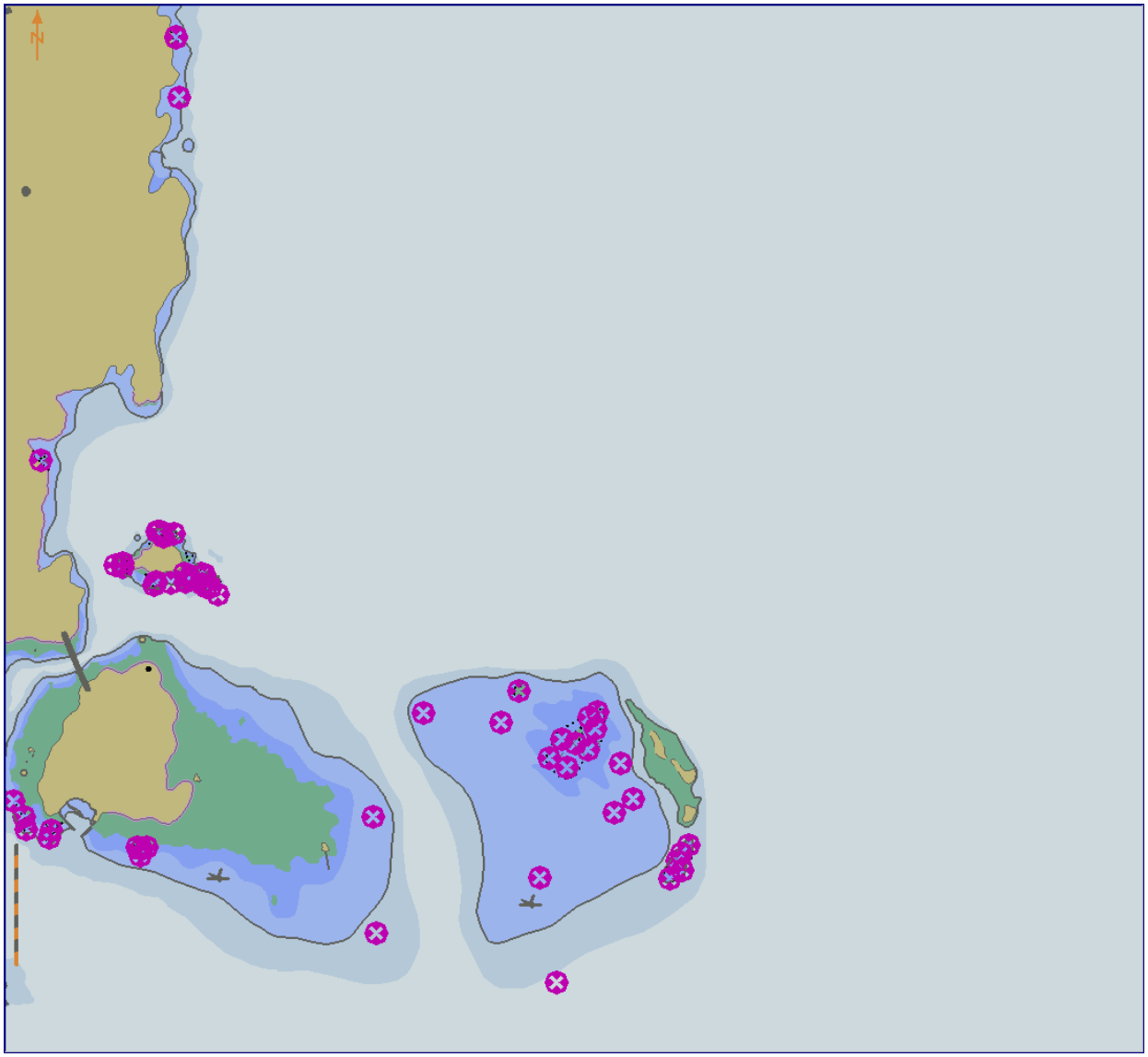
1. Set the Safety Contour value to 5 m (shallow contour 2 m, deep contour 10 m).

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

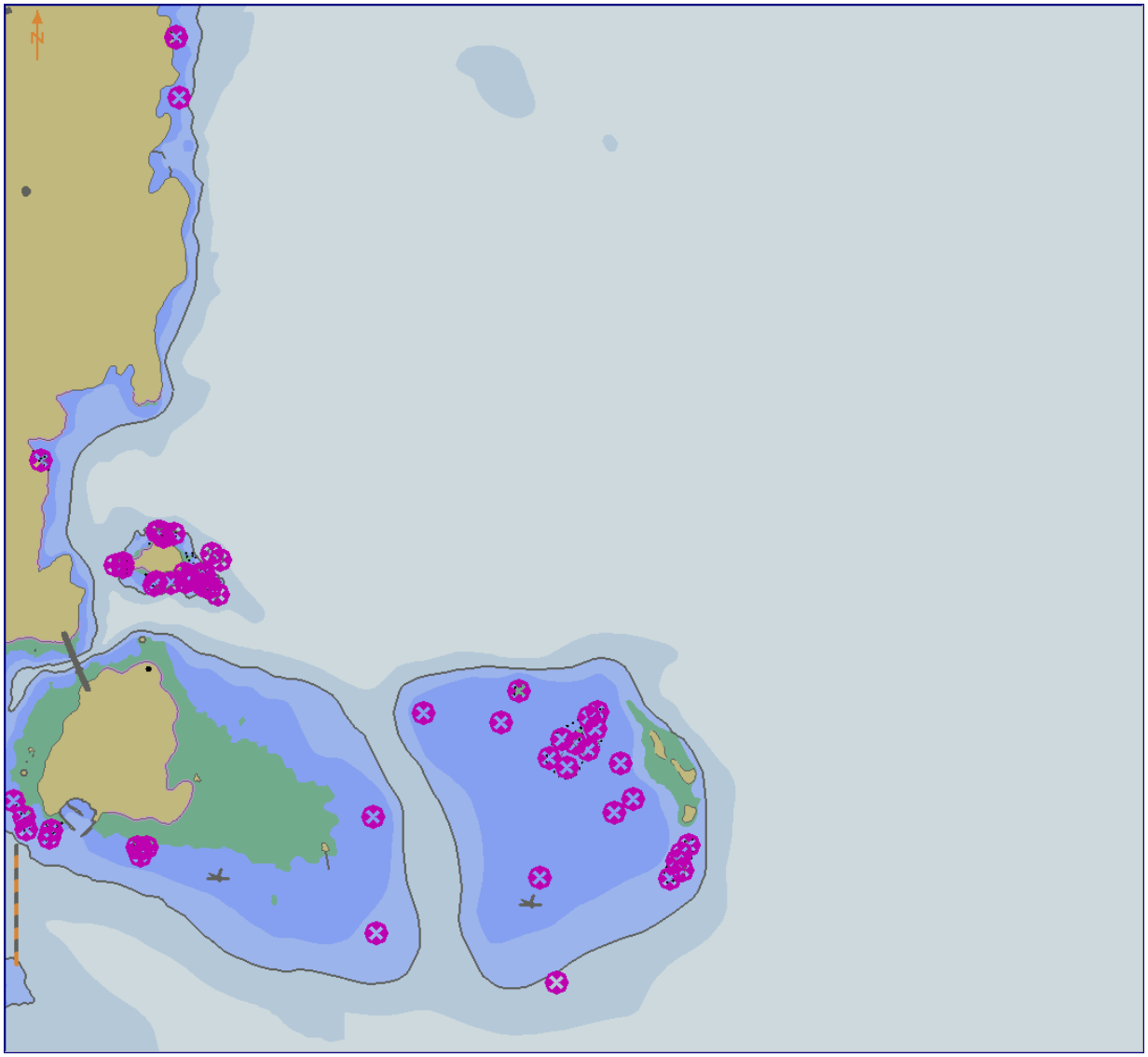
Results

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

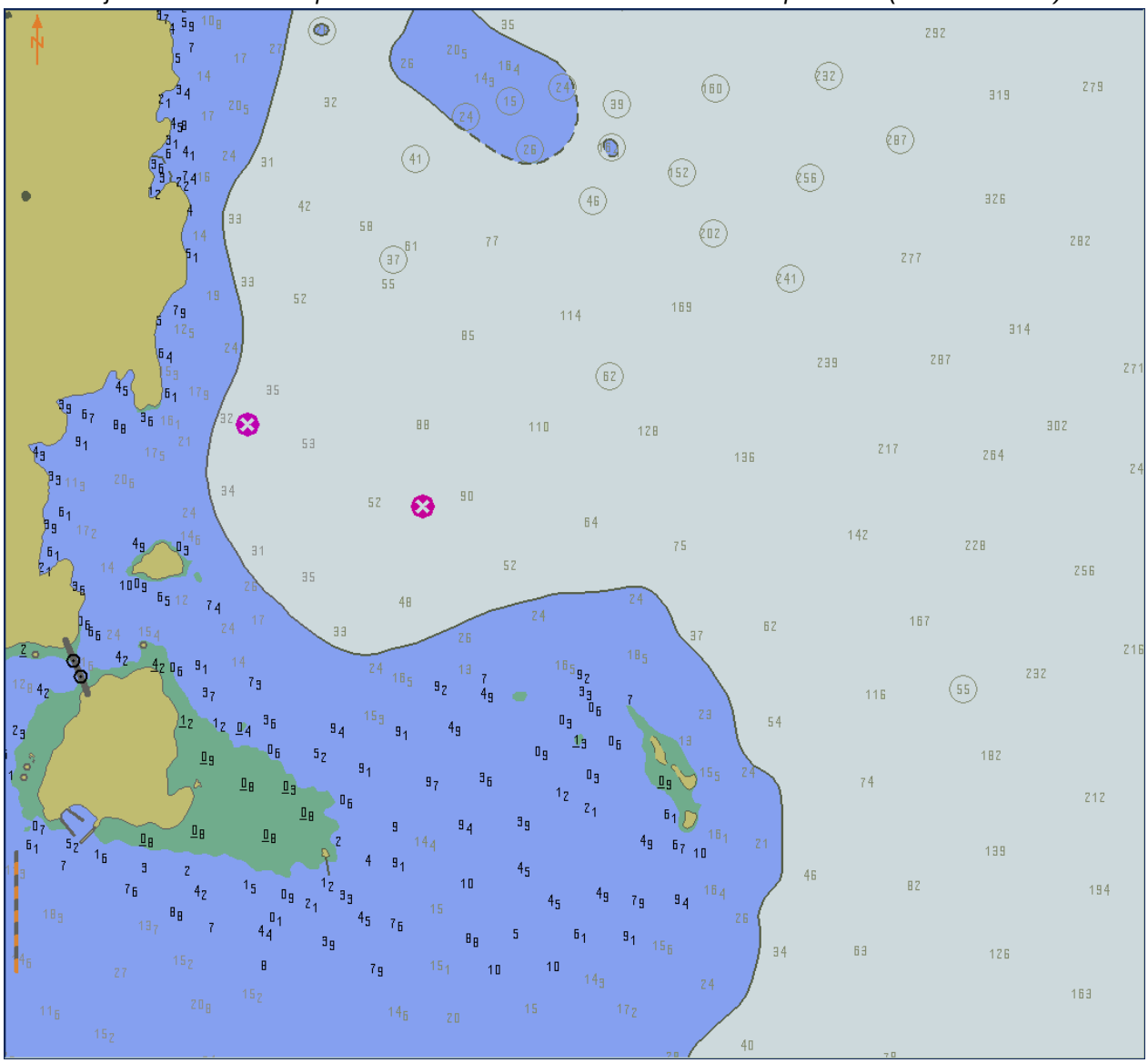
1. Safety Contour set as 5 m



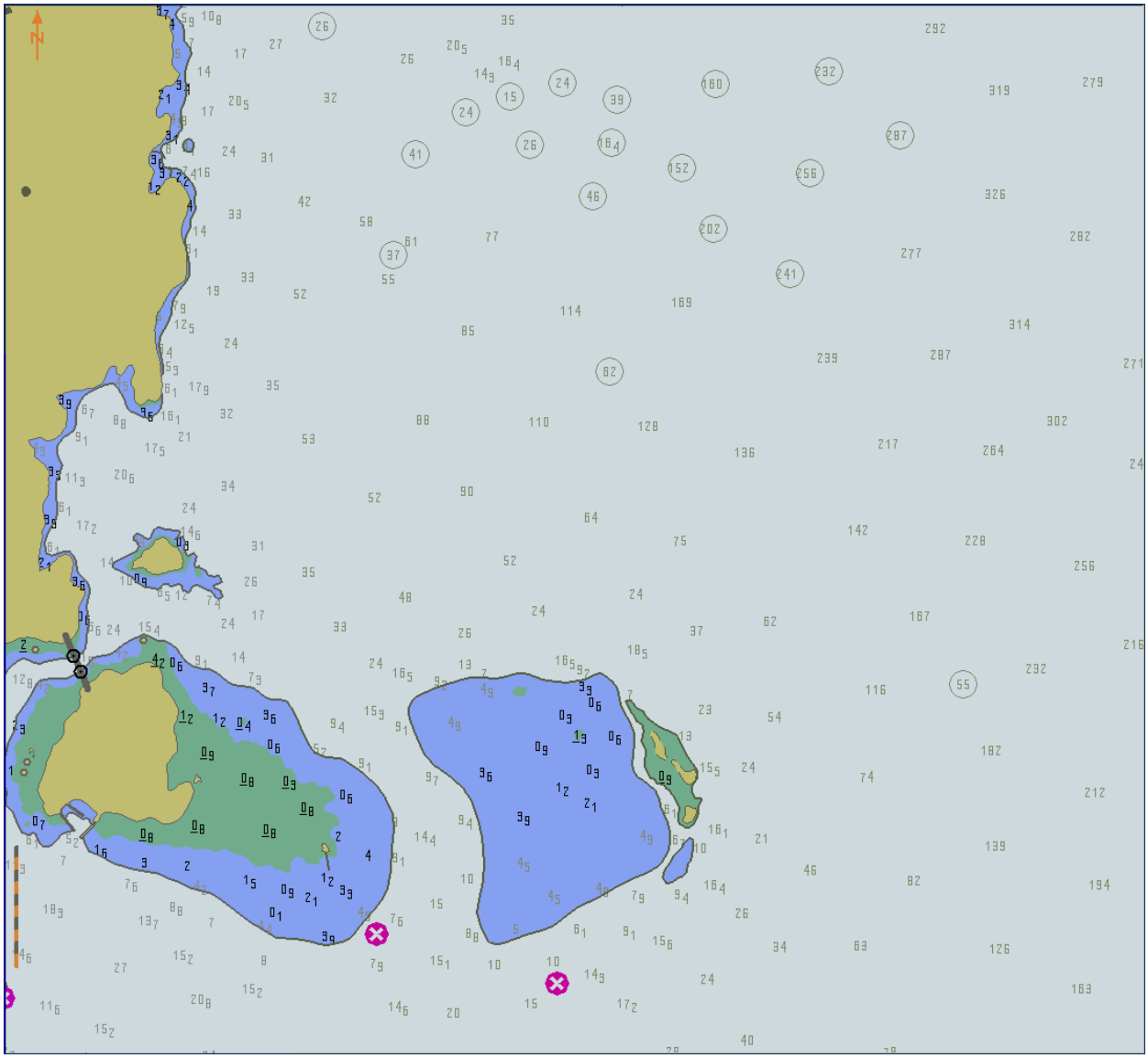
2. Safety Contour set as 10 m



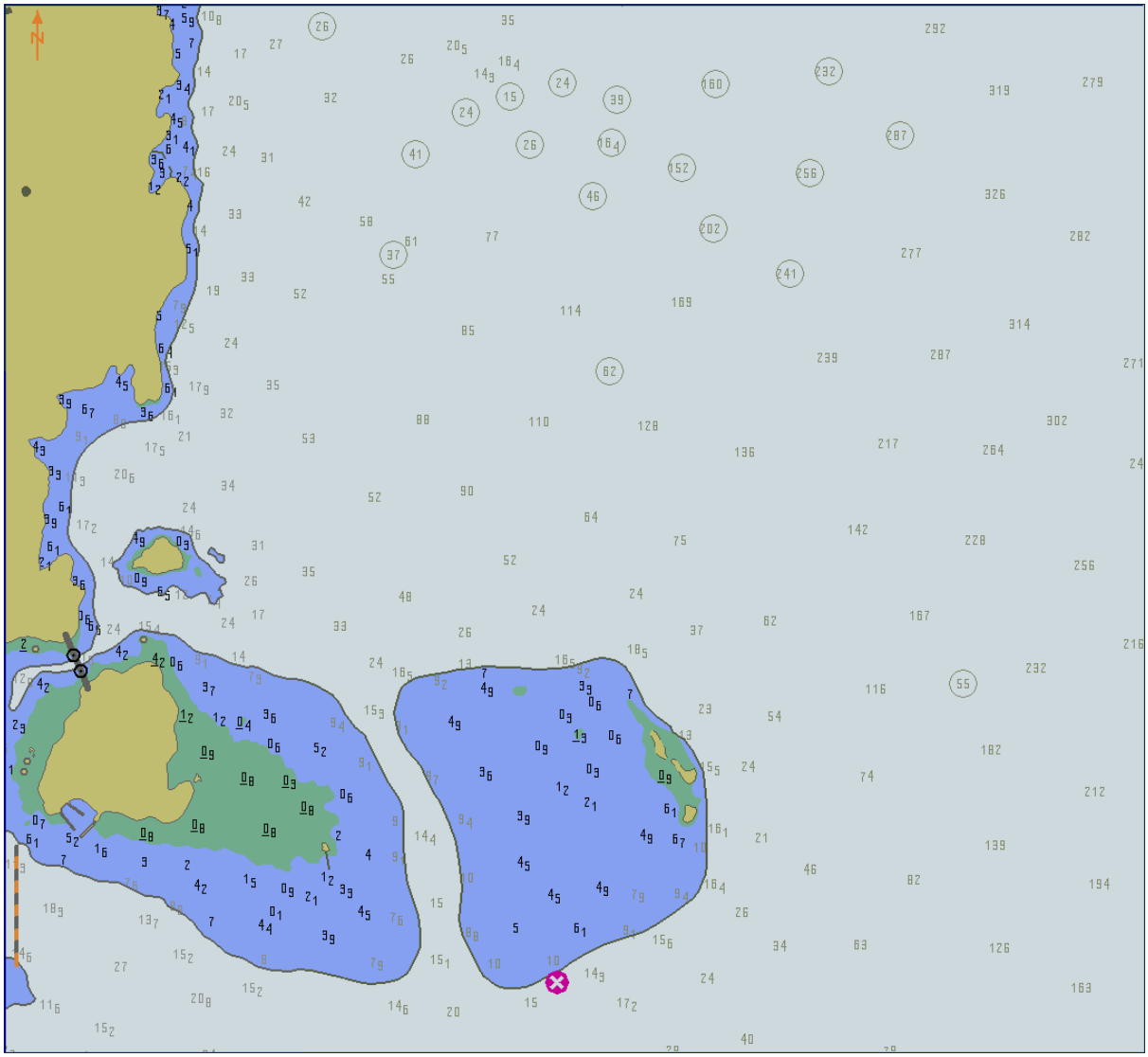
3.3.5 Safety depth

Test Reference	3.3.5	IHO Reference	S-52 13.2.15
Test description			
Display of objects with respect to value of safety depth			
Setup			
Load GB4X00000.000 from 2.1.1 Power Up\ENC_ROOT 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 objects shown with depth values shallower than 10 m must be emphasised (scale 1:52 000). 			

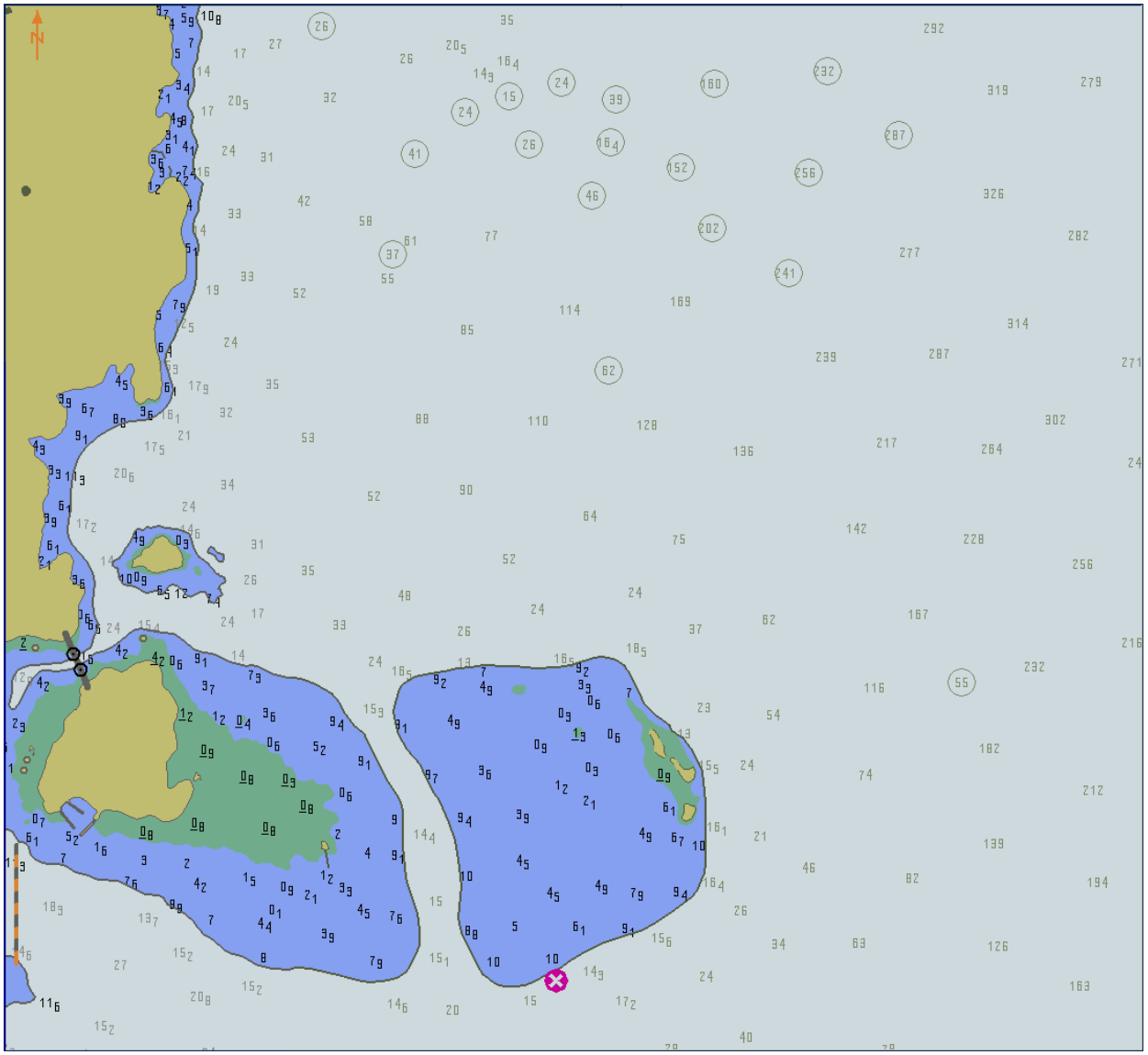
2. The objects shown with depth values shallower than 4 m must be emphasised.



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

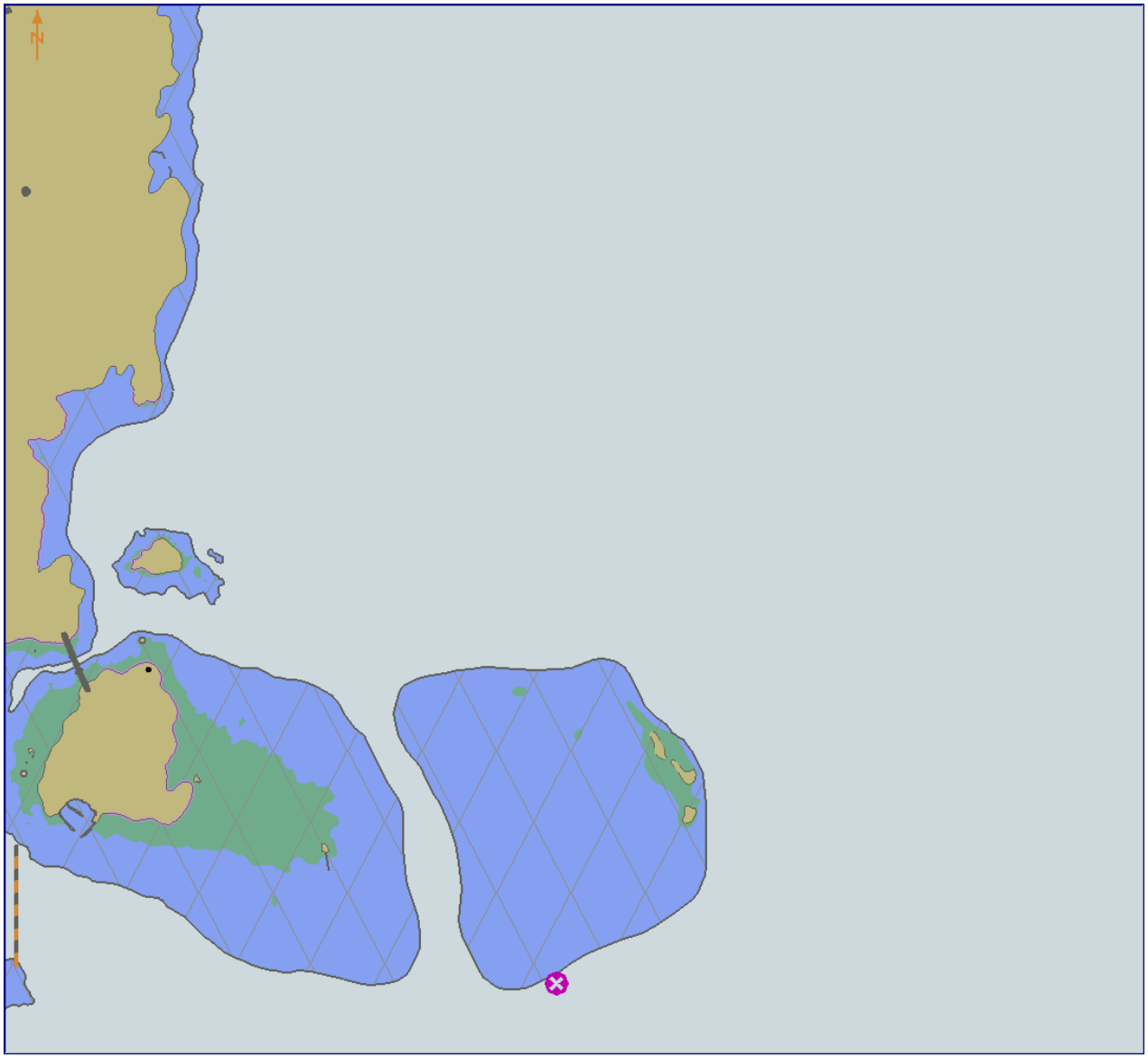


4. The spot soundings shallower than 12 m must be emphasised.



3.3.6 Shallow pattern

Test Reference	3.3.6	IHO Reference	S-52 10.5.7 S-52 10.3.4.4
Test description			
Display of shallow pattern.			
Setup			
Load all cells from 2.1.1 Power Up\ENC_ROOT with the following settings: *Set the Safety Contour value to 10 m* *Select Shallow Pattern*			
Action			
Display loaded cell GB4X0000.000 at compilation scale (1:52 000), select Display Category Display Base			
Results			
Confirm that the diamond shallow pattern is displayed as follows:			



3.3.7 Contour labels

Test Reference	3.3.7	IHO Reference	S-52 10.3.4.4

Test description

Contour labels is an optional Mariners' selection. This test shall be performed, if the contour label option is provided.

Setup

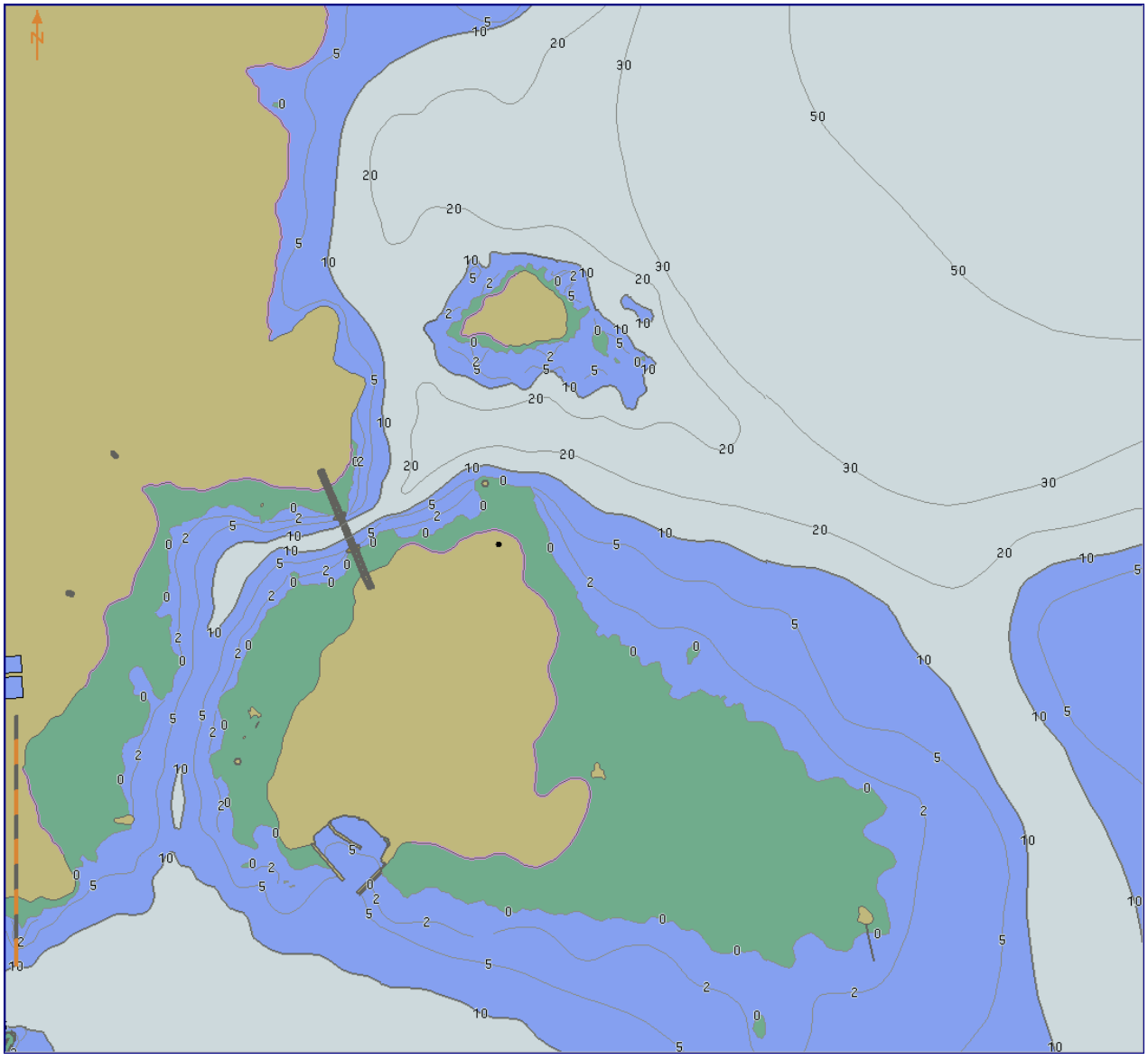
Load all cells from 2.1.1 Power Up\ENC_ROOT with the following settings:
Set the Safety Contour to 10 m
Select Display Category Display Base
Select Colour Palette as "DAY"
Select Symbolized Boundaries
Select Paper chart symbols
Select Other Depth contours
Select Contour labels

Action

Display loaded cell GB5X01NE.000 at compilation scale (1:25 000)

Results

Confirm that the objects display as follows



3.3.8 Colour palettes

Test Reference	3.3.8 a)	IHO Reference	S-52 App A

Test description

Display of ENC in Day palette

Setup

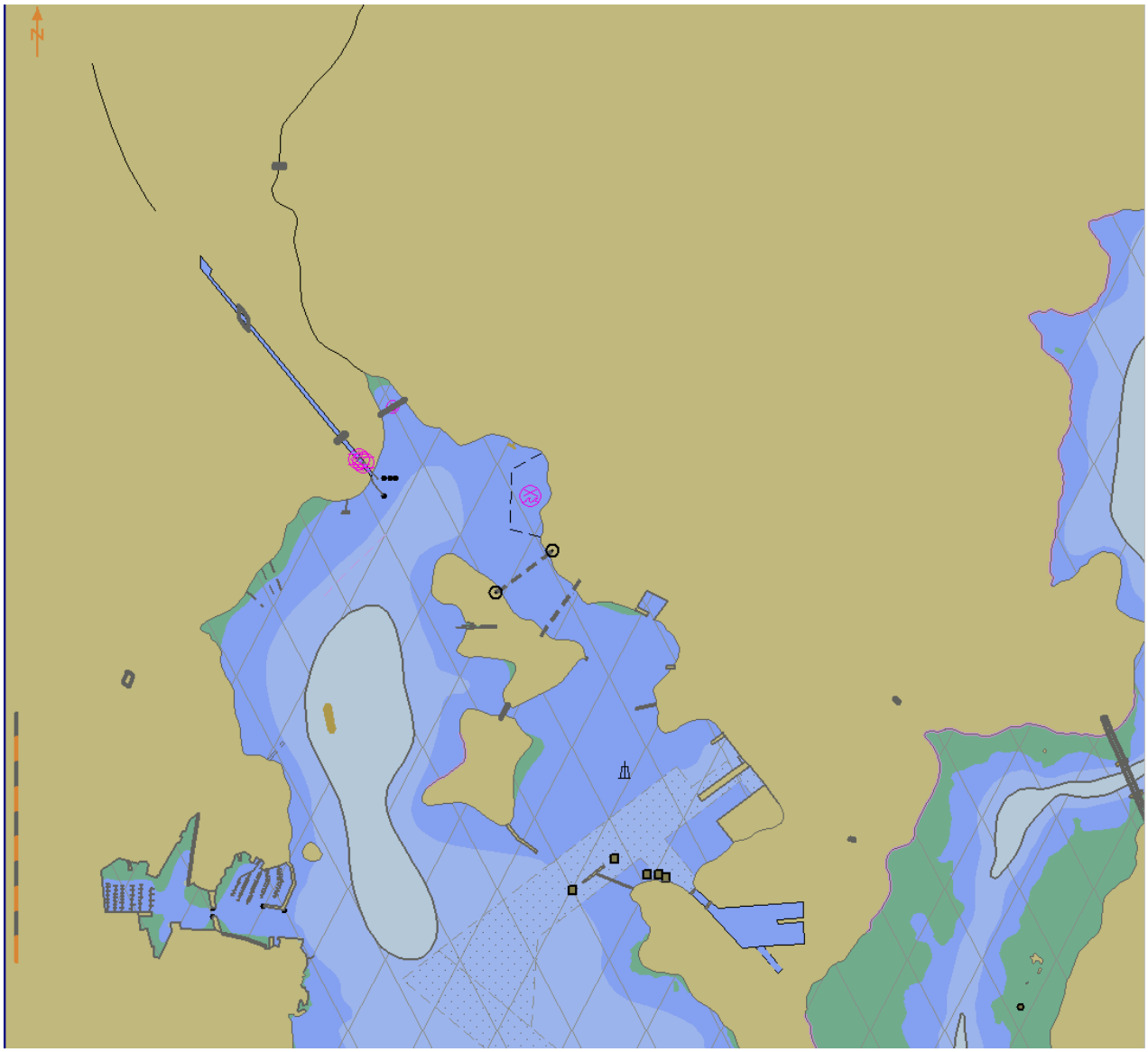
Load all cells from 2.1.1 Power Up\ENC_ROOT with the following settings:
Set the Safety Contour value to 10 m
Set the Safety Depth to 10 m
Set the Shallow contour to 5 m
Set the Deep contour to 20 m
Display Category Display Base
Select Colour Palette DAY
Select Symbolized Boundaries
Select Depth Shades4
Select Shallow Pattern

Action

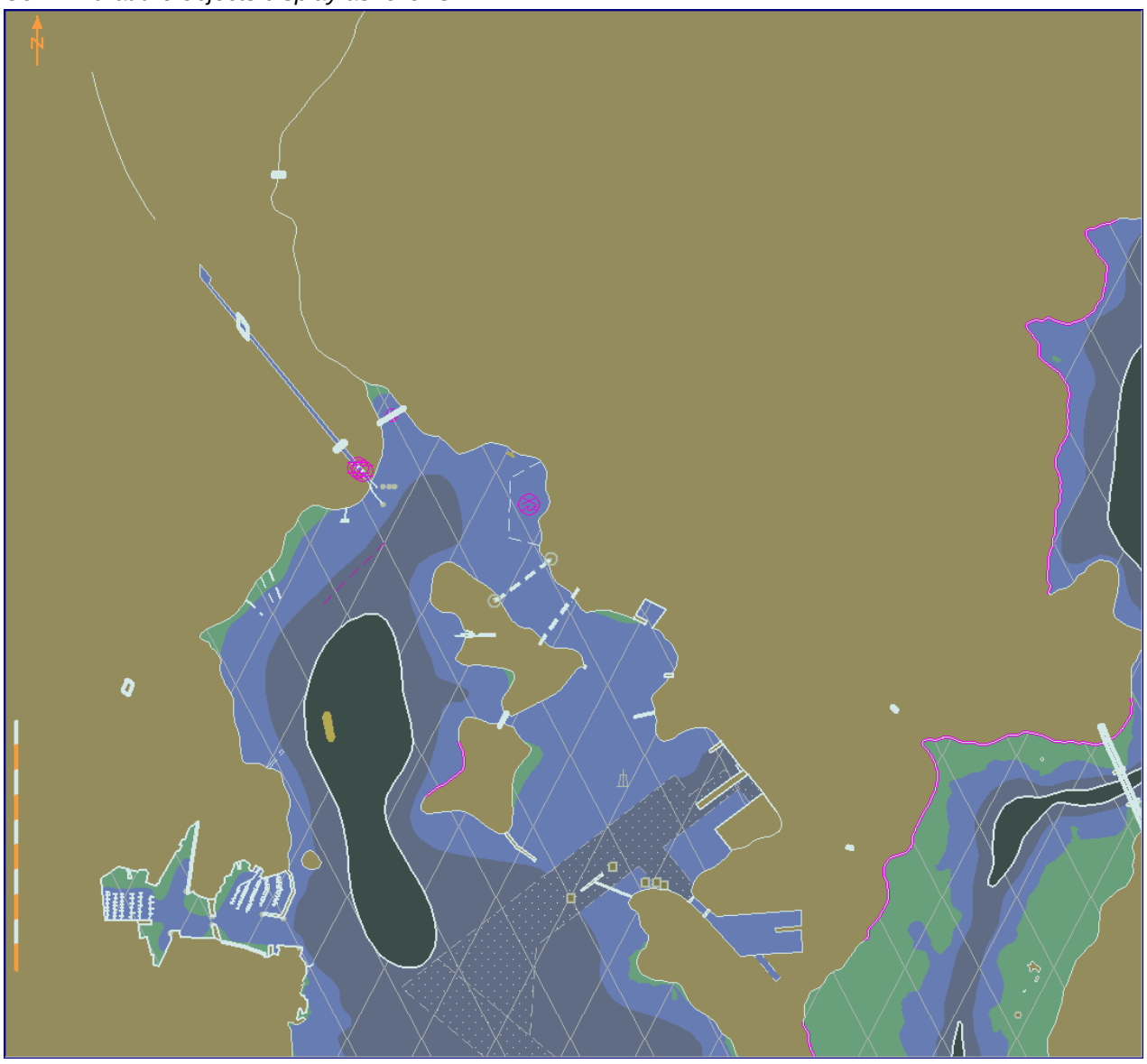
Display loaded cell GB5X01NW.000 at compilation scale (1:25 000)

Results

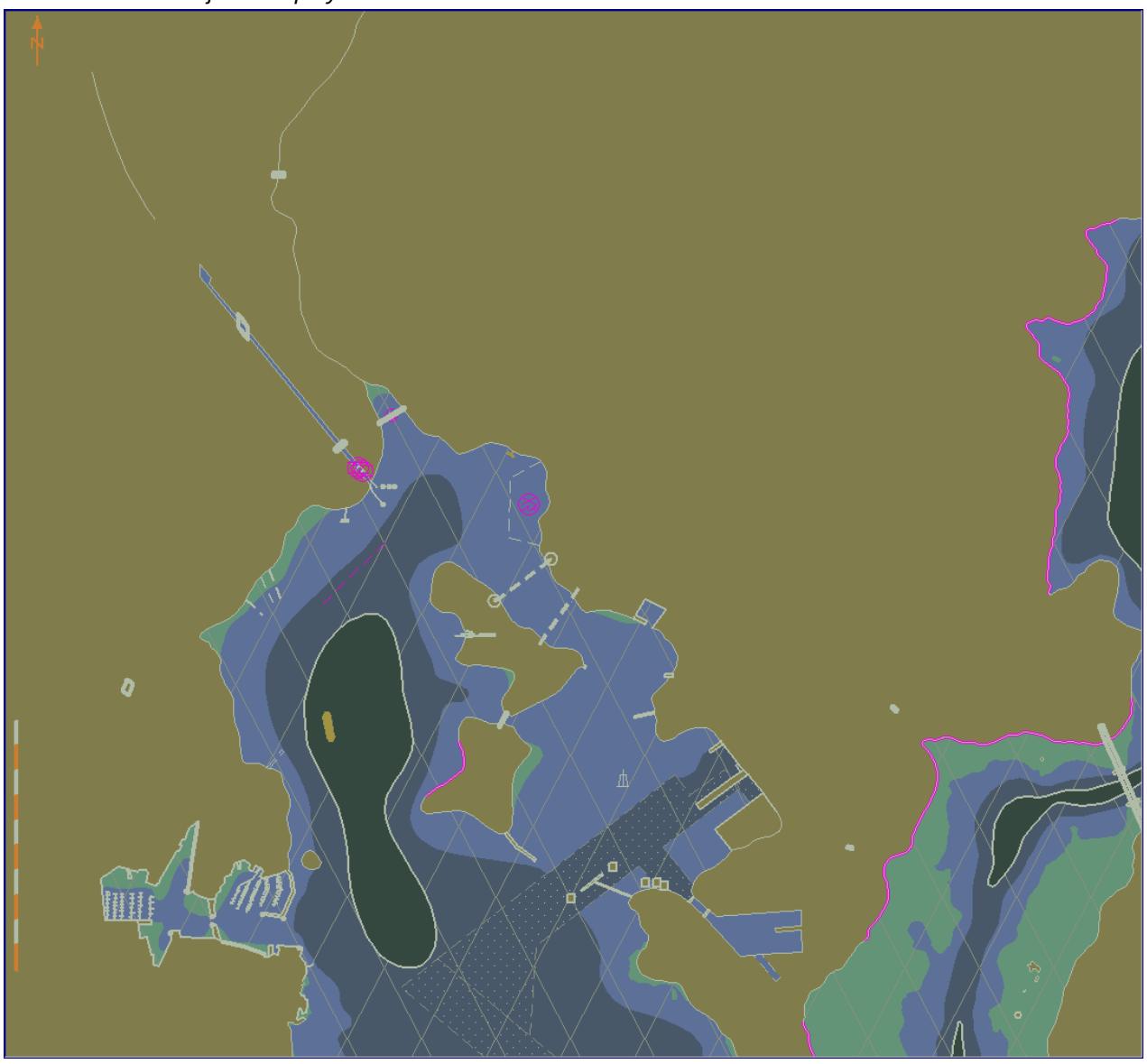
Confirm that the objects display as follows:



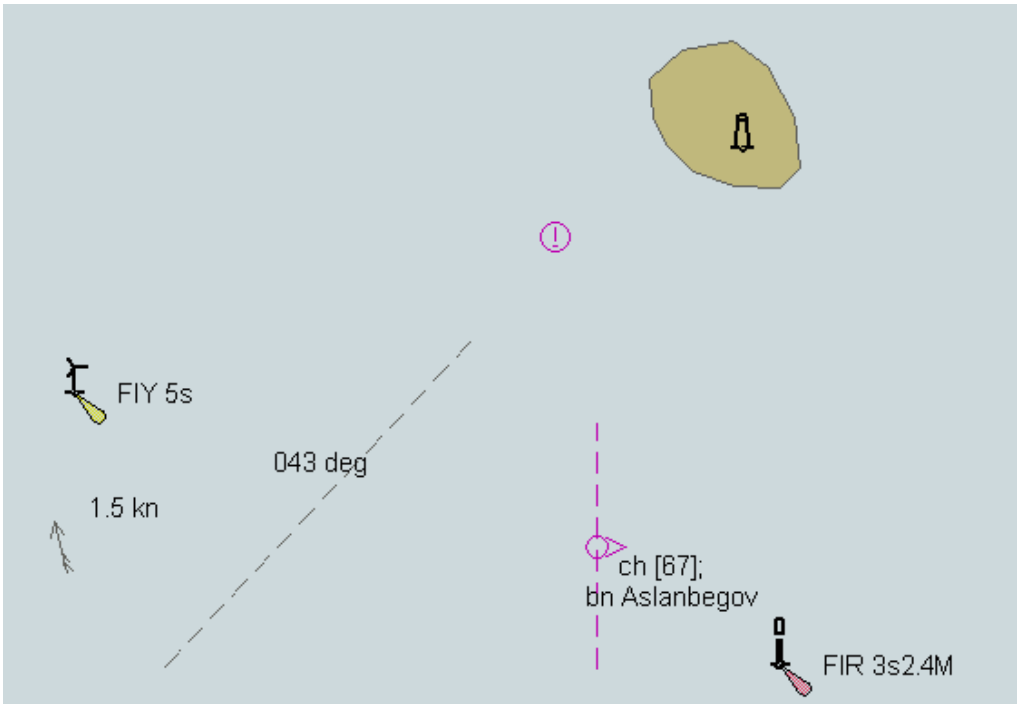
Test Reference	3.3.8 b)	IHO Reference	S-52 App A
Test description			
Display of ENC in Dusk palette			
Setup			
As for test 3.3.8 a) Colour Palette = "DUSK"			
Action			
Display loaded cell GB5X01NW.000 at compilation scale (1:25 000)			
Results			
Confirm that the objects display as follows:			

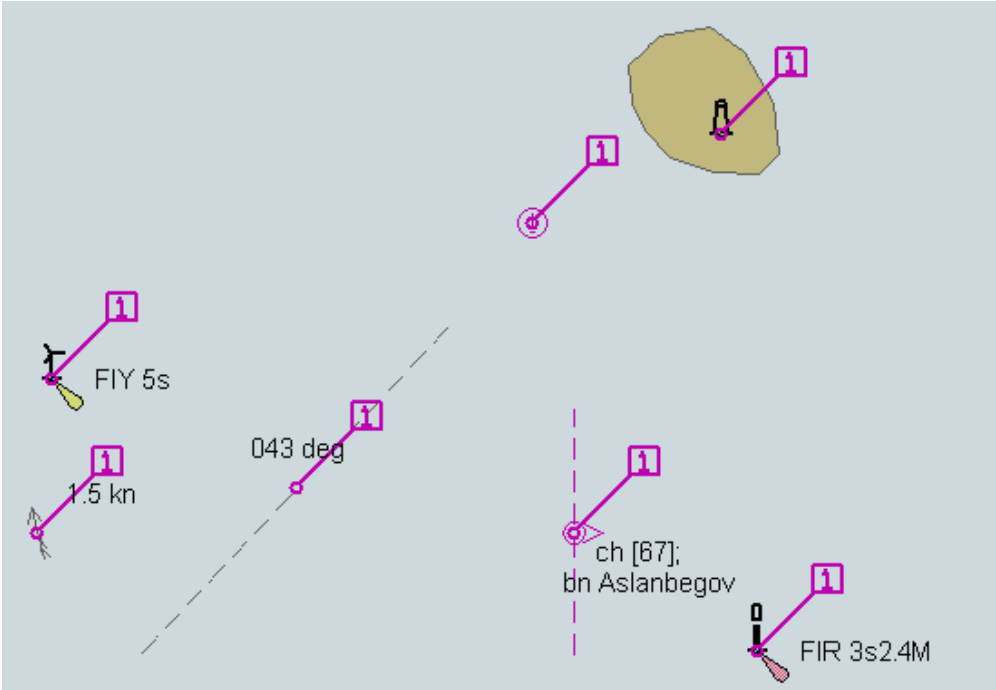


Test Reference	3.3.8 c)	IHO Reference	S-52 App A
Test description			
Display of ENC in Night palette			
Setup			
As for test 3.3.8 a) *Colour Palette = "NIGHT"*			
Action			
Display loaded cell GB5X01NW.000 at compilation scale (1:25 000)			
Results			
Confirm that the objects display as follows:			

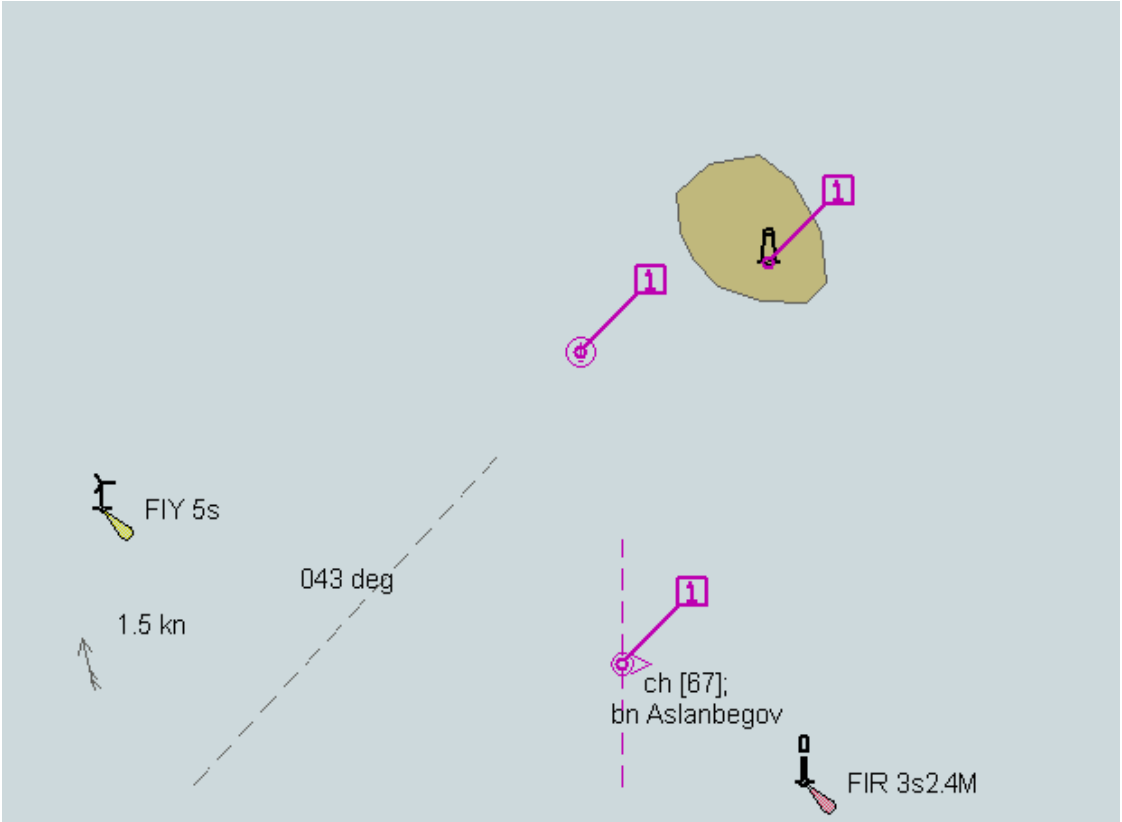


3.3.9 Display of additional Chart Information Symbol

Test Reference	3.3.9 a)	**IHO Reference**	S-52 10.6.1.1
Test description			
Display of additional chart information symbol (INFORM).			
Setup			
Load the following cell 3.3 Settings\ENC_ROOT\GB4X0001.000 with the following settings: *Select Display Category Other* *Select Symbolized Boundaries* *Select Paper chart symbols* *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 objects display as in the image below:  *Note: the display should show all of the objects above without the chart information symbols.*			

Test Reference	3.3.9 b)	IHO Reference	S-52 10.6.1.1
Test description			
Display of additional chart information symbol (INFORM).			
Setup			
As for test 3.3.9 a) *Select Highlight info*			
Action			
As for test 3.3.9 a)			
Results			
Confirm that the objects display as in the image below: 			

Test Reference	3.3.9 c)	IHO Reference	S-52 10.6.1.1
Test description			
Display of additional chart information symbol (INFORM).			
Setup			
As for test 3.3.9 a) *Select Highlight document*			
Action			
As for test 3.3.9 a)			
Results			
Confirm that the objects display as in the image below:			



3.3.10 Scale minimum

Test Reference	3.3.10	IHO Reference	S-52 10.4.2

Test description

Disabling Scale Minimum using the Scale min Mariner's Selection

Setup

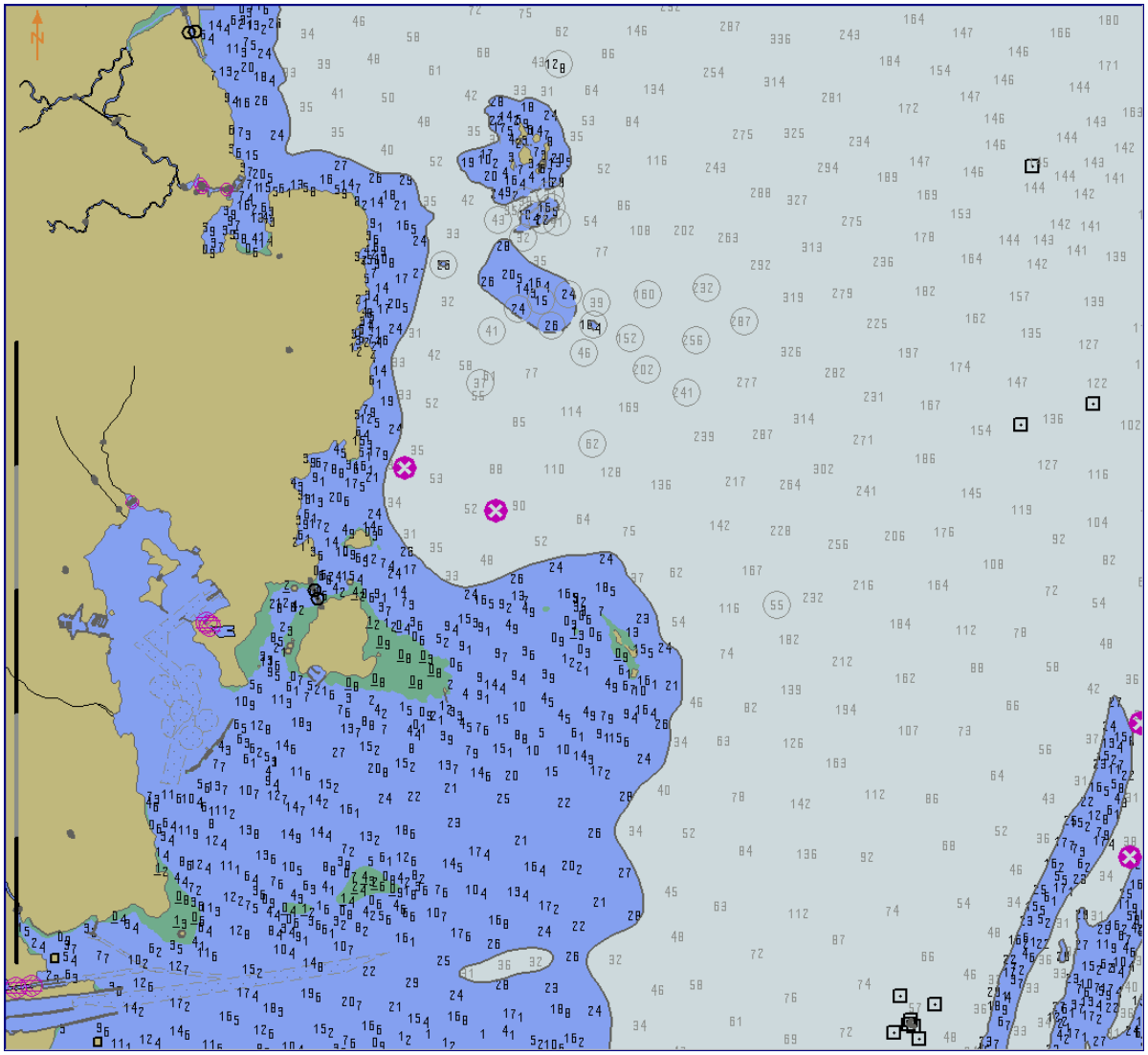
Load the following cell 2.1.1 Power Up\ENC_ROOT\GB4X0000.000 with the following settings:
Select Display Category Display Base
Set the Safety Contour value to 30 m
Set the Safety Depth value to 30 m
Select Symbolized Boundaries
Select Paper chart symbols
Select Spot soundings

Action

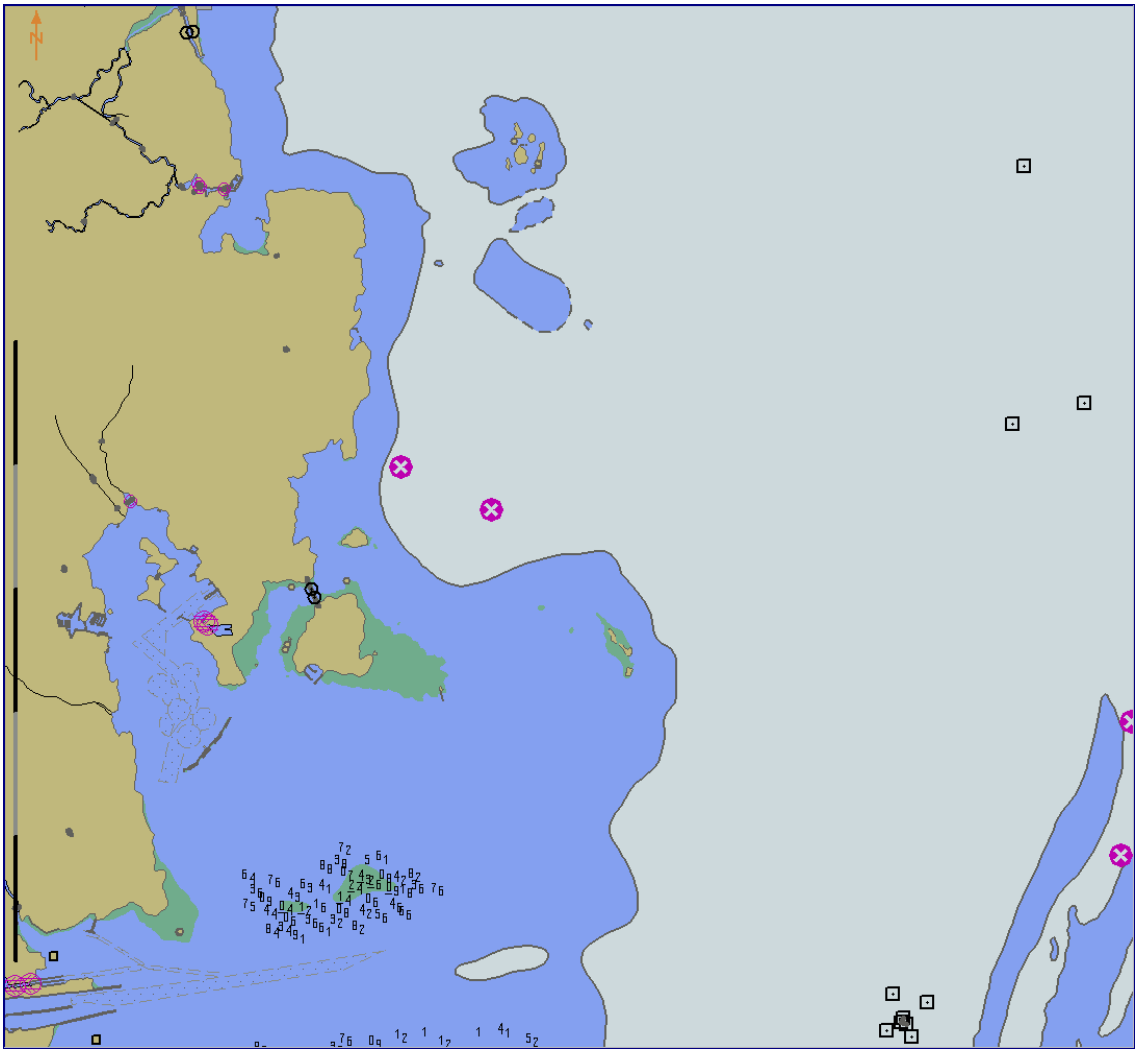
Centre the display on position 32°28.600'S 61° 02.800'E and then zoom in to a scale of 1:100 000.
1. Observe the display
2. Select Scale min

Results

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



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



3.3.11 Full Light Lines

Test Reference	3.3.11	IHO Reference	S-52 13.2.7

Test description

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

Setup

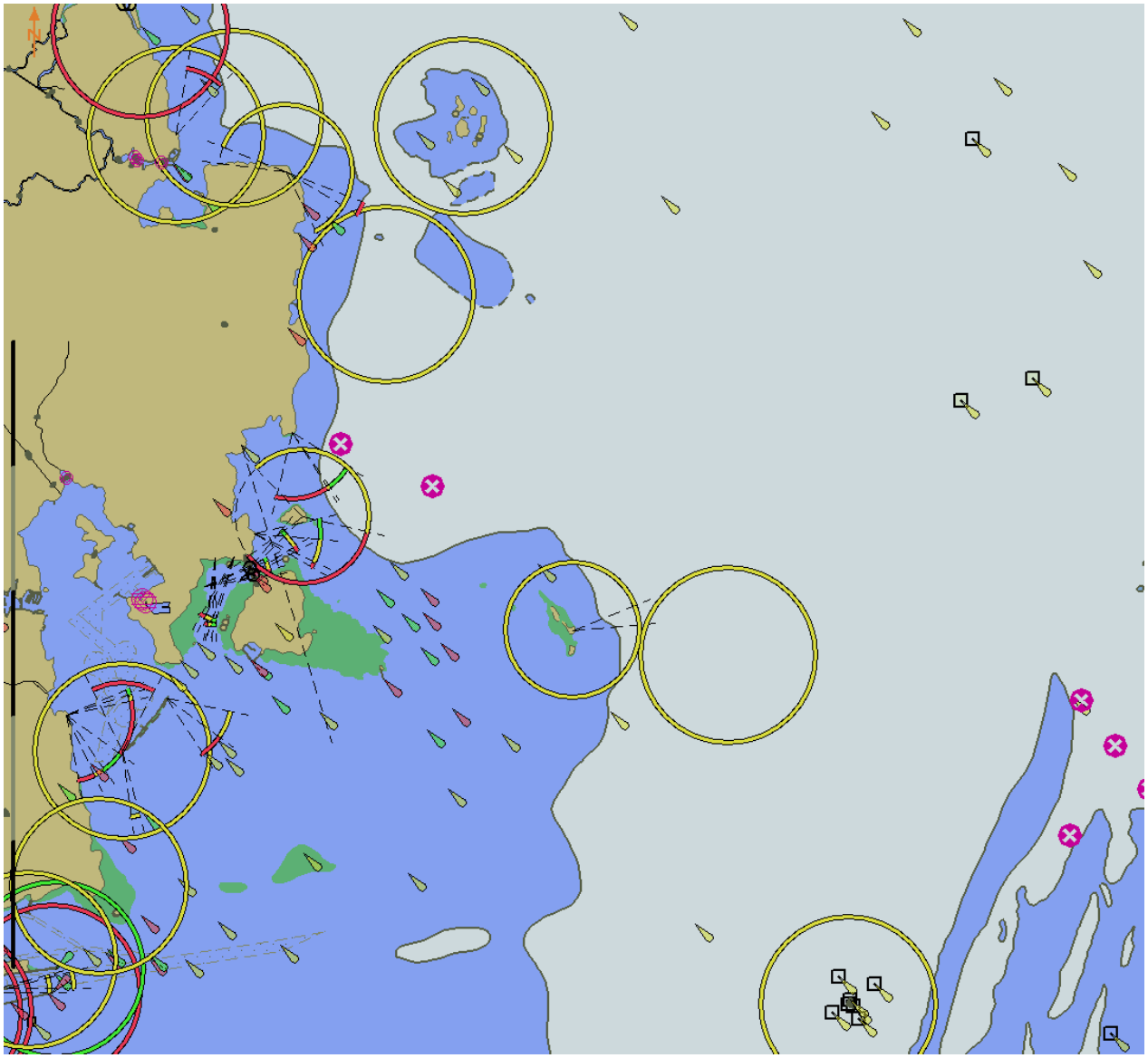
Load the following cell 2.1.1 Power Up\ENC_ROOT\GB4X0000.000 with the following settings:
Select Display Category Display Base
Set the Safety Contour value to 30 m
Set the Safety Depth value to 30 m
Select Symbolized Boundaries
Select Paper chart symbols
Select Lights

Action

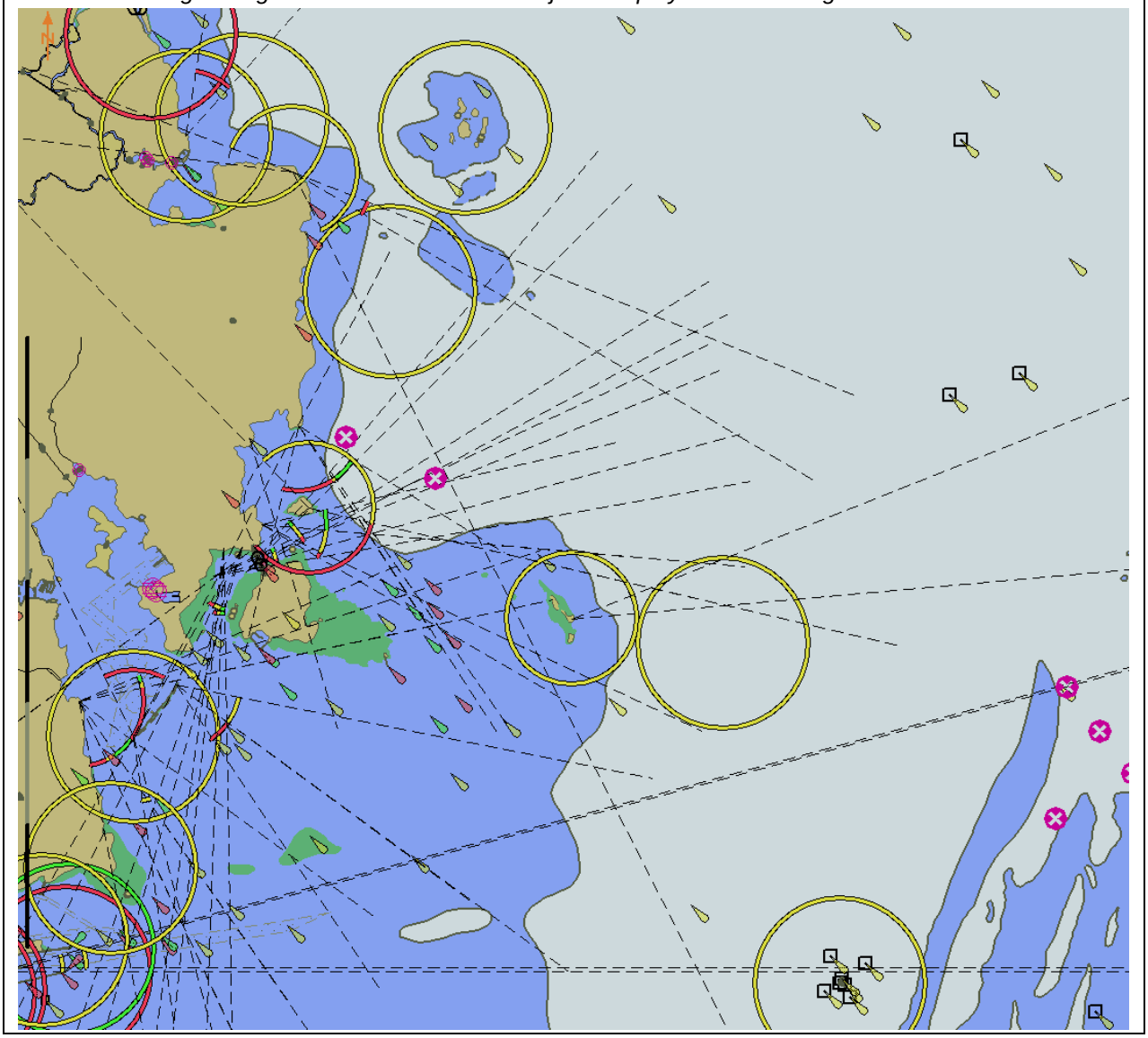
Centre the display on position 32°29.000'S 61° 04.000'E and then zoom in to a scale of 1:100,000.
1. Observe the display
2.Select Full light lines

Results

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



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



3.3.12 National Language

Test Reference	3.3.12	IHO Reference	S-52 10.6.1.2
Test description			
Selecting the display of text in National language.			
Setup			
Load the following cell 3.3 Settings\ENC_ROOT\GB4X0001.000 with the following settings: *Select Display Category Other* *Select Symbolized Boundaries* *Select Paper chart symbols* *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 National language*			
Results			
1. Confirm that the objects display as in the image below:  *2. After selecting National language confirm that the objects display as in the image below:*  *Note: This object has name in national language (NOBJNM) and information in national language (NINFOM)*			

3.4 Non-Official Data

Test Reference	3.4 a)	**IHO Reference**	S-52 10.1.7
Test description			
Loading and display of non-official data.			
Setup			
Load the following cell 3.4 Non-Official Data\ENC_ROOT\1B5X01NE.000 *(The producer code of this cell has been changed from GB to 1B and the agency code (AGEN) has been modified from 540 to 65535 as specified in S-57 clauses 4.3.1 and 2.1.)*			
Action			
Visually inspect the cell.			
Results			
Confirm that the cell displays bounded by the LC(NONHODAT) symbol as defined in the Presentation Library and that an indication to refer to the official chart is provided.			

3.5 Area of No Data

Test Reference	3.5	**IHO Reference**	S-52 10.1.8
Test description			
Loading and display of areas of no data.			
Setup			
Load the following cell 2.1.1 Power Up\ENC_ROOT\GB4X0000.000			
Action			
View a display area for which no ENC data is present, the area around the edge of the cell.			
Results			
Confirm that the "no data" area symbolization defined in the Presentation Library is displayed in the appropriate area.			

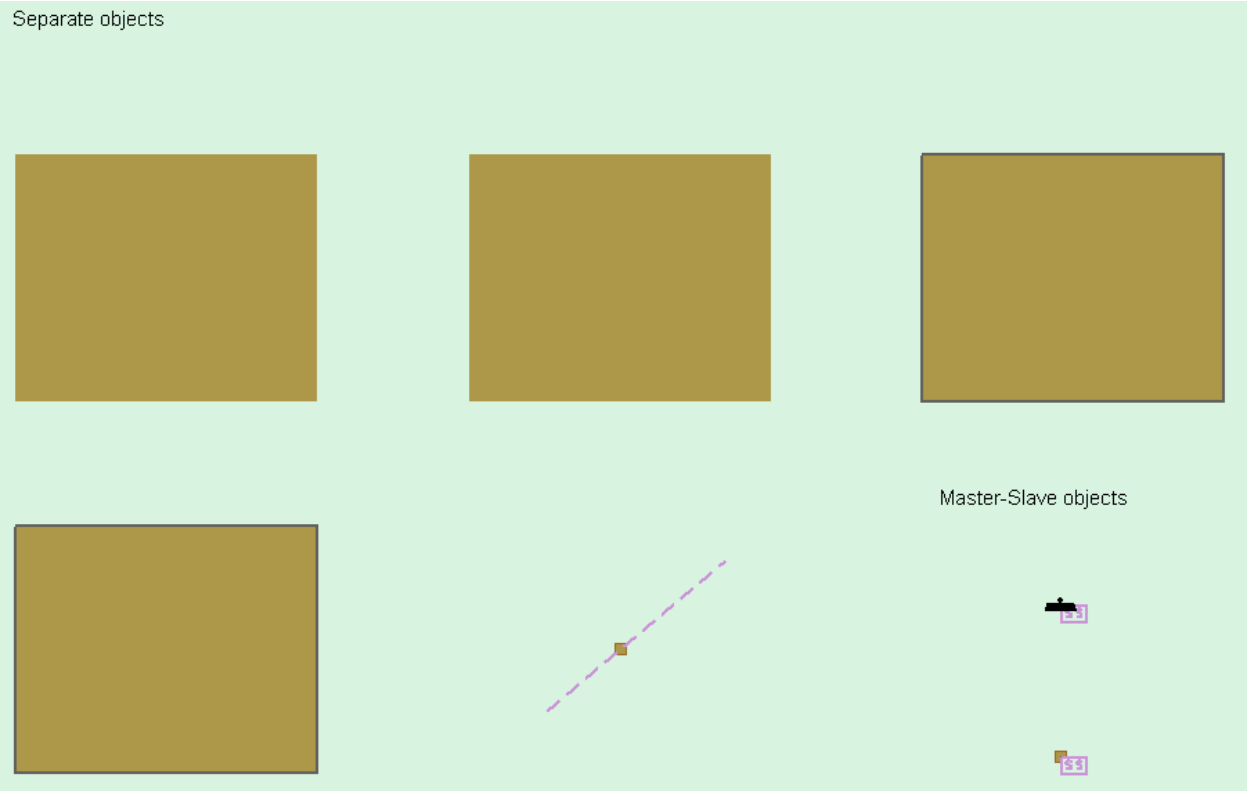
3.6 Display priority

3.6.1 Different priority

Test Reference	3.6.1	**IHO Reference**	S-52 10.3.4.1
Test description			
Different priority and different geometry			
Setup			
Load the following cell 3.6 Display priorities\ENC_ROOT\2J5X0001.000 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 objects at position 32°20.400'S 61°20.650' E scale 1:5000			

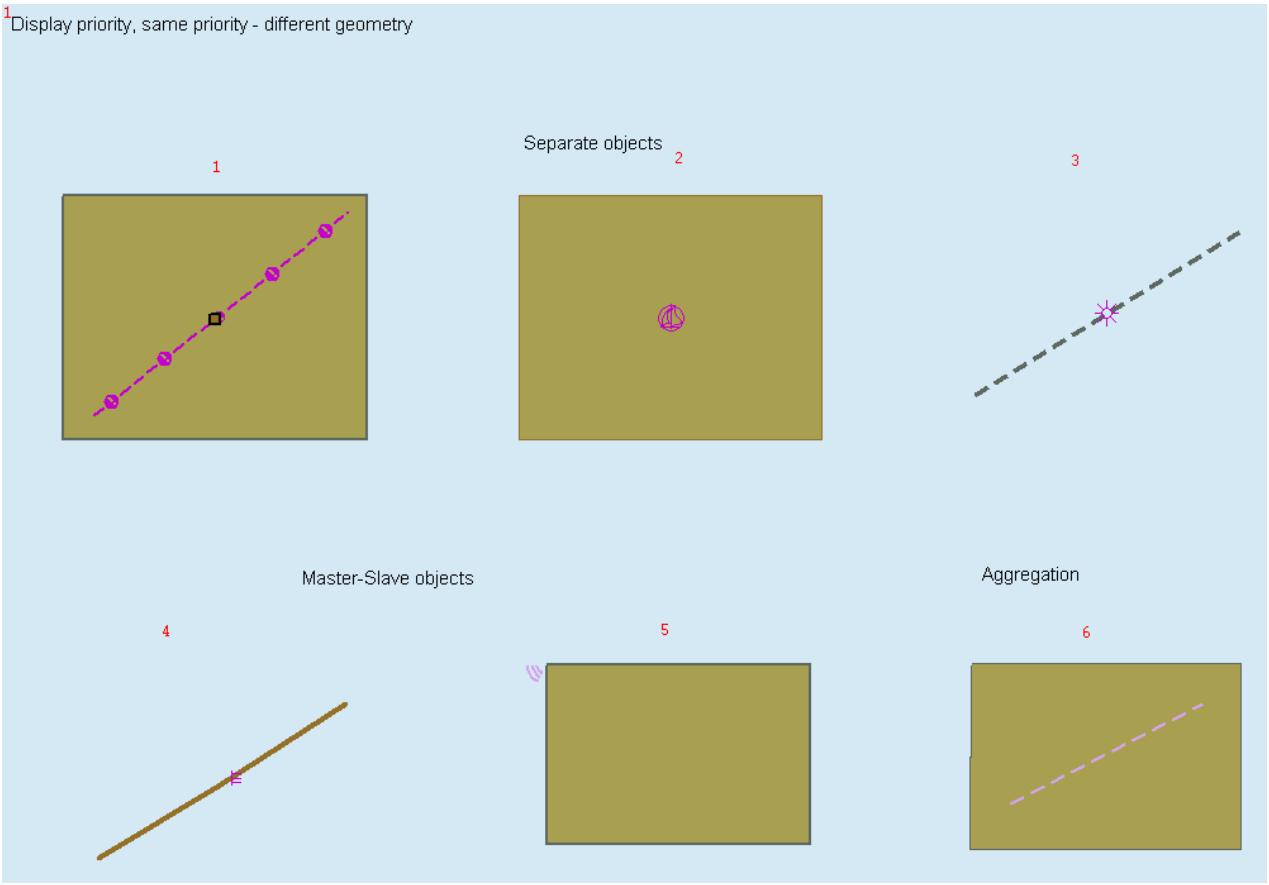
Results

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



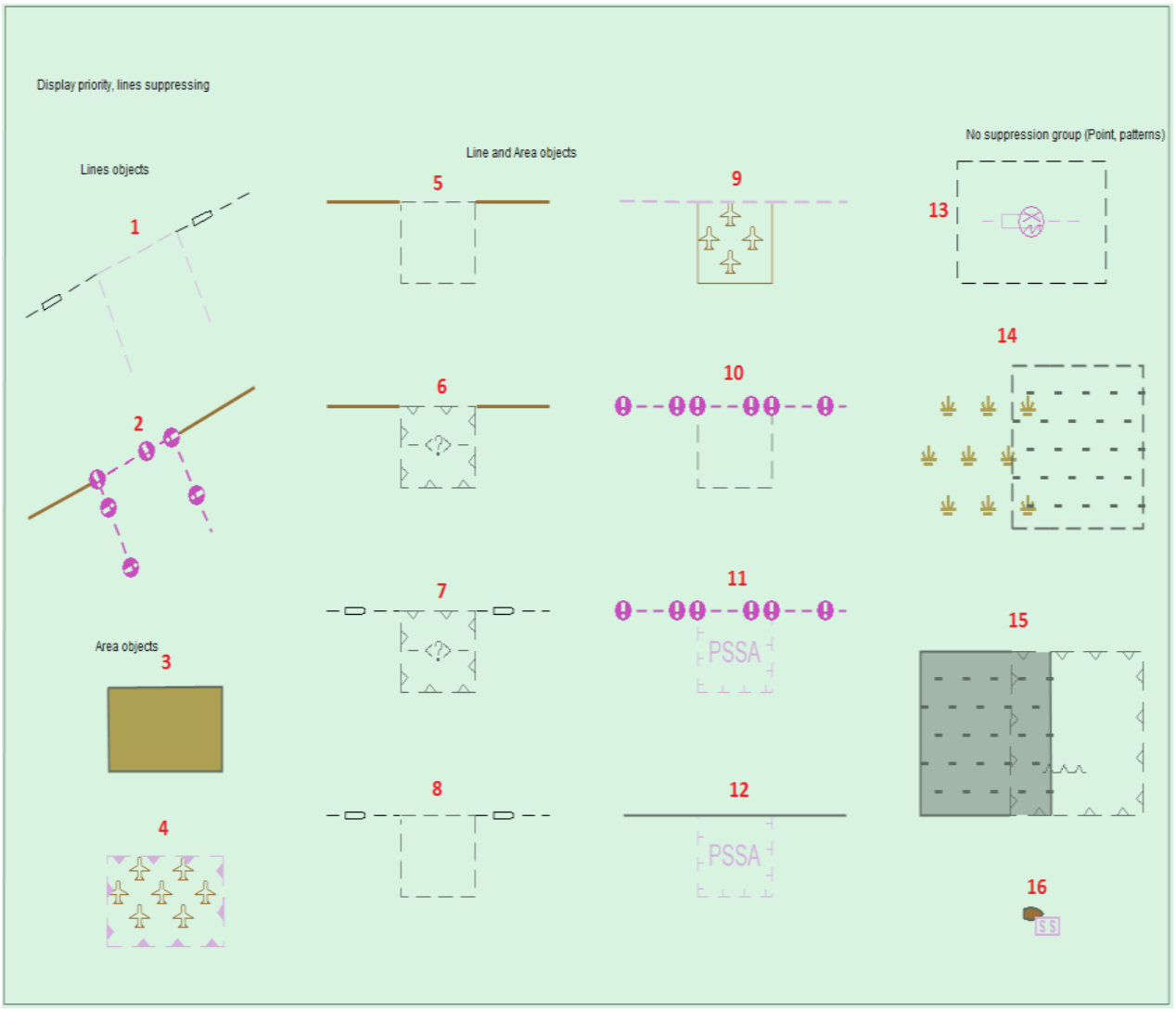
3.6.2 Same priority

Test Reference	3.6.2	IHO Reference	S-52 10.3.4.1
Test description			
Same priority and different geometry			
Setup			
As for test 3.6.1			
Action			
View the objects 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:			



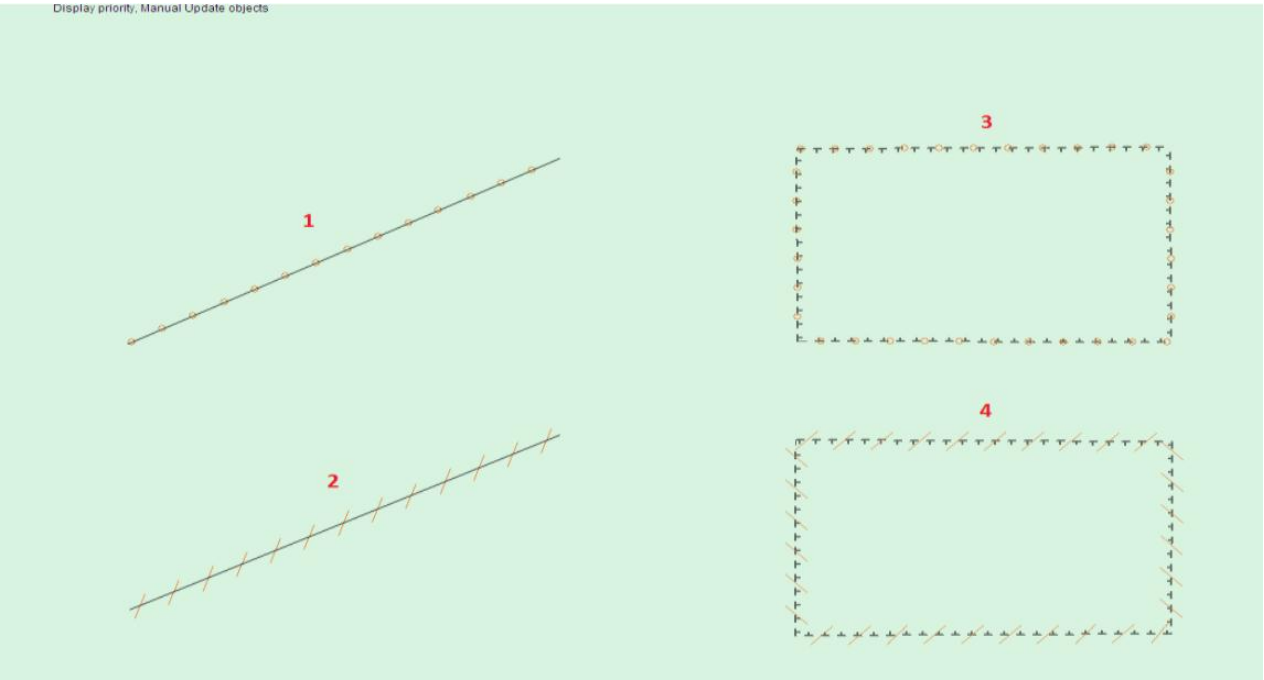
3.6.3 Line Suppression

Test Reference	3.6.3	IHO Reference	S-52 10.3.4.1
Test description			
Line suppression			
Setup			
As for test 3.6.1			
Action			
View the objects 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:			



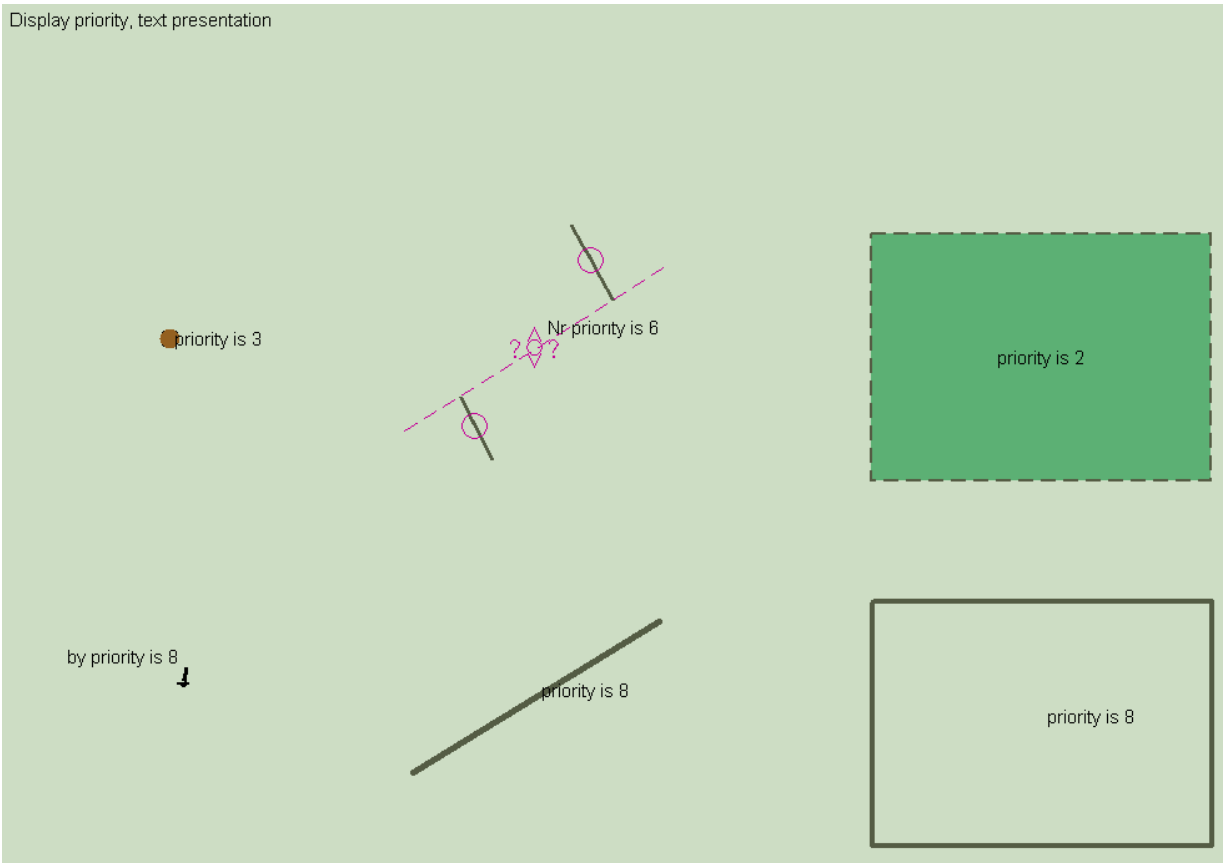
3.6.4 Manual Updates

Test Reference	3.6.4	**IHO Reference**	S-52 10.3.4.1
Test description			
Manual updates			
Setup			
As for test 3.6.1			
Action			
View the object 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:			

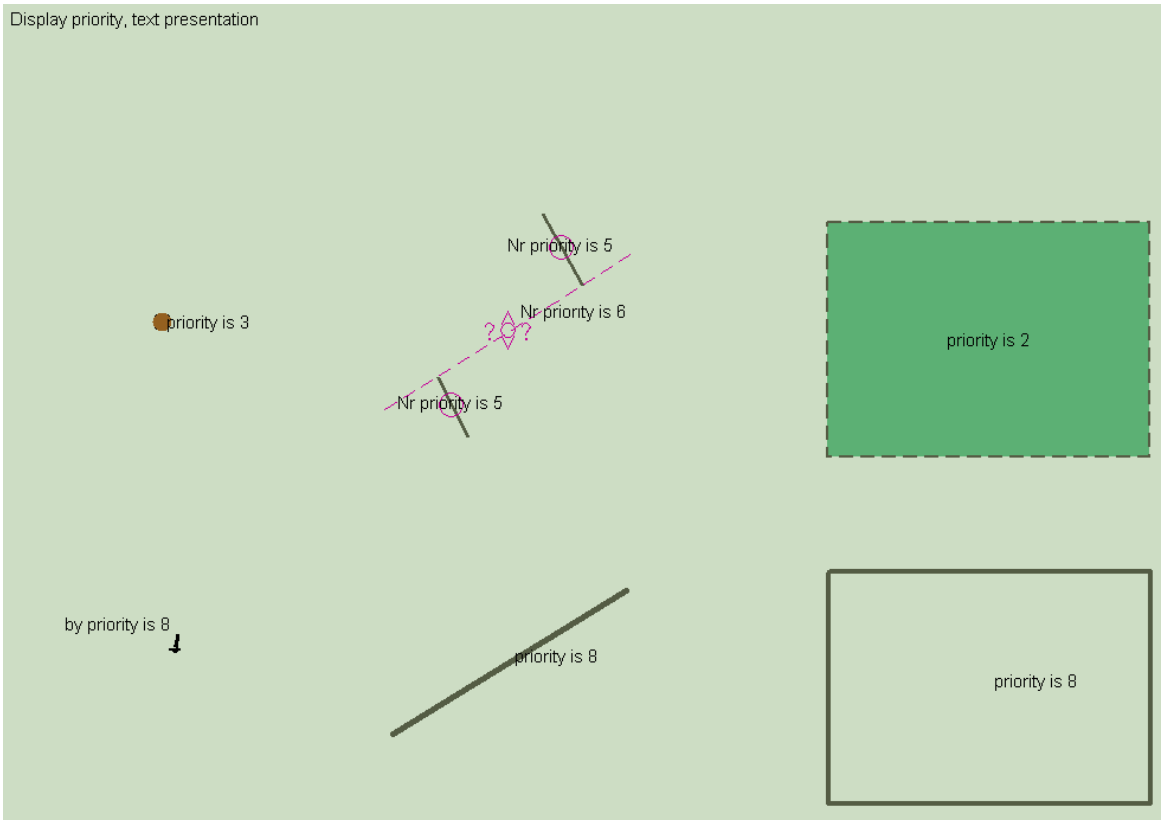


3.6.5 Text Display

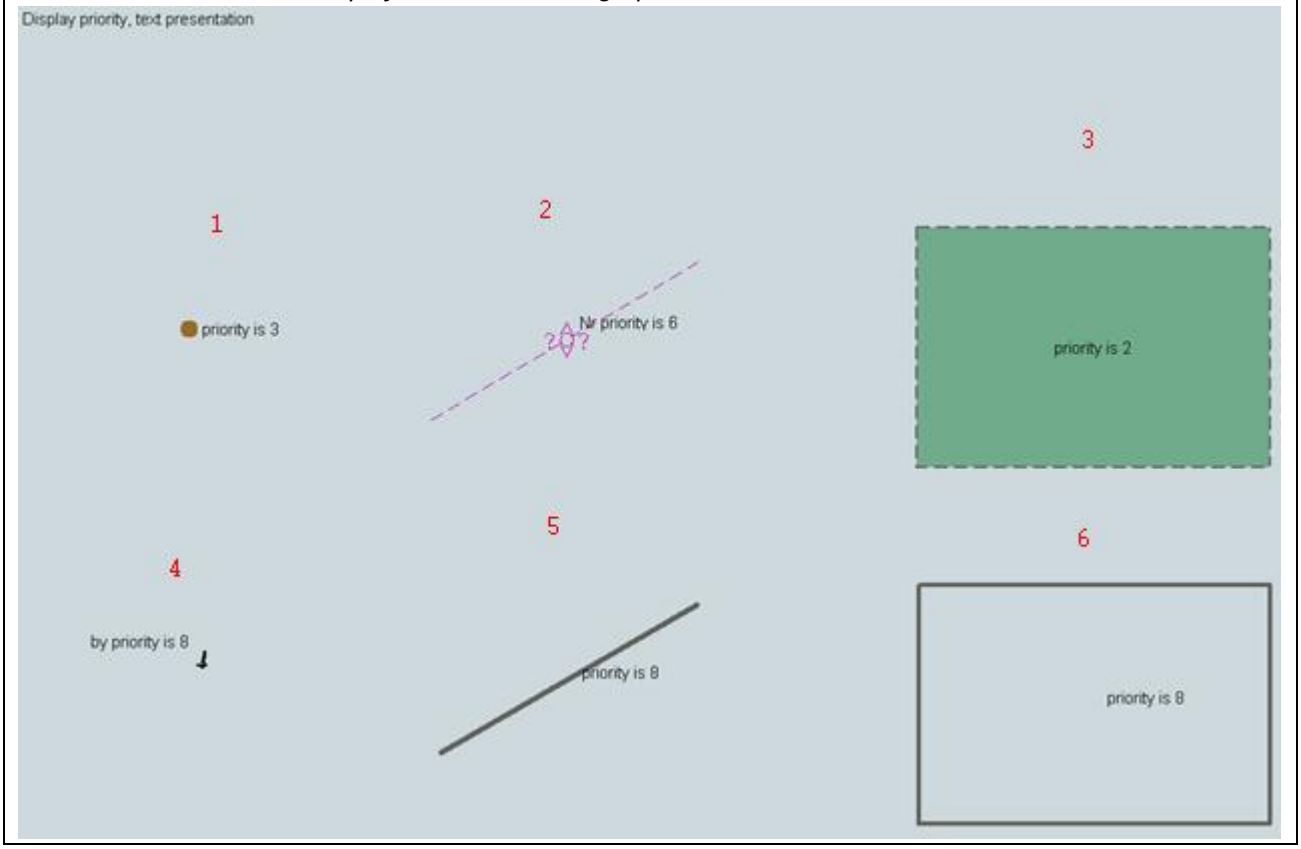
Test Reference	3.6.5 a)	**IHO Reference**	S-52 10.3.4.1
Test description			
Text display			
Setup			
As for test 3.6.1			
Action			
View the objects at position 32°21.100'S 61°21.900'E scale 1:5 000			
Results			
Confirm that items 1 to 6 display as shown in the graphic below:			



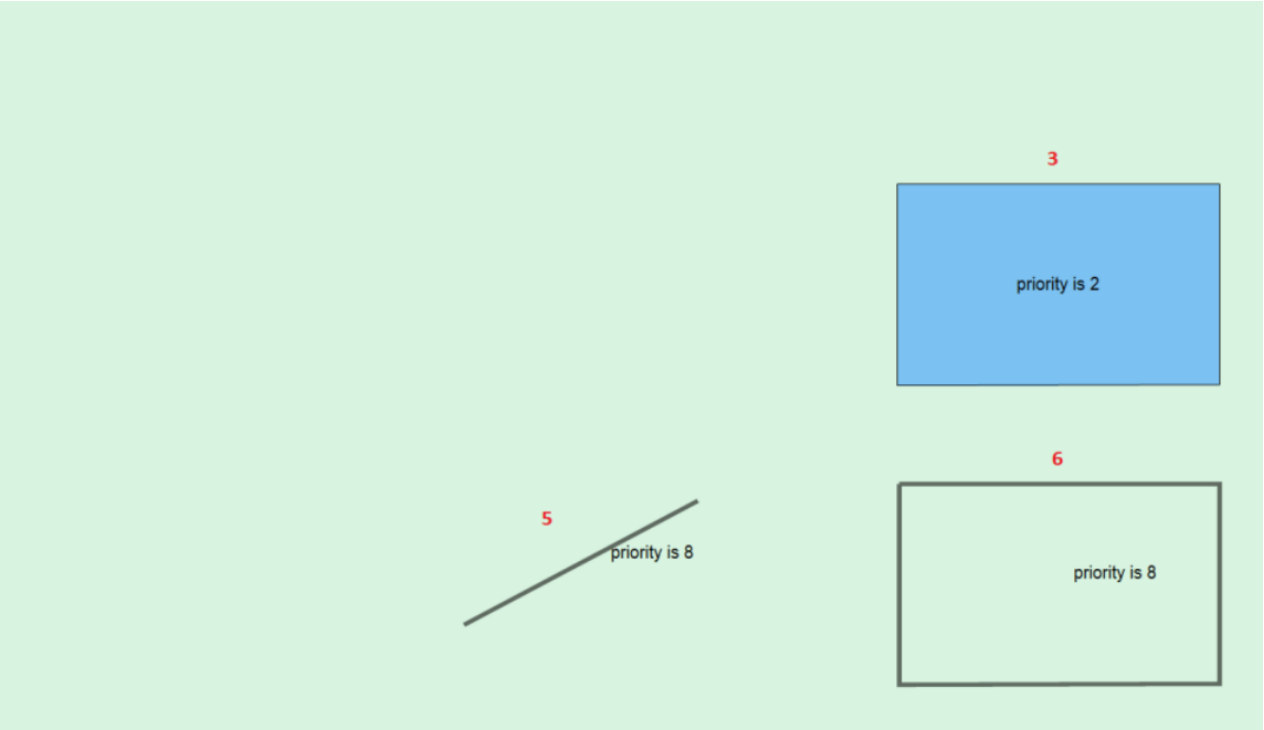
Alternative 1: Manufacturer may implement display of text only once for a feature which is masked



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

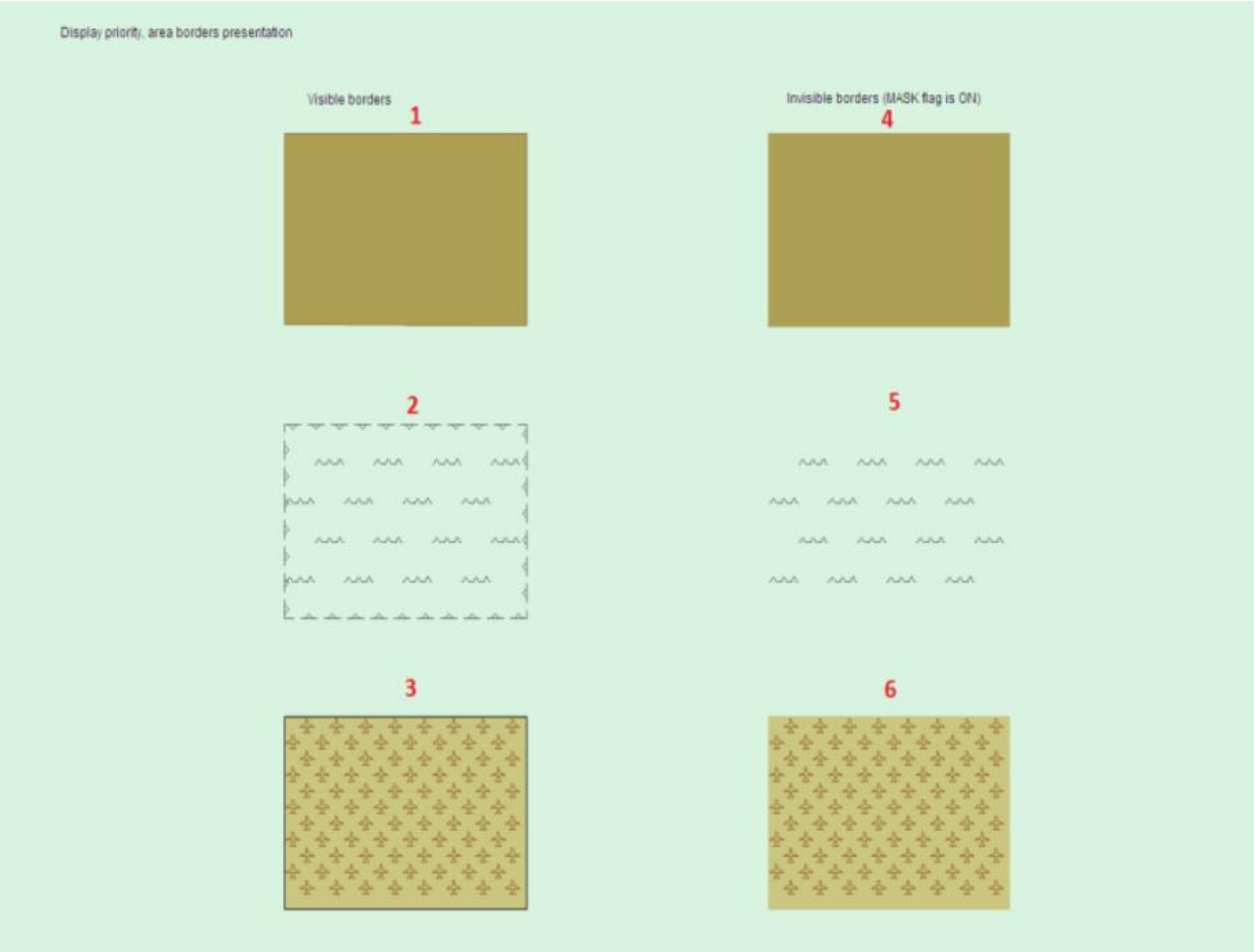
Test Reference	3.6.5 b)	**IHO Reference**	S-52 10.3.4.1
Test description			
Text display			
Setup			
As for test 3.6.5 a) except *Set Display Category Standard*			
Action			
View the objects at position 32°21.100'S 61°21.900'E scale 1:5 000			
Results			
Confirm that items 1 to 6 display as shown in the graphic below: 			

Test Reference	3.6.5 c)	**IHO Reference**	S-52 10.3.4.1
Test description			
Text display			
Setup			
As for test 3.6.5 b) except set Display Category Base Display			
Action			
View the objects 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:			



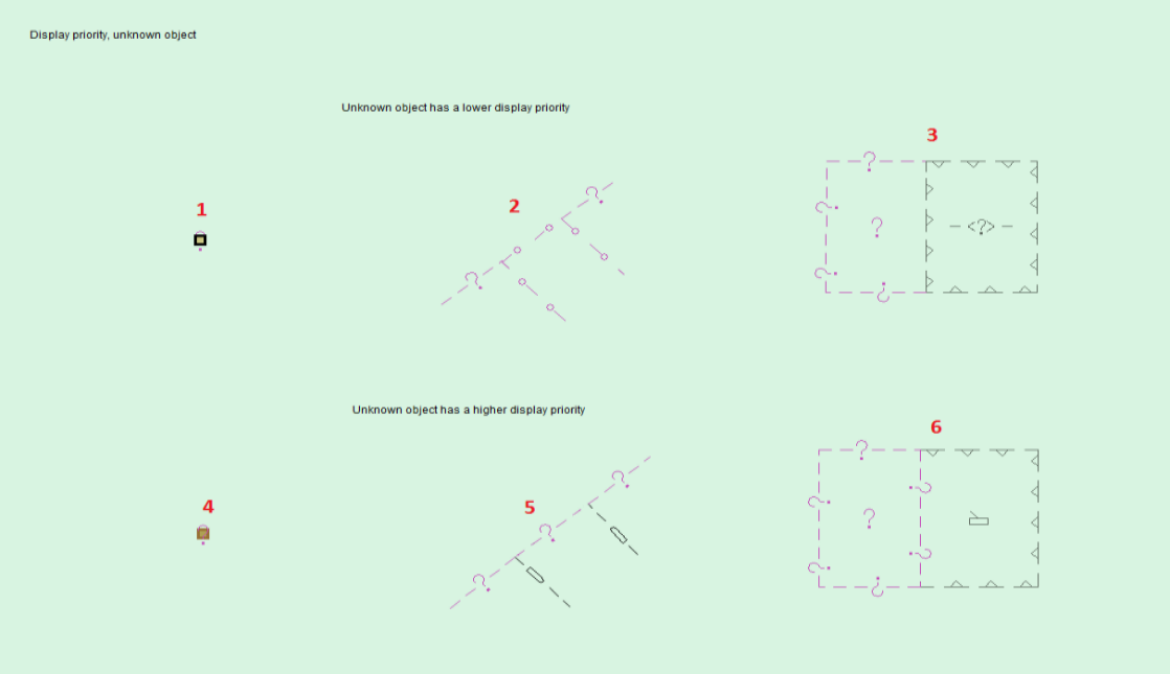
3.6.6 Display of area borders

Test Reference	3.6.6	IHO Reference	S-52 10.3.4.1
Test description			
Display of area borders			
Setup			
As for test 3.6.5 c) except *Set Display Category Other*			
Action			
View the objects 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:			



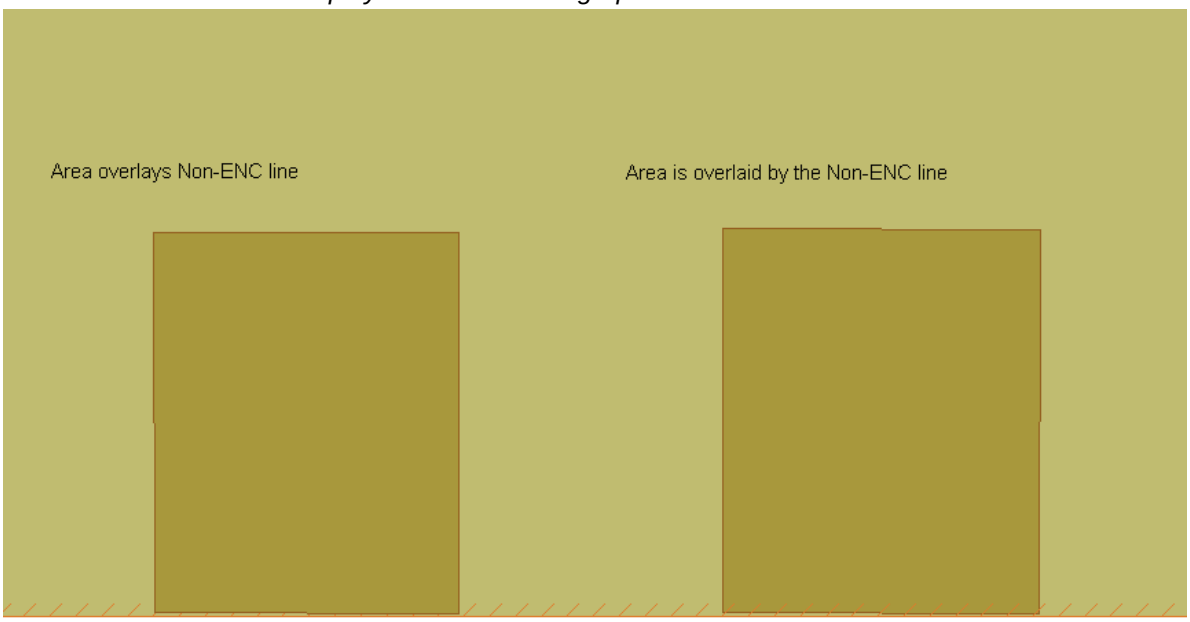
3.6.7 Display of unknown symbols

Test Reference	3.6.7	IHO Reference	S-52 10.3.4.1
Test description			
Display of unknown symbol			
Setup			
As for test 3.6.6			
Action			
View the objects 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:			

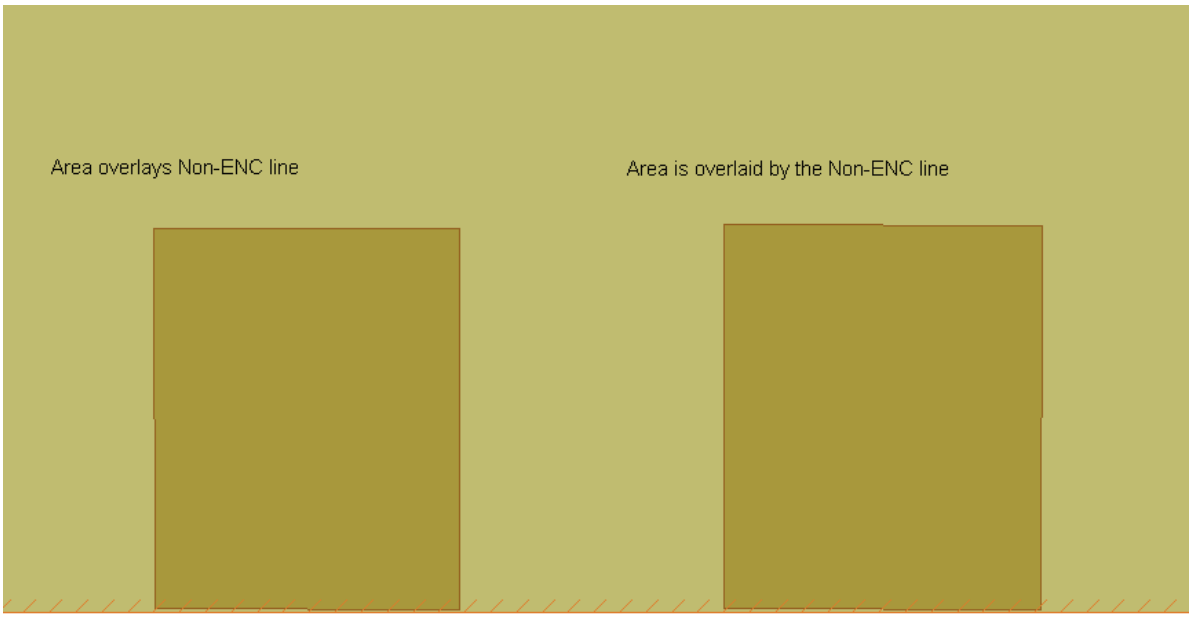


3.6.8 Boundary display for unofficial data

Test Reference	3.6.8.1	**IHO Reference**	S-52 10.3.4.1
Test description			
Unofficial data boundary display			
Setup			
As for test 3.6.6 and in addition, load the following cell 3.3 Settings\ENC_ROOT\GB4X0001.000 and 3.6 Display priorities \ ENC_ROOT \ 2J5X0002.000			
Action			
View the objects 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:			



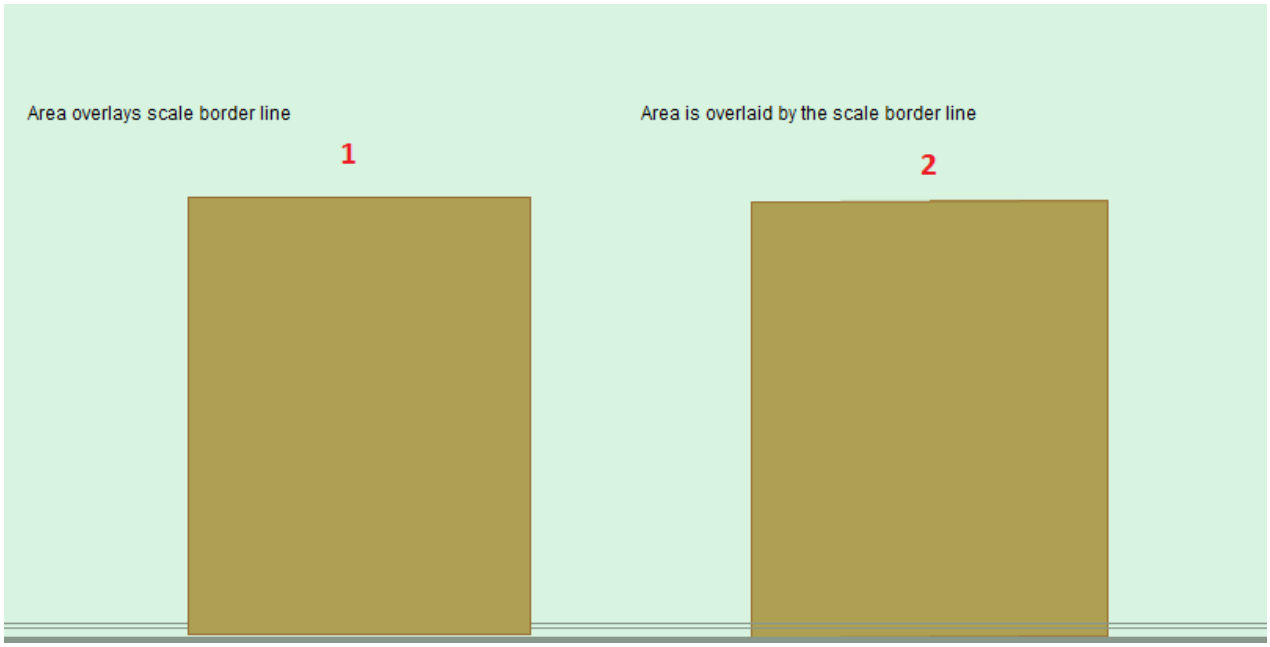
Alternative 1: Orange slashes are under left hand side dark brown area



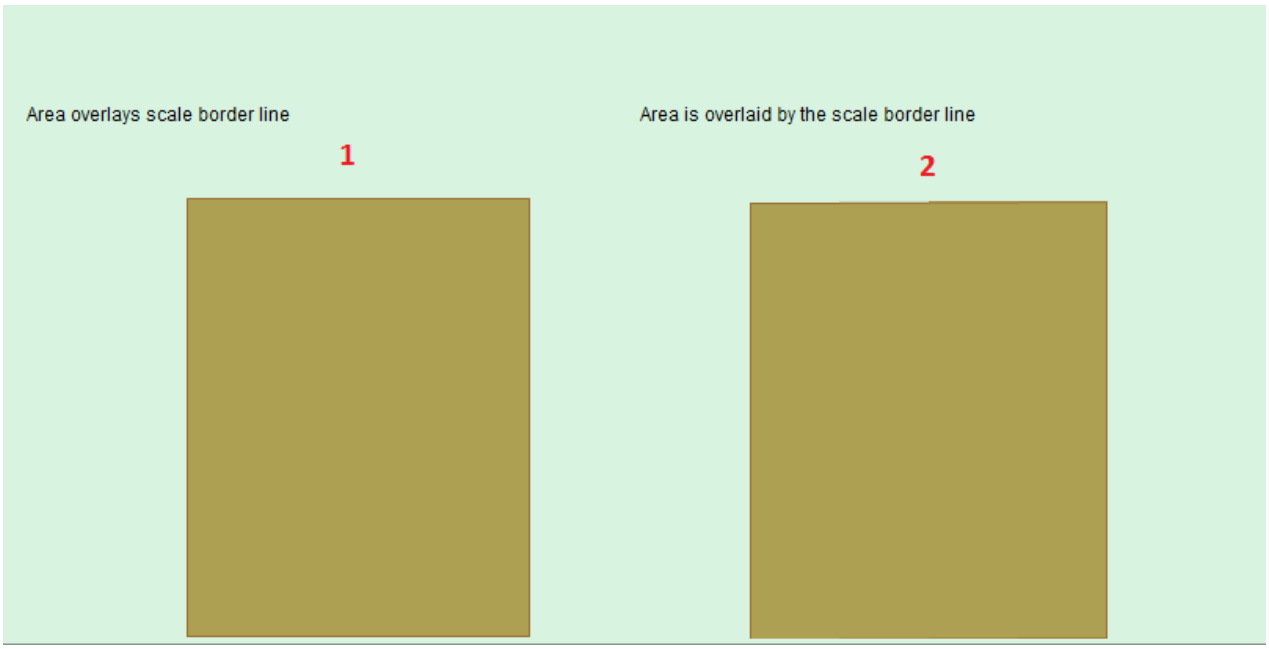
Alternative 2: Orange slashes are above left hand side dark brown area

Note: Alternative 2 allows for drawing speed optimization

Test Reference	3.6.8.2	IHO Reference	S-52 10.3.4.1
Test description			
Scale boundary display			
Setup			
As for test 3.6.6 and in addition, *Load the following cell 3.6 Display priorities\ENC_ROOT\2J4X0001.000* *Chart scale boundaries = On*			
Action			
View the objects 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:			

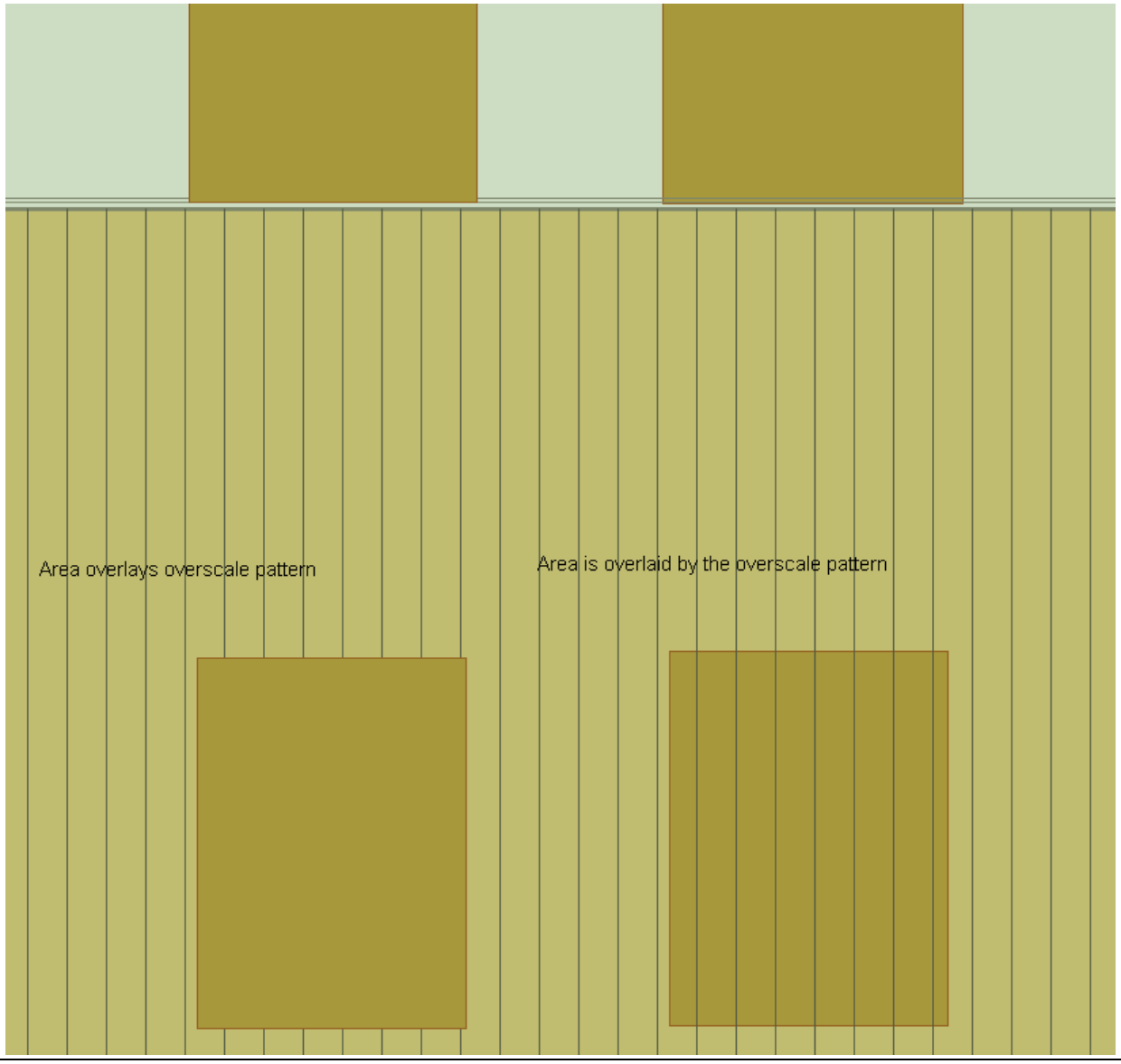


Alternative 1: Line style indicating side of larger scale available (complex line style with thick line at edge and double 1 pixel lines on larger scale available side)



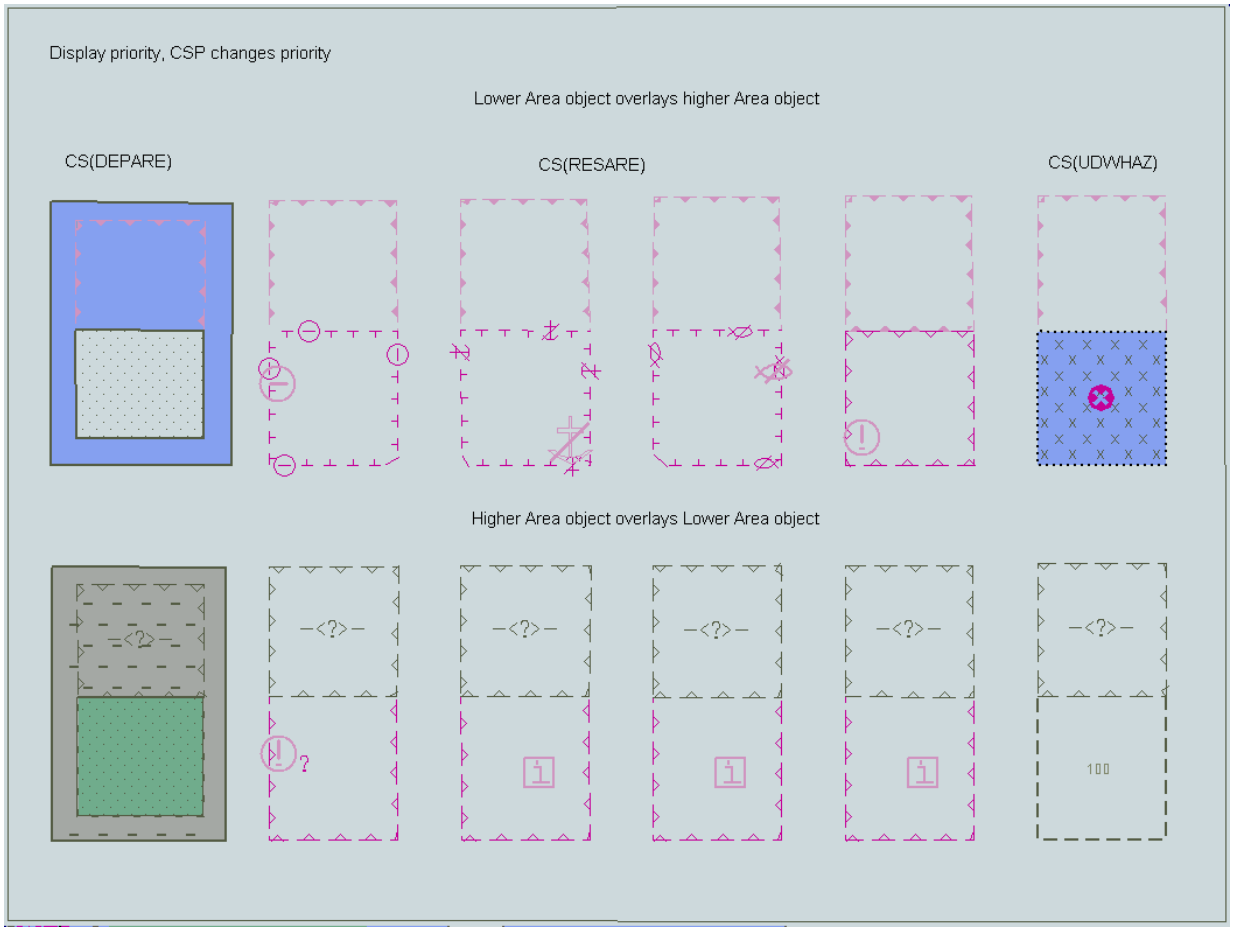
Alternative 2: Line style just indicating scale border (1 pixel line)

Test Reference	3.6.8.3	IHO Reference	S-52 10.3.4.1
Test description			
Overscale pattern display			
Setup			
As for test 3.6.8.2			
Action			
View the objects 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:			



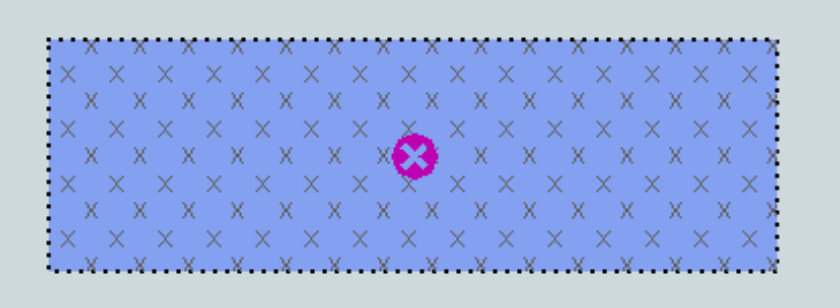
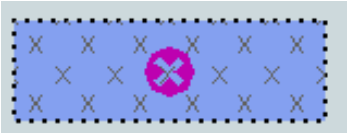
3.6.9 Display of objects affected by CSPs

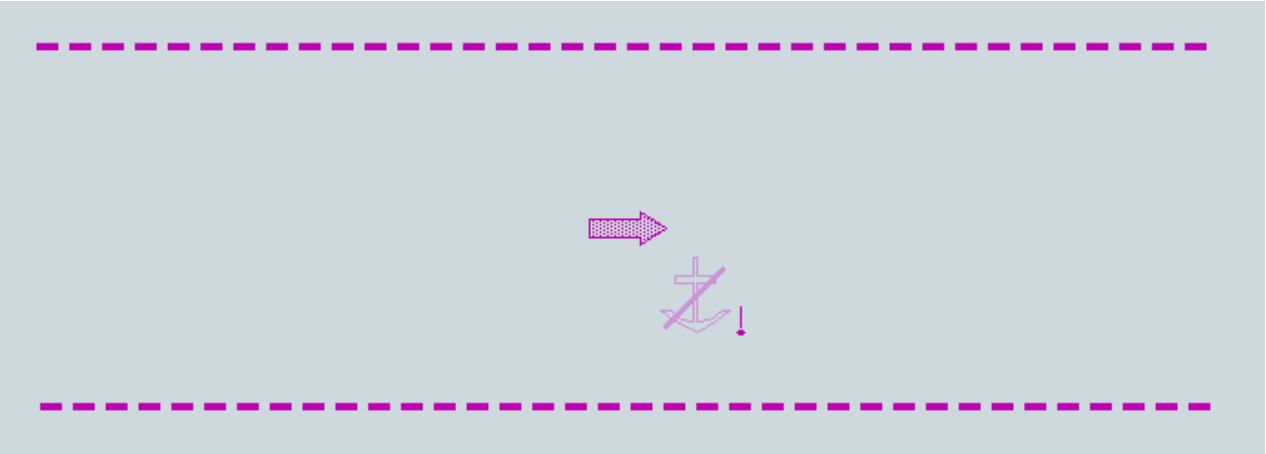
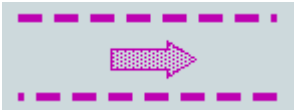
Test Reference	3.6.9	IHO Reference	S-52 10.3.4.1
Test description			
Display of objects with priority affected by conditional symbology procedures			
Setup			
As for test 3.6.1			
Action			
View the objects at position 32°21.850'S 61°23.150'E scale 1:5 000			
Results			
Confirm that items 1-12 display as shown in the graphic below :			

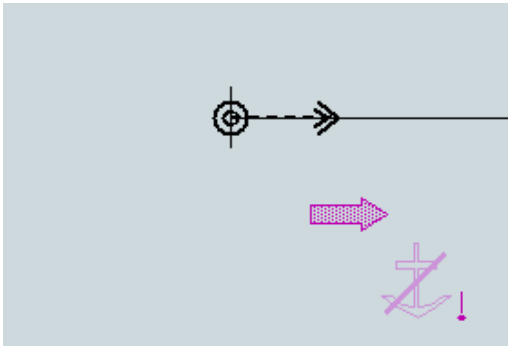


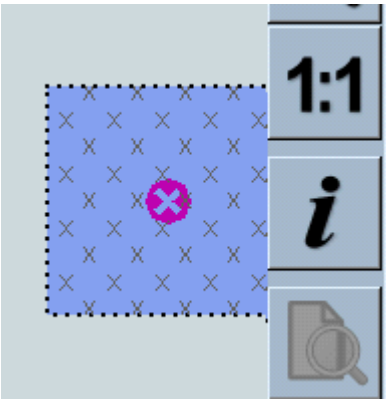
Note: Manufacturers can use their own algorithms for calculating the position of centred symbols S-52 PL 8.5.1.

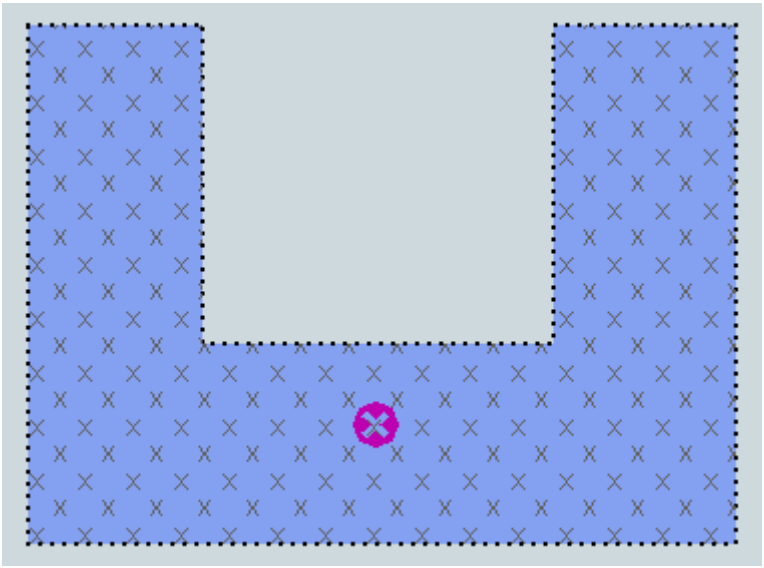
3.6.10 Display of Centred Symbols

Test Reference	3.6.10 a)	**IHO Reference**	S-52 8.5.1
Test description			
Display of centred symbol in the centre of an area.			
Setup			
Load the following cell 3.3 Settings\ENC_ROOT\GB4X0001.000 with the following settings: *Select Display Category Other* *Select Symbolized Boundaries* *Select Paper chart symbols* *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 object displays as in the image below:  *Zoom out to scale 1:50 000 and confirm that the objects now display as follows:* 			

Test Reference	3.6.10 b)	**IHO Reference**	S-52 8.5.1
Test description			
Display of centred symbols offset.			
Setup			
As for test 3.6.10 a)			
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 object 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 objects now display as follows:*  *Note: the display should only show the arrow as above without the centred symbol(s) offset.*			

Test Reference	3.6.10 c)	**IHO Reference**	S-52 8.5.2
Test description			
Display of centred symbols which conflict with the own ship symbol.			
Setup			
As for test 3.6.10 a)			
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 object displays as in the image below:  *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	3.6.10 d)	IHO Reference	S-52 8.5.1
Test description			
Display of centred symbols when area is partially off screen.			
Setup			
As for test 3.6.10 a)			
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 object displays as in the image below:  *Note: the display should show the centred symbol in the centre of the visible area.*			

Test Reference	3.6.10 e)	**IHO Reference**	S-52 8.5.1
Test description			
Display of centred symbols within complex areas.			
Setup			
As for test 3.6.10 a)			
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 object displays as in the image below:  *Note: the display should show the centred symbol within the OBSTRN area. The display may be different from the example shown above as long as the centre of the centred symbol remains within the OBSTRN area.*			

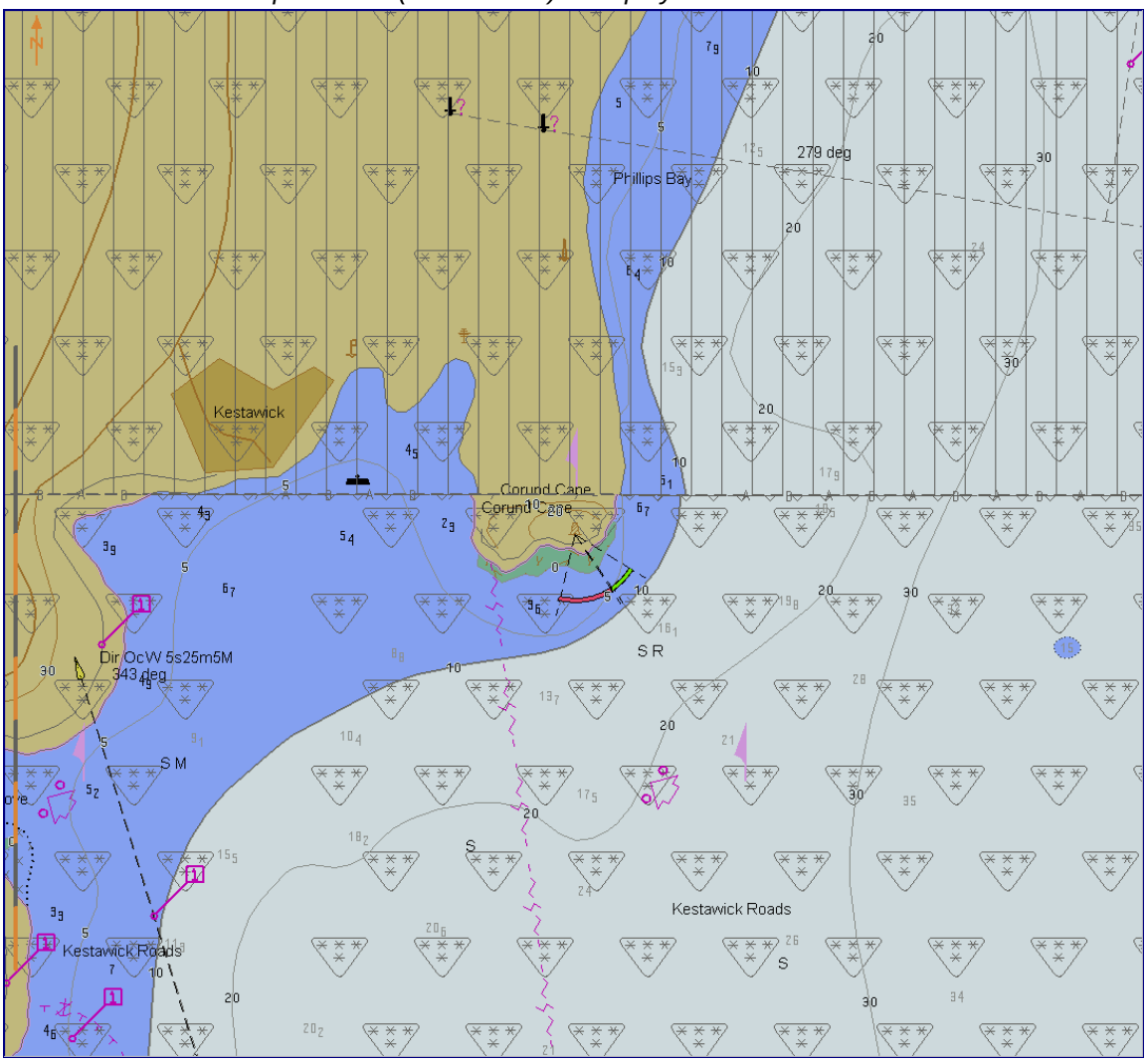
3.7 Scale and navigation purpose

3.7.1 Display of overscale indication

Test Reference	3.7.1 a)	**IHO Reference**	S-52 10.1.10.1
Test description			
Display of overscale indication.			
Setup			
Load the cells from 2.1.1 Power Up\ENC_ROOT			
Action			
Zoom in beyond 1:25 000. This is the compilation scale of the harbour usage band cells.			
Results			
Confirm that an overscale indication is provided. *For example, if scale zoomed is 1:20 000 then for areas based on compilation scale 1:25 000 the overscale factor shall be 1.3 and for areas based on compilation scale 1:52 000 it shall be 2.6*			

Test Reference	3.7.1 b)	**IHO Reference**	S-52 10.1.10.2
Test description			
Display of overscale pattern.			
Setup			
Load the cells from 2.1.1 Power Up\ENC_ROOT *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 compilation scale of the harbour usage band cells.*			

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

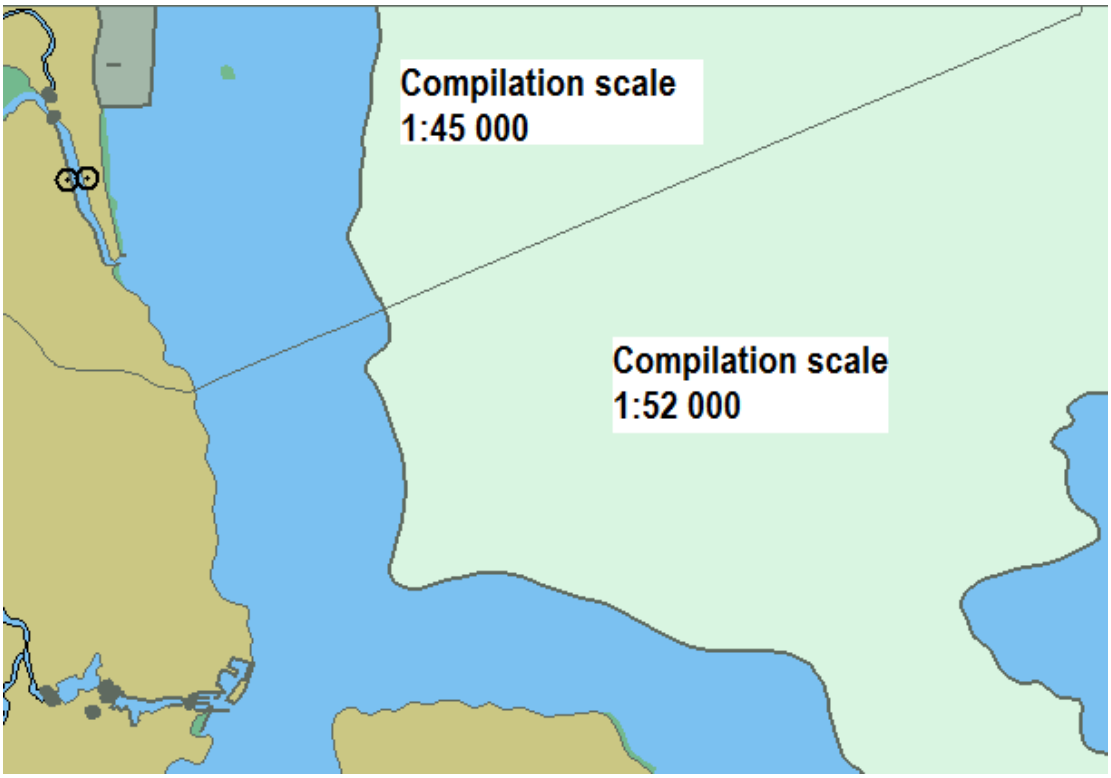


3.7.2 Indication of larger scale data

Test Reference	3.7.2	**IHO Reference**	S-52 10.1.10.3
Test description			
Indication of better (larger) scale data being available.			
Setup			
Load the following cells: *2.1.1 Power Up\ENC_ROOT\GB4X0000.000* *2.1.1 Power Up\ENC_ROOT\GB5X01NW.000* *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 less detailed navigational purpose cell (GB4X0000.000). Observe this cell.			
Results			
Position the displayed area over the own ship. Confirm that an indication is provided that larger scale is available.			

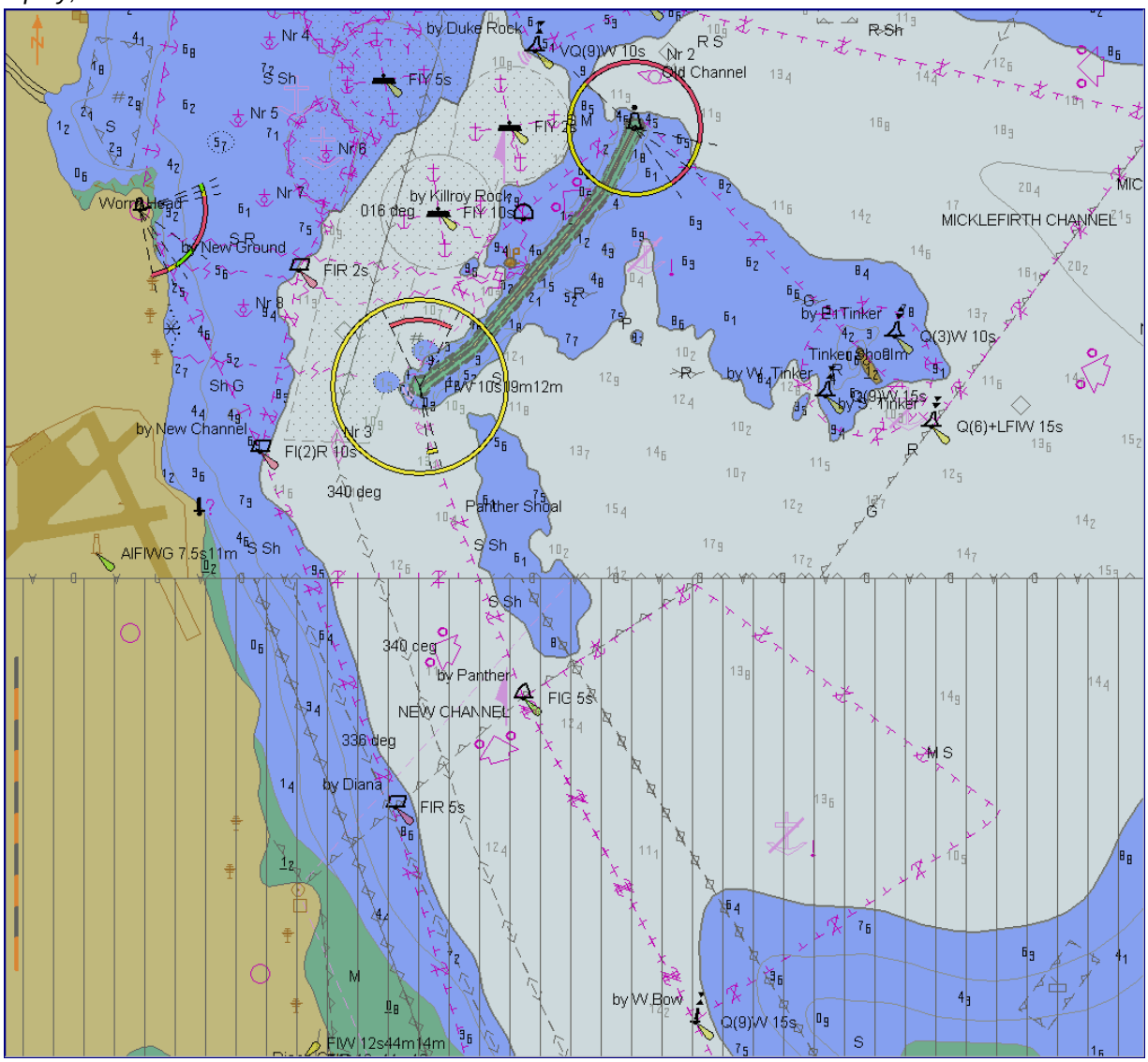
3.7.3 Boundaries between compilation scales

Test Reference	3.7.3	IHO Reference	S-52 10.1.9.1
Test description			
Boundaries between compilation scales.			
Setup			
Load the following cell: *2.1.1 Power Up\ENC_ROOT\GB4X0000.000* *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 cell. Also confirm that the overscale indication is provided for the area in which compilation scale is 1:52 000.			



3.7.4 Display of data from another navigational purpose

Test Reference	3.7.4 a)	IHO Reference	S-52 10.1.4
Test description			
Display of data from a smaller scale navigational purpose to completely cover the display.			
Setup			
Load all cells from 2.1.1 Power Up\ENC_ROOT *Select Display Category Other* *Select Safety Contour value to 10 m* *Select Safety Depth value to 10 m* *Select Symbolized Boundaries* *Select Paper chart symbols*			
Action			
Centre the display at 32°33.000'S 60°56.000'E *Select scale 1:20 000 so that harbour detail (buoyage, lights) is shown.*			
Results			
Confirm that south of 32°33.141'S data from the smaller navigational purpose is shown. *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.*			



Test Reference	3.7.4 b)	IHO Reference	S-52 10.1.3

Test description

Display of overlapping data.

Setup

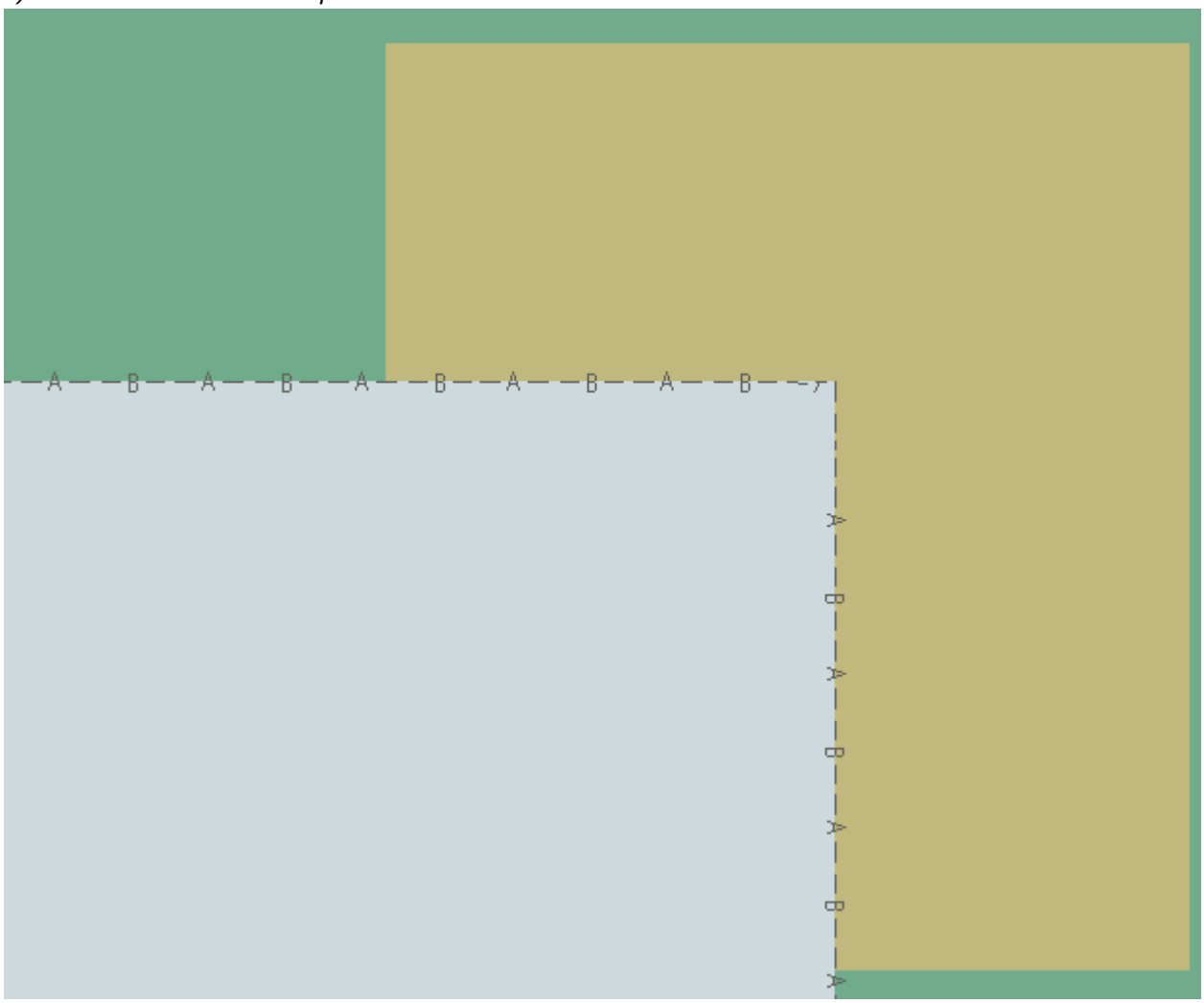
Load cell from 3.7 Overlap\ENC_ROOT
Load cell from 3.7.7 Scale minimum\ENC_ROOT
Select Display Category Other
Select Safety Contour value to 10 m
Select Safety Depth value to 10 m
Select Symbolized Boundaries
Select Paper chart symbols
Display cell GB3OVRLP at compilation scale (1:90 000)

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 AA3SCAMN overlaps chart GB3OVRLP



b) Chart GB3OVRLP overlaps chart AA3SCAMN

3.7.5 Display of graphical index

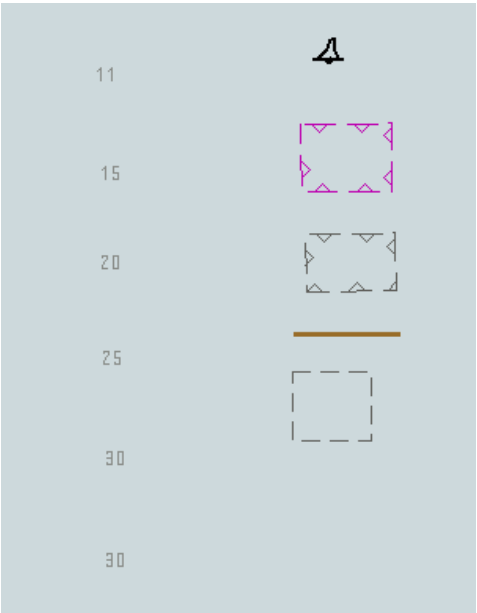
Test Reference	3.7.5	**IHO Reference**	S-52 10.1.7
Test description			
Display of graphical index of cell boundaries.			
Setup			
Load the cells from 2.1.1 Power Up\ENC_ROOT			
Action			
Navigate to a graphical index of cell boundaries.			
Results			
Confirm that a graphical index of the cell boundaries is displayed and access to the edition number and update number of each cell is available.			

3.7.6 Change of display scale

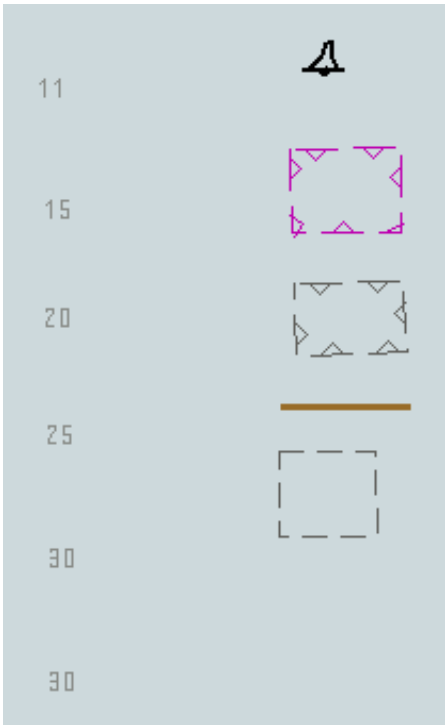
Test Reference	3.7.6	IHO Reference	-
Test description			
Change of display scale by chart scale values and by increments of displayed range values in nautical miles.			
Setup			
Load the cells from 2.1.1 Power Up\ENC_ROOT			
Action			
Change display scale by chart scale values or by increments of displayed range values in nautical miles.			
Results			
Confirm that the display changes accordingly.			

3.7.7 Impact of SCAMIN on display

Test Reference	3.7.7	IHO Reference	S-52 10.4.2 S-52 10.3.4.4
Test description			
Impact of SCAMIN values on display of charted objects.			
Setup			
Load the cell AA3SCAMN.000 from 3.7.7 Scale minimum\ENC_ROOT *Select Display Category Other* *Select Safety Contour value to 10 m* *Select Safety Depth value to 10 m* *Select Symbolized Boundaries* *Select Paper chart symbols* *Display cell AA3SCAMN at compilation 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 SCAMIN*			
Results			
1. All objects shall be shown.			



2. All objects shall be shown



3. The objects with SCAMIN values of 119 000 and 179 999 shall not be shown.

4. All objects shall be shown

3.8 Additional Display Functions

3.8.1 Mariners' objects

Test Reference	3.8.1	**IHO Reference**	S-52 Part II
Test description			
The display of Mariners' Features.			
Setup			
Load the following cell 2.1.1 Power Up\ENC_ROOT\GB4X0000.000			
Action			
1. Create a Mariner's object of type point. *2. Create 10 Mariner's object of type line.* *3. Create a Mariner's object of type area.* *4. Specify a fill style as described in S-52, 2.3.1b for the created area object.* *5. Add 25 characters of text on a Mariner's object.*			
Results			
Check that all information added by the Mariner (items 1-5) is distinguishable. *Check that all of these objects can be added to the SENC.* *Recall them from the SENC and check that they may be deleted.*			

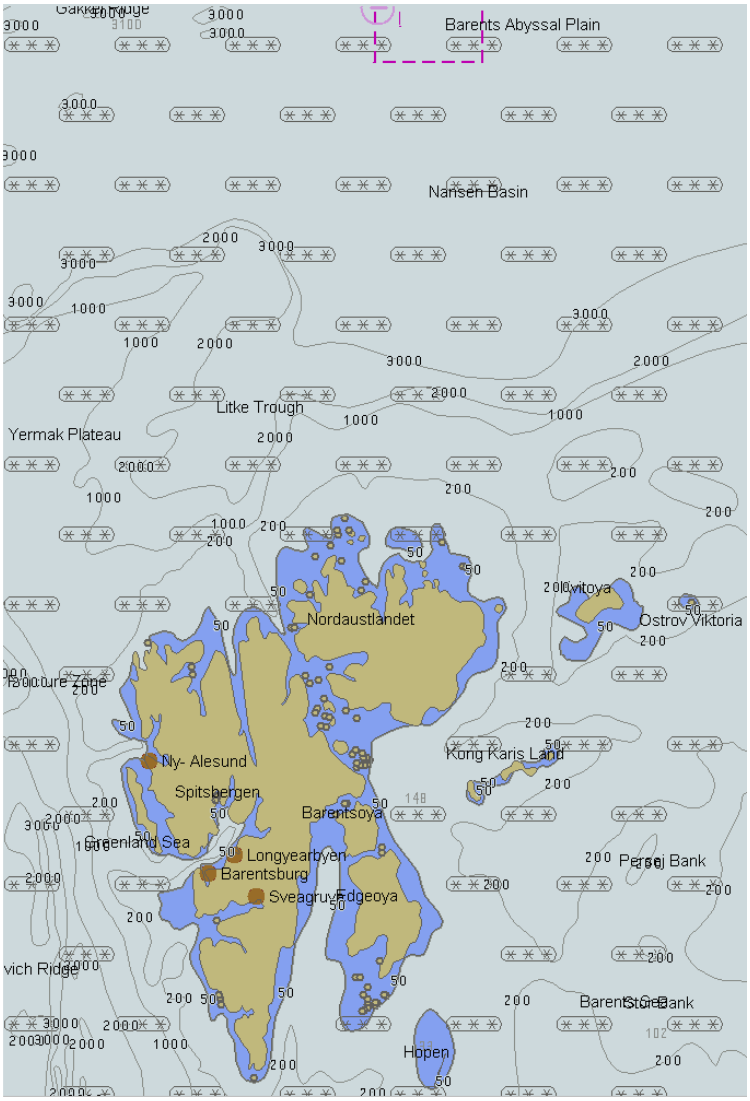
3.8.2 Adjustment of depth information by tidal height

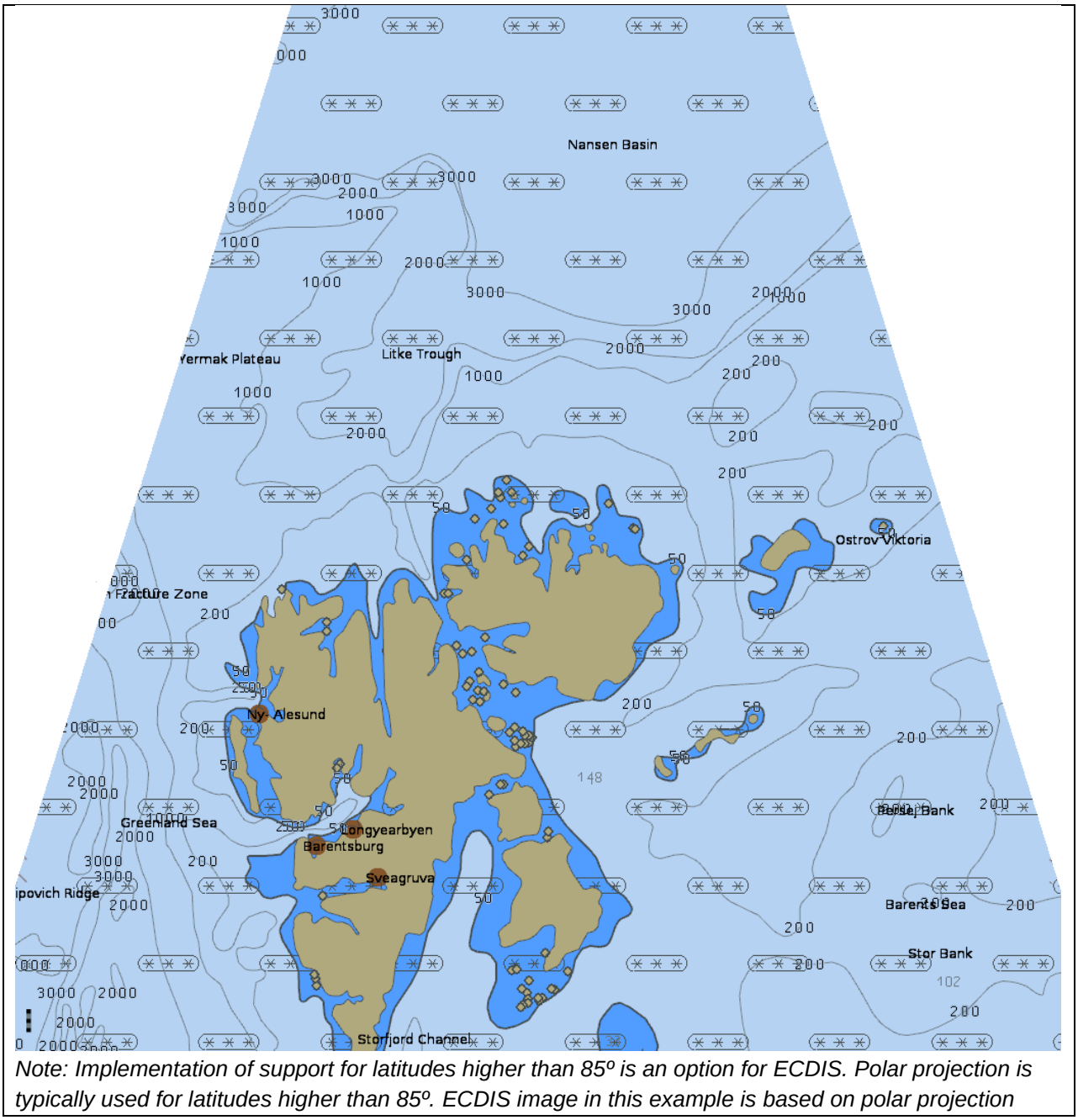
Test Reference	3.8.2	**IHO Reference**	S-52 Main document Ed 6.1.0, 1.2 (f)
Test description			
Depth information is not affected by tidal height information.			
Setup			
Load the following cell 2.1.1 Power Up\ENC_ROOT\GB4X0000.000			
Action			
Confirm by analytical evaluation that depth information is not affected by tidal height.			
Results			
Depth information is not affected by tidal height.			

3.9 Display of ENC covering Polar Regions

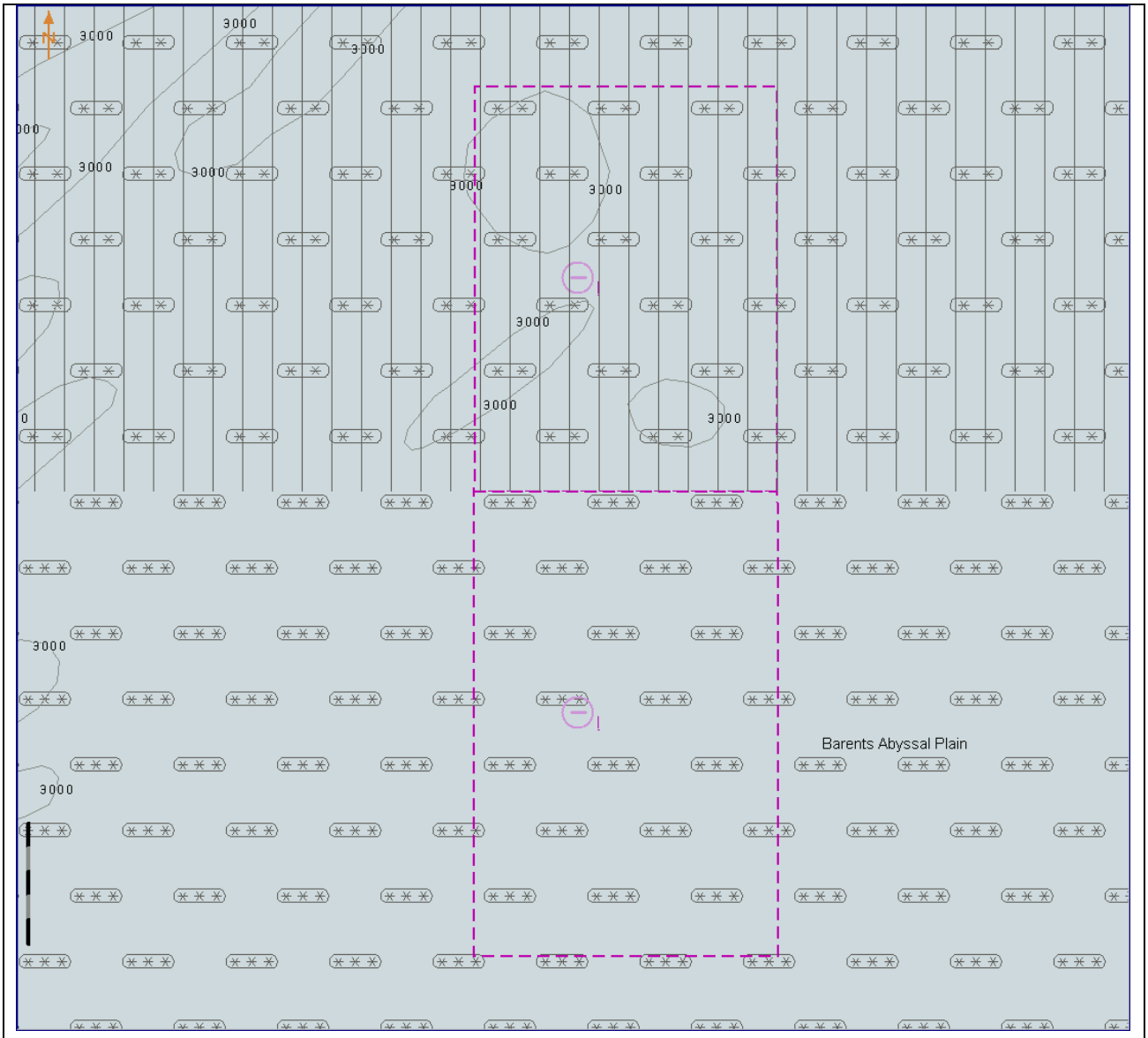
Test 3.9.1 is for all ECDIS. Test 3.9.2 is optional and should only be carried out on ECDIS claiming to be approved to function in Polar Regions.

3.9.1 Display of ENC Data up to 85 degrees

Test Reference	3.9.1	**IHO Reference**	S-52 10.1.10.2
Test description			
Display of charts up to 85 degrees.			
Setup			
Load all cells from 3.9 Polar ENC Data *Select Display Category Other* *Select Safety Contour value to 30 m* *Select Plain Boundaries* *Select Paper chart symbols* *Select Accuracy* *Select Contour label*			
Action			
Select chart AA1NPOL3.000 at compilation 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:  *Display is based on Mercator projection*			

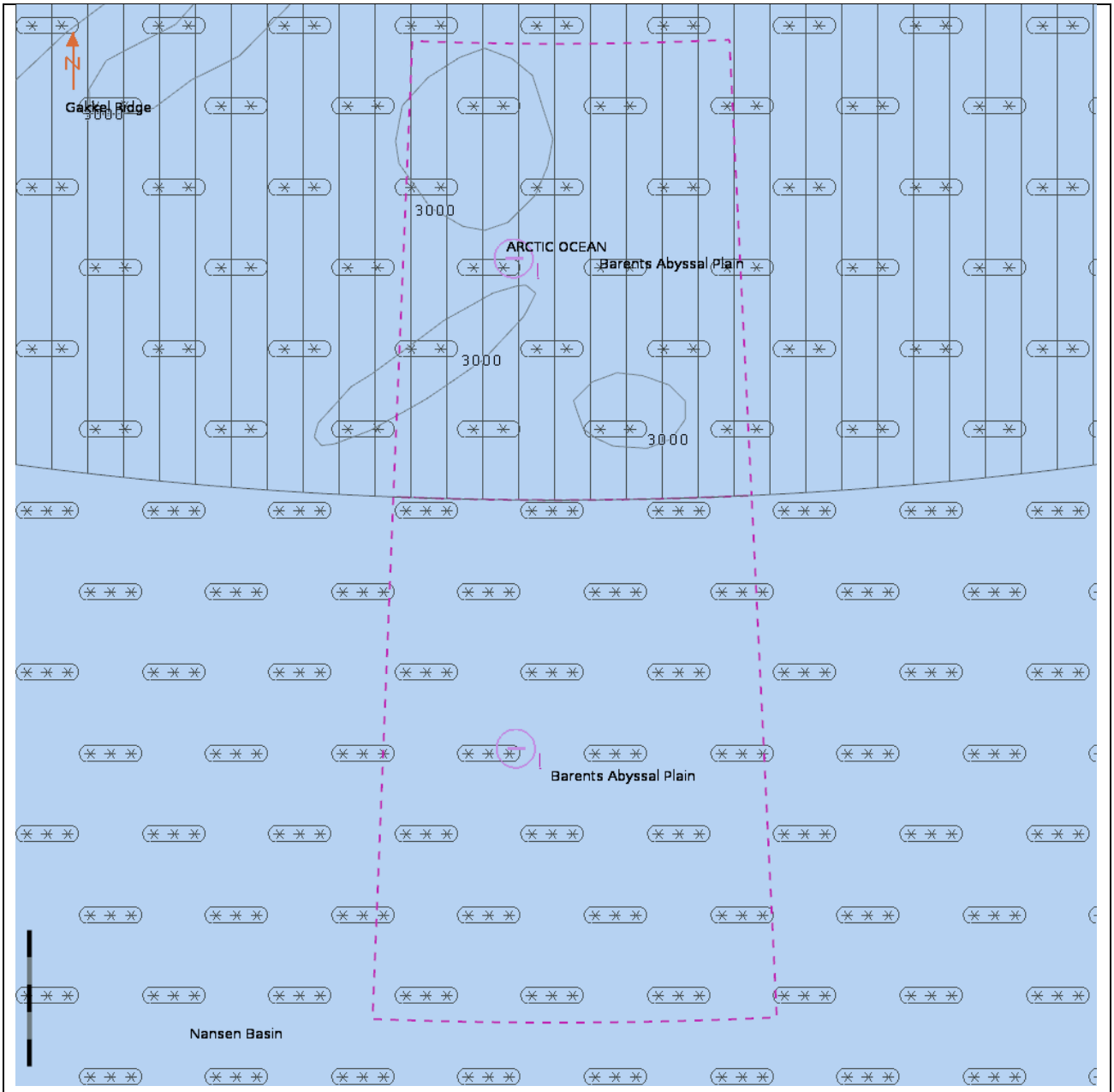


Note: Implementation of support for latitudes higher than 85º is an option for ECDIS. Polar projection is typically used for latitudes higher than 85º. ECDIS image in this example is based on polar projection



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

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.



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.

3.9.2 Display of Data at Extreme High Latitudes

Test Reference	3.9.2	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

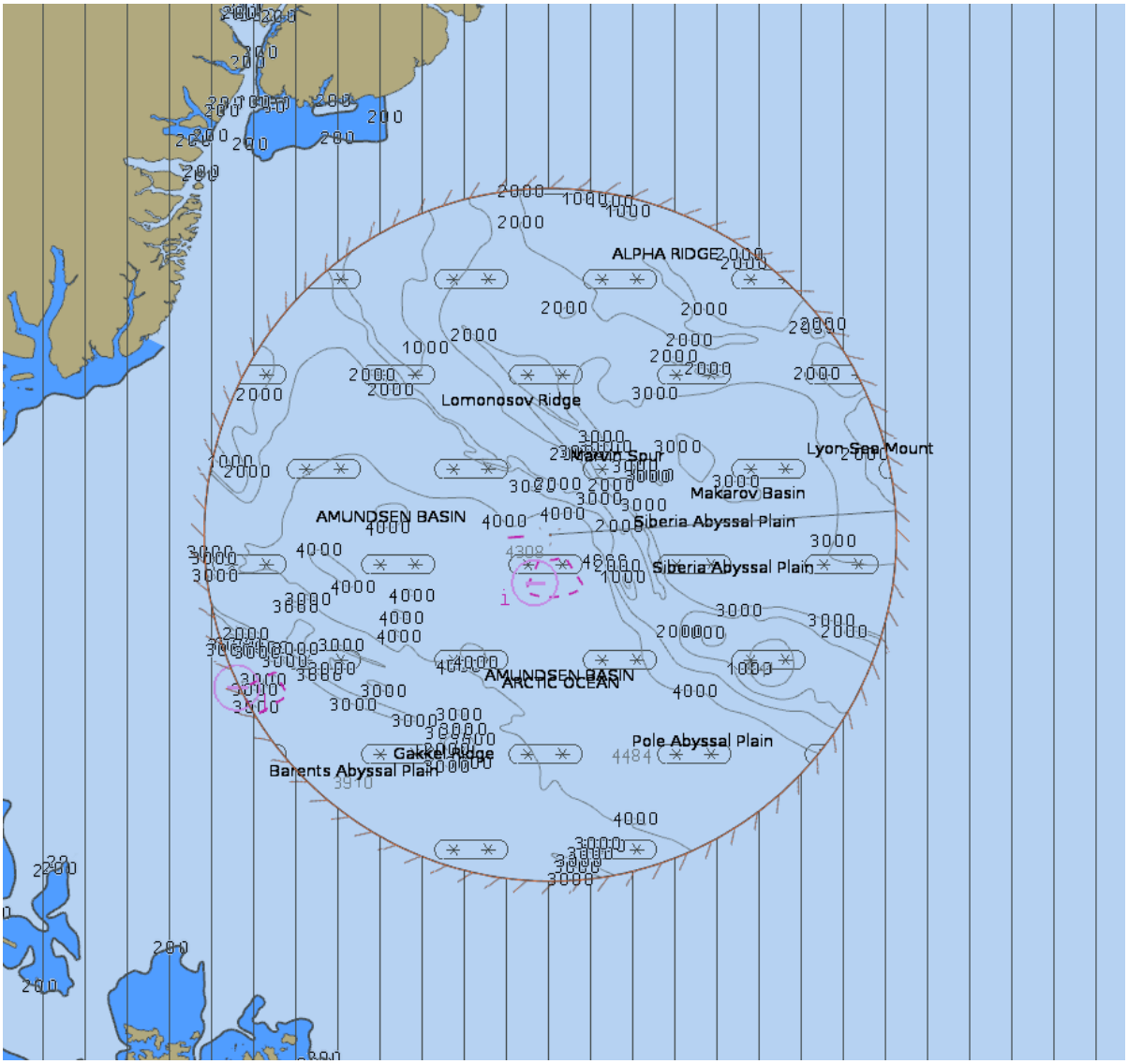
Load all cells from 3.9 Polar ENC Data
Select Display Category Other
Select Safety Contour value to 30 m
Select Plain Boundaries
Select Paper chart symbols
Select Accuracy
Select Contour label

Action

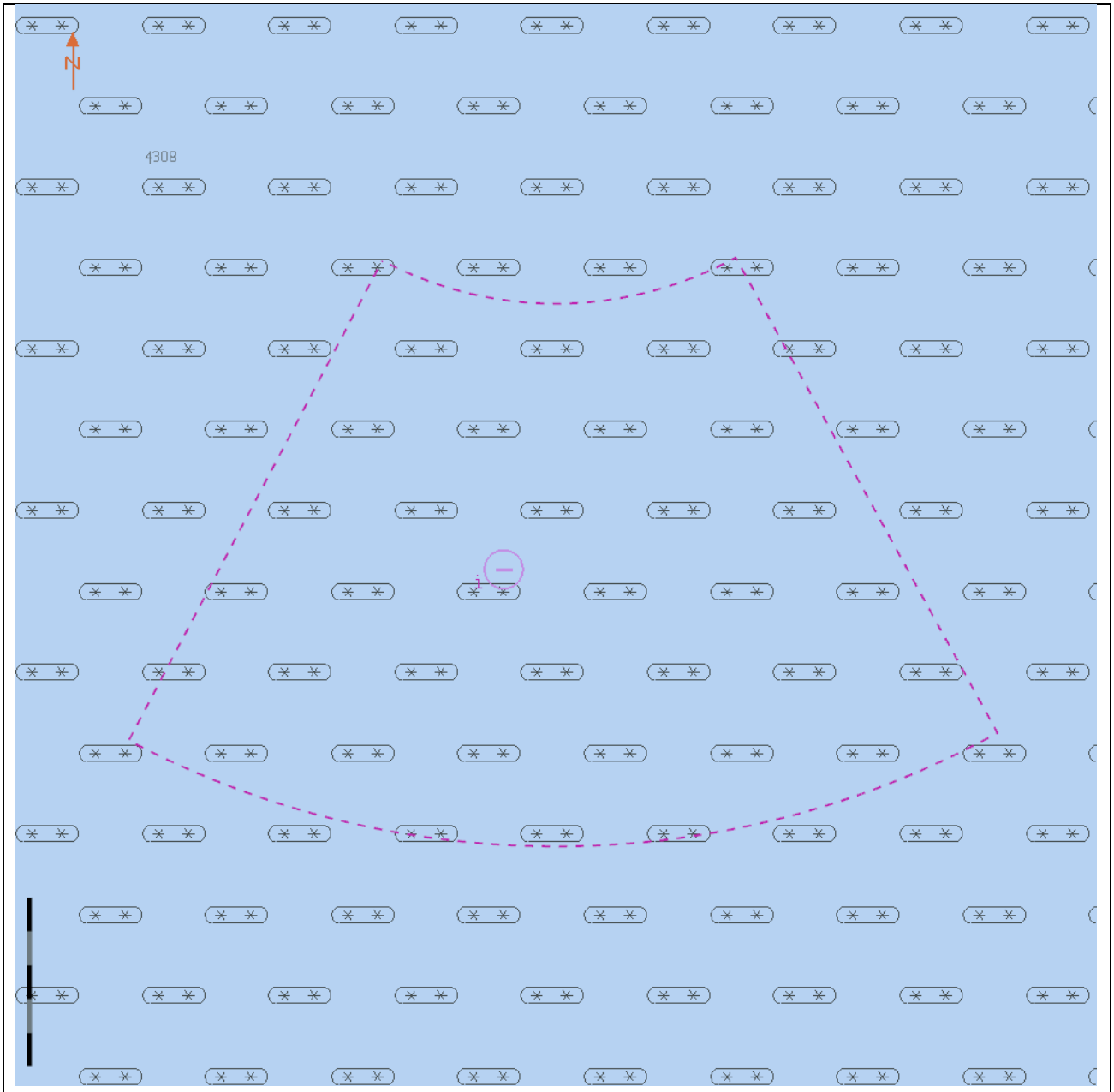
Check ENC symbols shown in the ECDIS against the graphical plot.

Results

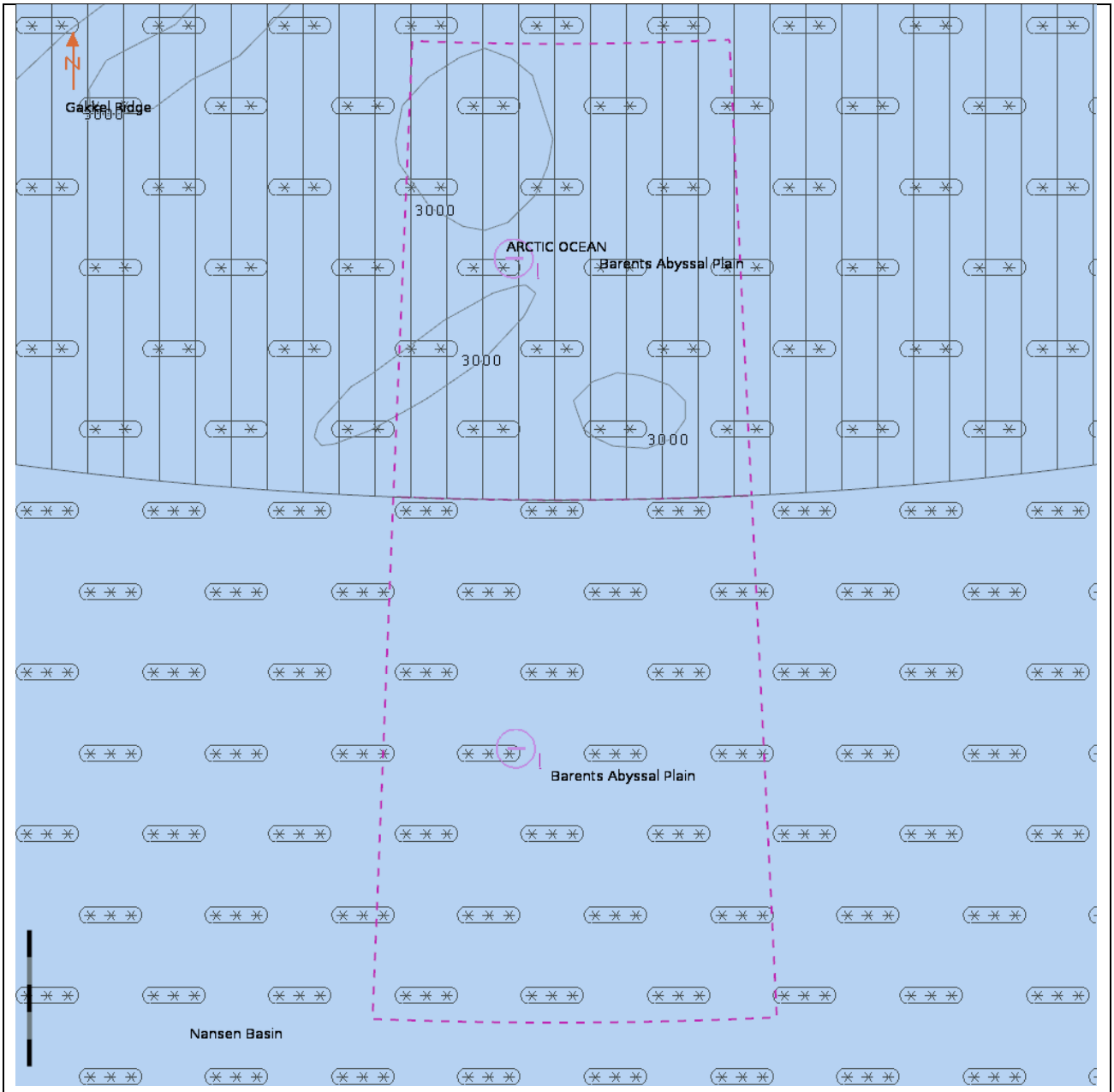
The ENC in the ECDIS should be shown like in the picture below.
Note: The chart outside the circular area is an example of an optional background chart.



North Pole is in the centre of the display



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



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

4 Chart related functions

4.1 Mode and orientation

Test Reference	4.1 a)	**IHO Reference**	S-52 10.5.4
Test description			
Display of the north arrow symbol.			
Setup			
Load the following cell 2.1.1 Power Up\ENC_ROOT\GB4X0000.000			
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	4.1 b)	**IHO Reference**	S-52 2.2.3
Test description			
True motion operation.			
Setup			
As for test 4.1 a)			
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	4.1 c)	**IHO Reference**	-
Test description			
Manual adjustment of chart display area and own ship position.			
Setup			
As for test 4.1 a)			
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	4.1 d)	IHO Reference	S-52 10.1.8
Test description			
No ENC data available.			
Setup			
As for test 4.1 a) *Ship position as follows: 32°24.53'S 061°19.29'E (within ENC data coverage (M_COVR) where CATCOV = 2 (no coverage available)).*			
Action			
Observe the display.			
Results			
Confirm that a "No ENC available" indication is provided.			

Test Reference	4.1 e)	IHO Reference	S-52 10.1.8
Test description			
No ENC data available.			
Setup			
As for test 4.1 a) *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	4.1 f)	IHO Reference	S-52 [3.1.6]
Test description			
Display in non 'north-up' orientation.			
Setup			
As for test 4.1 a)			
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 chart 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	4.2	IHO Reference	S-52 10.5.1
Test description			
Display of scale bar at appropriate scales.			
Setup			
Load the cells from 2.1.1 Power Up\ENC_ROOT *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	4.3	**IHO Reference**	S-52 10.5.1
Test description			
Display of latitude bar at appropriate scales.			
Setup			
Load the cells from 2.1.1 Power Up\ENC_ROOT *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 Object information

Test Reference	4.4 a)	**IHO Reference**	
Test description			
General rules for cursor pick report			
Setup			
Load the cells from 2.1.1 Power Up\ENC_ROOT *Select Display Category Other.*			
Action			
1. Select several objects 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 object information.* *3. Remove object information from display.*			
Results			
1. The following rules shall be applied to the pick report: *a. Full S-57 Object 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.* *An exception to show the value of SORDAT if it is for the following objects:* *- WRECKS, OBSTRN, UWTROC, and SOUNDG with value QUASOU = 9 and geometry attribute QUAPOS = 8;* *- DRGARE with QUASOU = 11;* *- SWPARE;* *- Any object class with attribute CONDTN = 1or 3 or 5.*			

e. Dates shall be given in the form "Day Month Year" DD-MMM-YYYY. (MMM = JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC). *f. The pick report shall only return information about the objects present on the ECDIS display. This means all objects in the viewing layers enabled even if those objects have no resultant display. For example the meta object M_SREL has no display but should be detailed in the pick report.* *g. Cursor enquiry shall extend to the spatial object, which carries accuracy attributes QUAPOS and POSACC. It shall include collection objects which carry additional information, for example the OBJNAM of traffic separation schemes, navigation lines (NAVLNE, RECTRC, DWRTCL, etc.).* *2. Text associated with chart objects must be removed from the display.* *Note: The text and background colour of pick report is specified by the OEM*

Test Reference	4.4 b)	**IHO Reference**	S-52 10.8.1, 10.8.2 & 10.8.4
Test description			
Pick report descriptions and sorting			
Setup			
As for test 4.4 a)			
Action			
Select several objects as mentioned in 4.4a)			
Results			
1. A plain language explanation of each symbol shall be used as included in the S-52 Symbol Library and in the S-52 Presentation Library section 17 to provide quick and understandable information which is not always obvious from the object 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 object information shall be sorted by the drawing priority of the object as defined in the look-up table for symbolizing. When the drawing priority of objects is equal, the geometric primitive shall be used to order the information (points followed by lines and finally areas).* *4. Check that the content displayed in the pick report is configurable by the user.*			

Test Reference	4.4 c)	**IHO Reference**	S-52 10.8.3
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 objects 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	4.4 d)	IHO Reference	S-52 10.8.5

Test description

Hover-over function for object information (optional)
Test shall only be performed if a hover-over function for object 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 objects in the table below and to objects where additional information is available or date dependent objects:
3. Configure the hover-over function ON.
4. Move cursor to one of the objects mentioned in 2.
5. Move cursor to any other objects.

Features	S-57 Acronym
Lights	*LIGHTS*
Beacon, cardinal	*BCNCAR*
Beacon, isolated danger	*BCNISD*
Beacon, lateral	*BCNLAT*
Beacon, safe water	*BCNSAW*
Beacon, special purpose/general	*BVNSPP*
Buoy, cardinal	*BOYCAR*
Buoy, installation	*BOYINB*
Buoy, isolated danger	*BOYISD*
Buoy, lateral	*BOYLAT*
Buoy, safe water	*BOYSAW*
Buoy, special purpose/general	*BOYSPP*
Landmarks	*LNDMRK*

Results

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

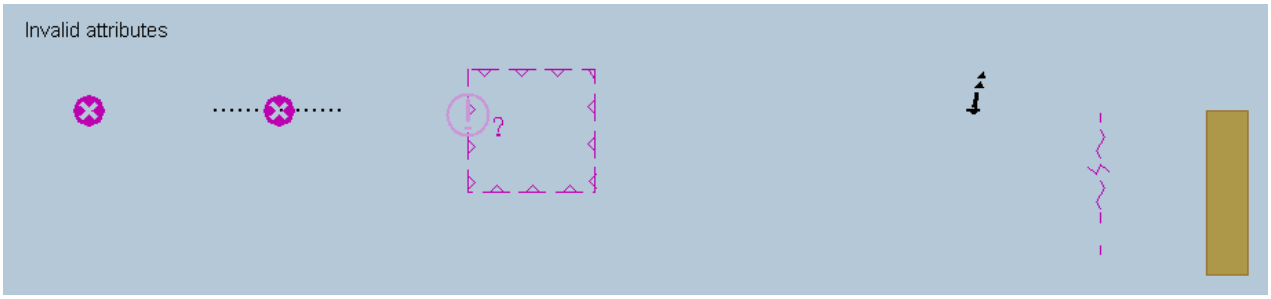
Test Reference	4.4 e)	IHO Reference	S-52 10.8.6

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 object. The main purpose of this test is to check
that ECDIS is able to accept ENC cells 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 cell AA3INVOB.000 from 3.2 Invalid Object\ENC_ROOT
Select Display Category Other
Set the Safety Contour value to 0 m
Select Symbolized Boundaries
Select Paper chart symbols

Action
Select chart objects 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 objects 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* 

Test Reference	4.4 f)	**IHO Reference**	S-52 10.9
Test description			
Display of tidal stream panels			
Setup			
Load all cells from *2.1.1 Power Up\ENC_ROOT*			
Action			
1. Select an example of TS_PAD (tidal stream panel information) *1a. select tidal stream panel information object at 32°31.45'S 60°56.35'E for display;* *2. Select an example of TS_PRH (tidal stream prediction by harmonic methods)* *2a. select tidal stream prediction by harmonic methods object 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:

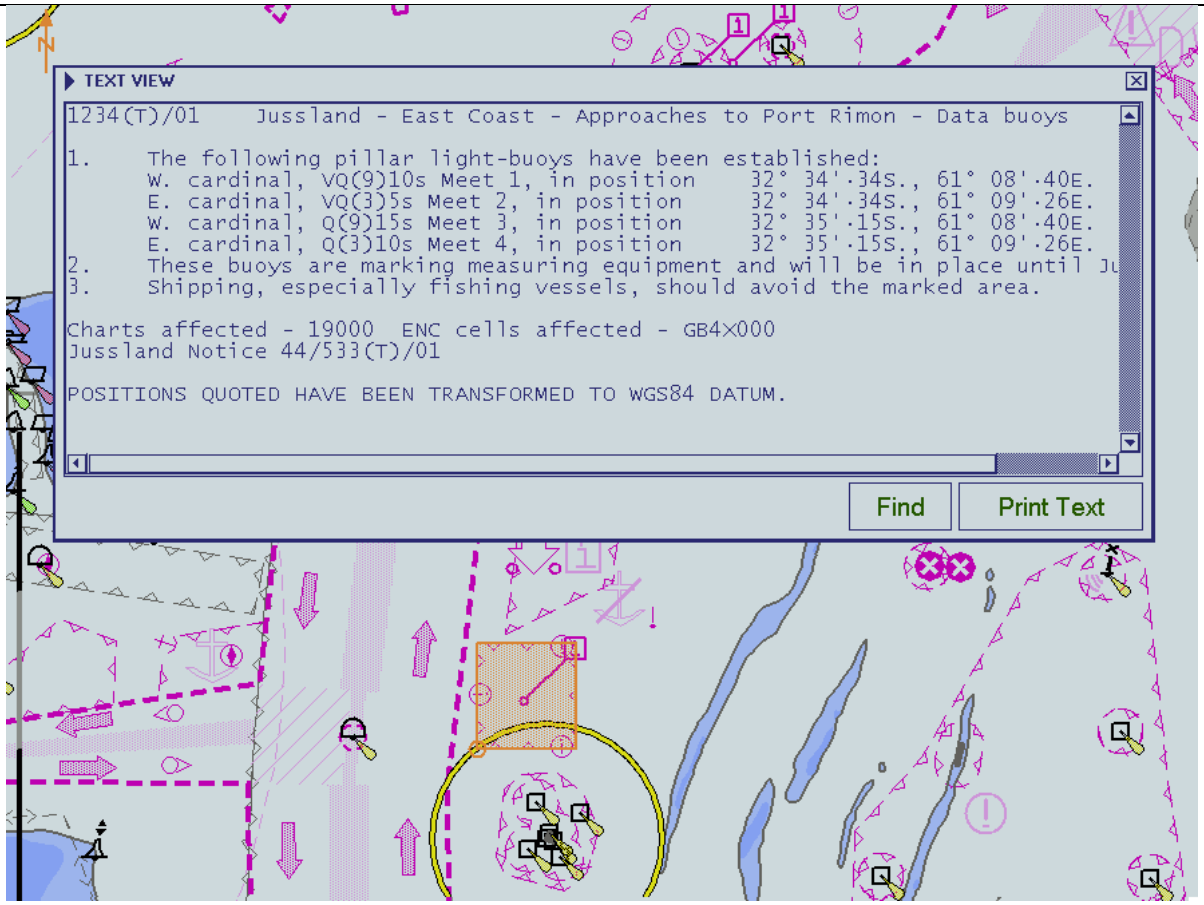
Tidal Station: xxxxxxx			
Tidal Station Identifier: yyyyyyyy			
	Hours	*Direction of stream (degrees)*	*Rates at spring tide (knots)*
Before	*-6*	*xxx*	*xxx*
	-5	*xxx*	*xxx*
	-4	*xxx*	*xxx*
	-3	*xxx*	*xxx*
	-2	*xxx*	*xxx*
	-1	*xxx*	*xxx*
HW/LW	*0*	*xxx*	*xxx*
After	*+1*	*xxx*	*xxx*
	+2	*xxx*	*xxx*
	+3	*xxx*	*xxx*
	+4	*xxx*	*xxx*
	+5	*xxx*	*xxx*
	+6	*xxx*	*xxx*

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

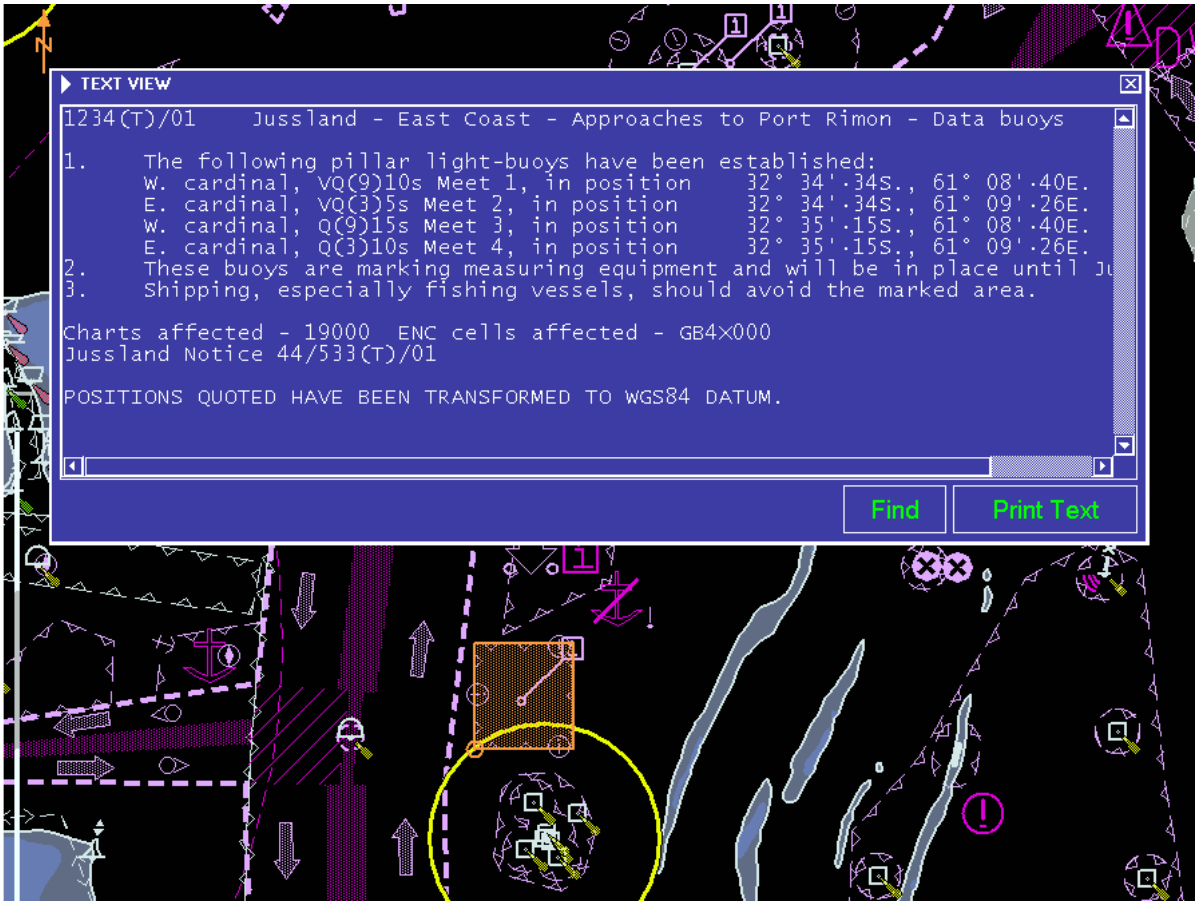
	amplitude	phase
M2	0.962	165
S2	0.361	243
K1	1.223	097
O1	0.875	143

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

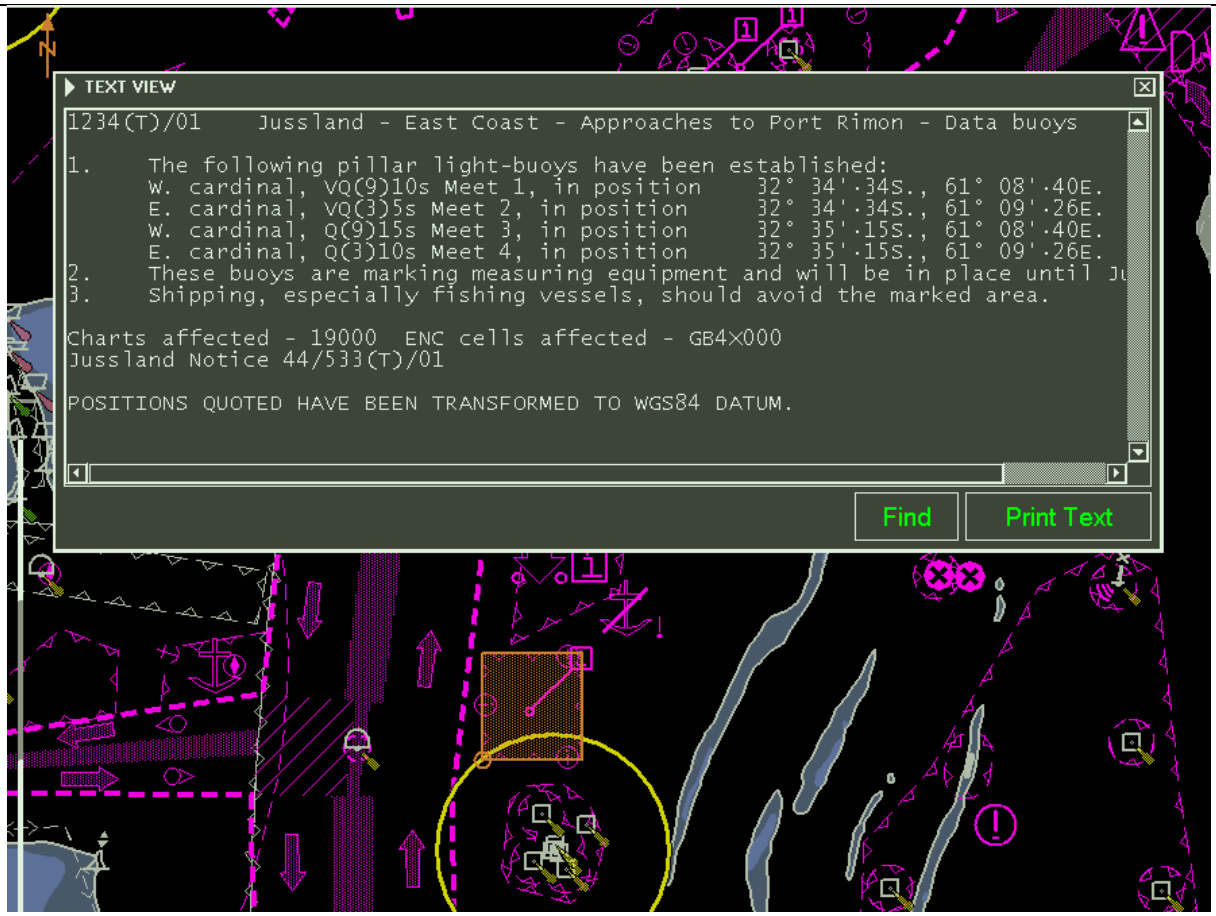
Test Reference	4.4 g)	**IHO Reference**	S-52 [3.2.3] & 10.6.1.1
Test description			
Display of text description			
Setup			
As for test 4.4 a)			
Action			
1. Select an example of a note encoded using TXTDSC (text description) (for example caution area at approximately 32°34.74'S 061°08.92'E); *2. Repeat 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 GBIECTMP.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).*			



Example of Text GBIECTMP.TXT over cell GB4X0000.000, Day palette

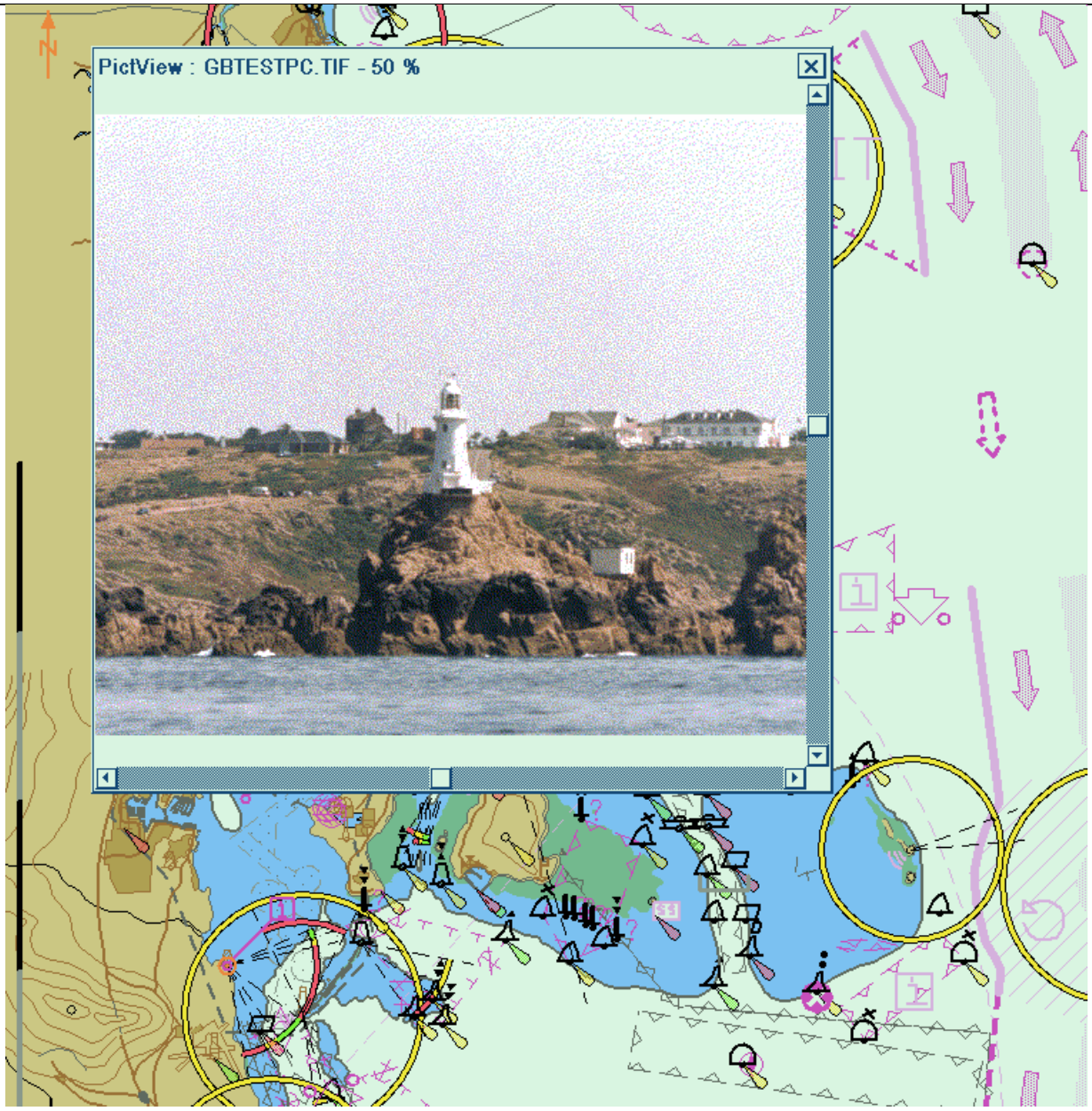


Example of Text GBIECTMP.TXT over cell GB4X0000.000, Dusk palette



Example of Text GBIECTMP.TXT over cell GB4X0000.000, Night palette

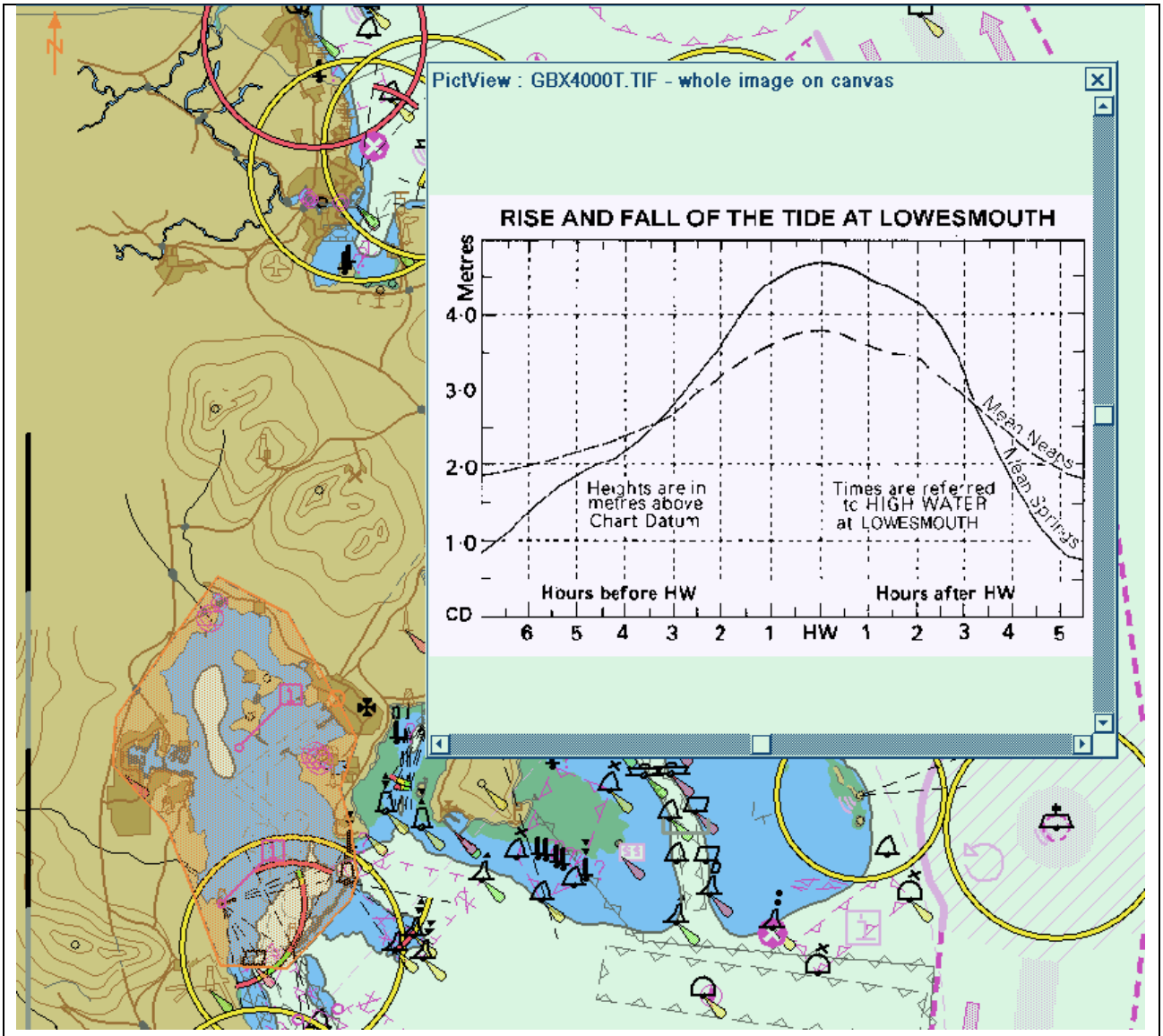
Test Reference	4.4 h)	IHO Reference	S-52 [3.2.3] & 10.6.1.1
Test description			
Display of picture representation			
Setup			
As for test 4.4 a)			
Action			
1. Select an example of PICREP (picture representation) *1a. select landmark object at 32°31.95'S 60°54.34'E and select picture representation for display;* *1b. select area object of 32°30.25'S 60°54.64'E with nautical publication (M_NPUB) and select picture representation for display;* *2. Repeat step 1a and b for different light conditions (DAY, DUSK, NIGHT).*			
Results			
1a. The picture GBTESTPC.TIF must be displayed; *1b. The picture GBX4000T.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 GBTESTPC.TIF over cell GB4X0000.000, Day palette

Example of Picture GBTESTPC.TIF over cell GB4X0000.000, Dusk palette

Example of Picture GBTESTPC.TIF over cell GB4X0000.000, Night palette

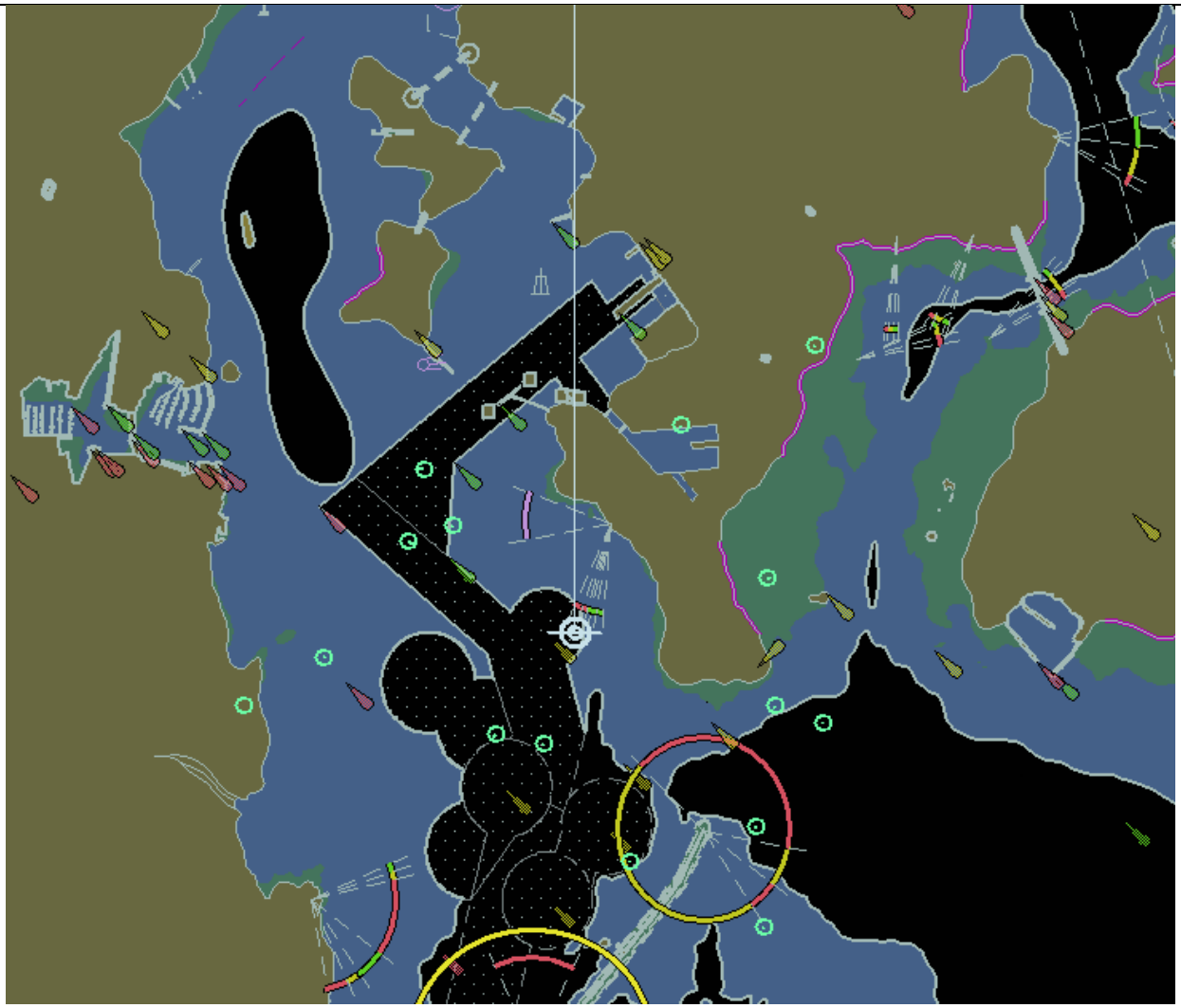


Example of Picture GBX4000T.TIF over cell GB4X0000.000, Day palette

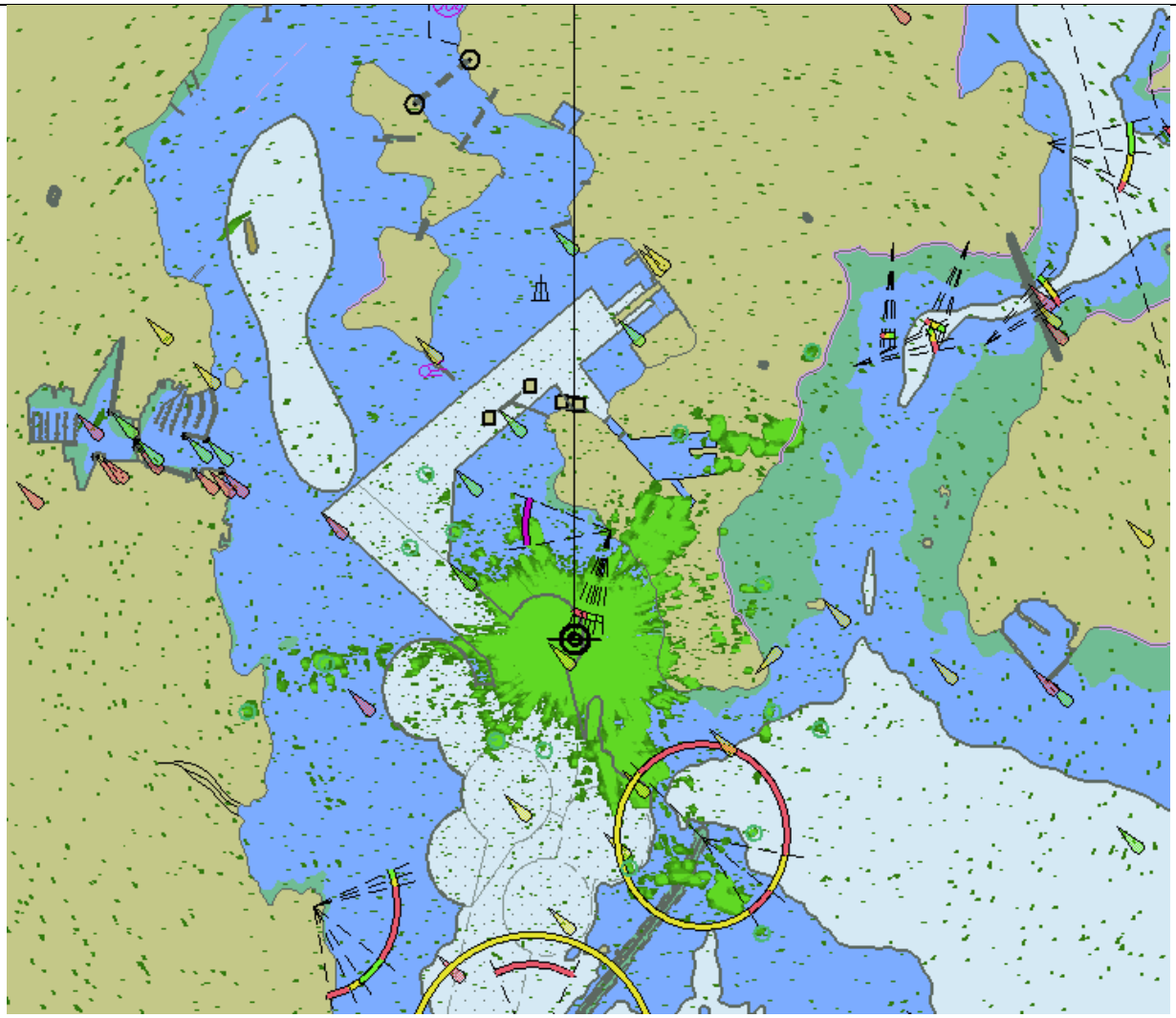
4.5 Radar and Plotting Information

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:

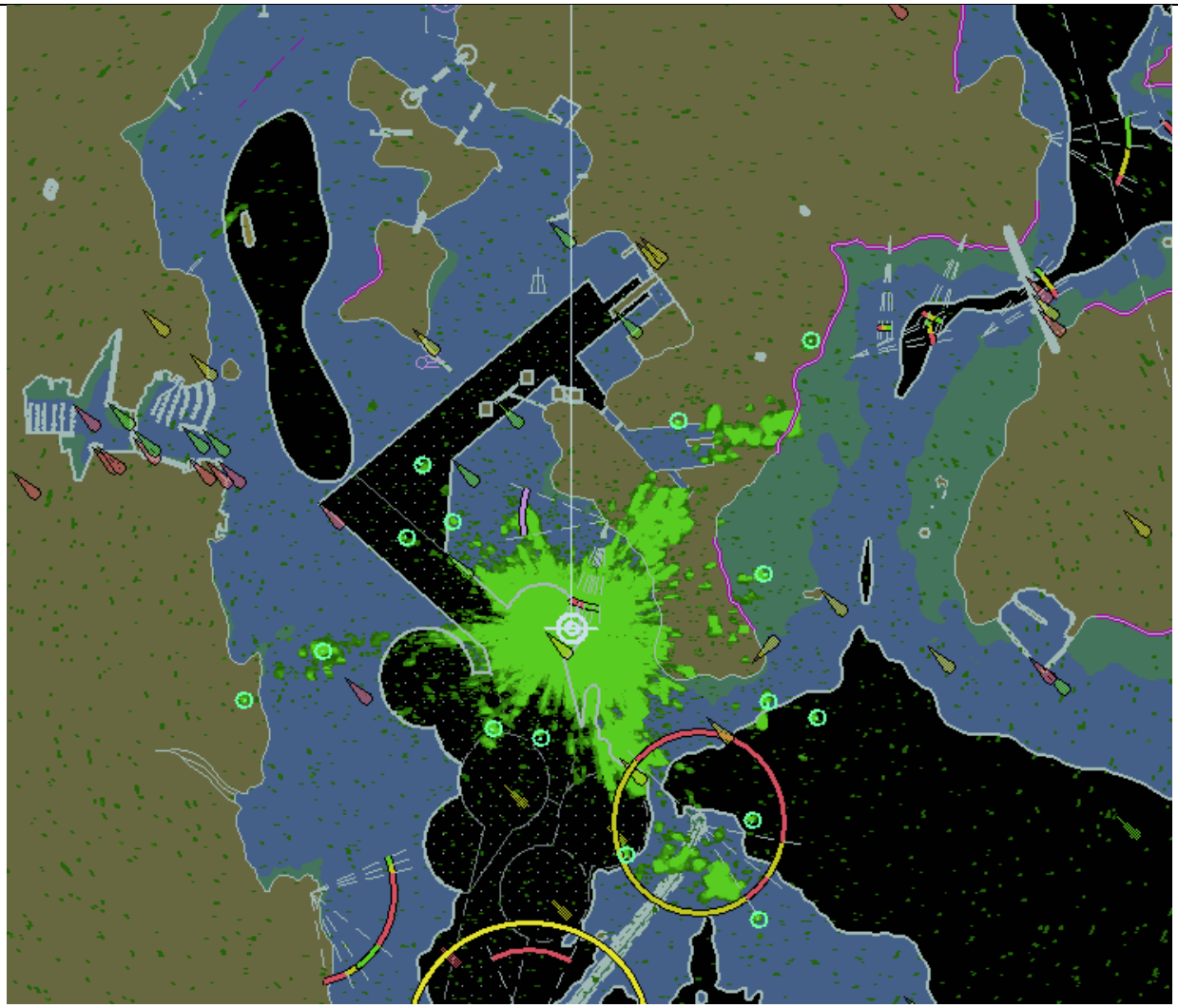
Test Reference	4.5 a)	**IHO Reference**	-
Test description			
Display of Radar overlays with SENC information.			
Setup			
Load all cells from 2.1.1 Power Up *Display cell GB5X01NE at 3 NM range scale* *Select Safety Contour value to 8 m* *Select Safety Depth value to 8 m* *Select Plain Boundaries* *Select 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 SENC objects 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 SENC objects which shall be over or under radar echoes.  *Day with radar tracked targets. Display Category Display Base + Lights*			



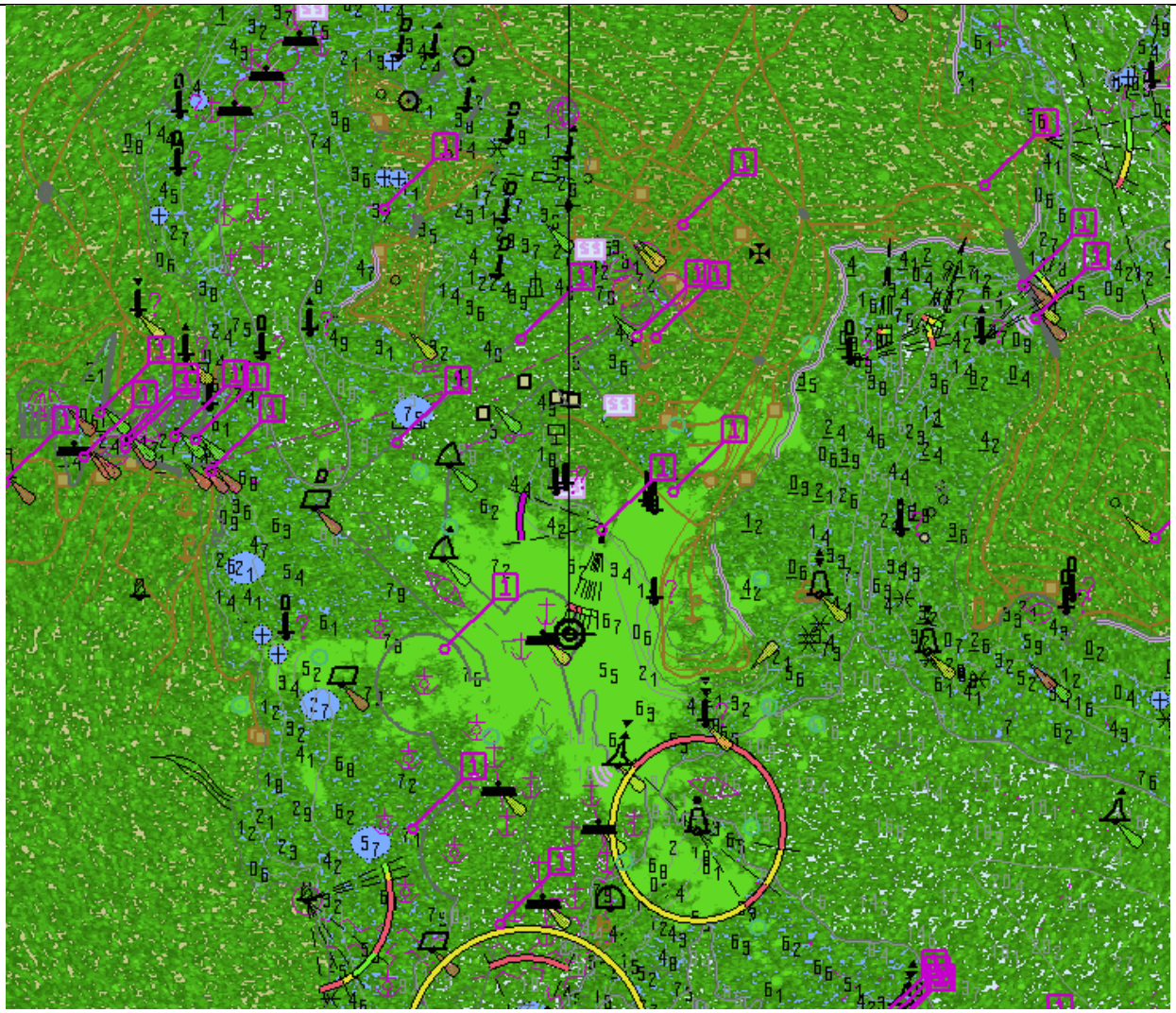
Dusk with radar tracked targets. Display Category Display Base + Lights



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

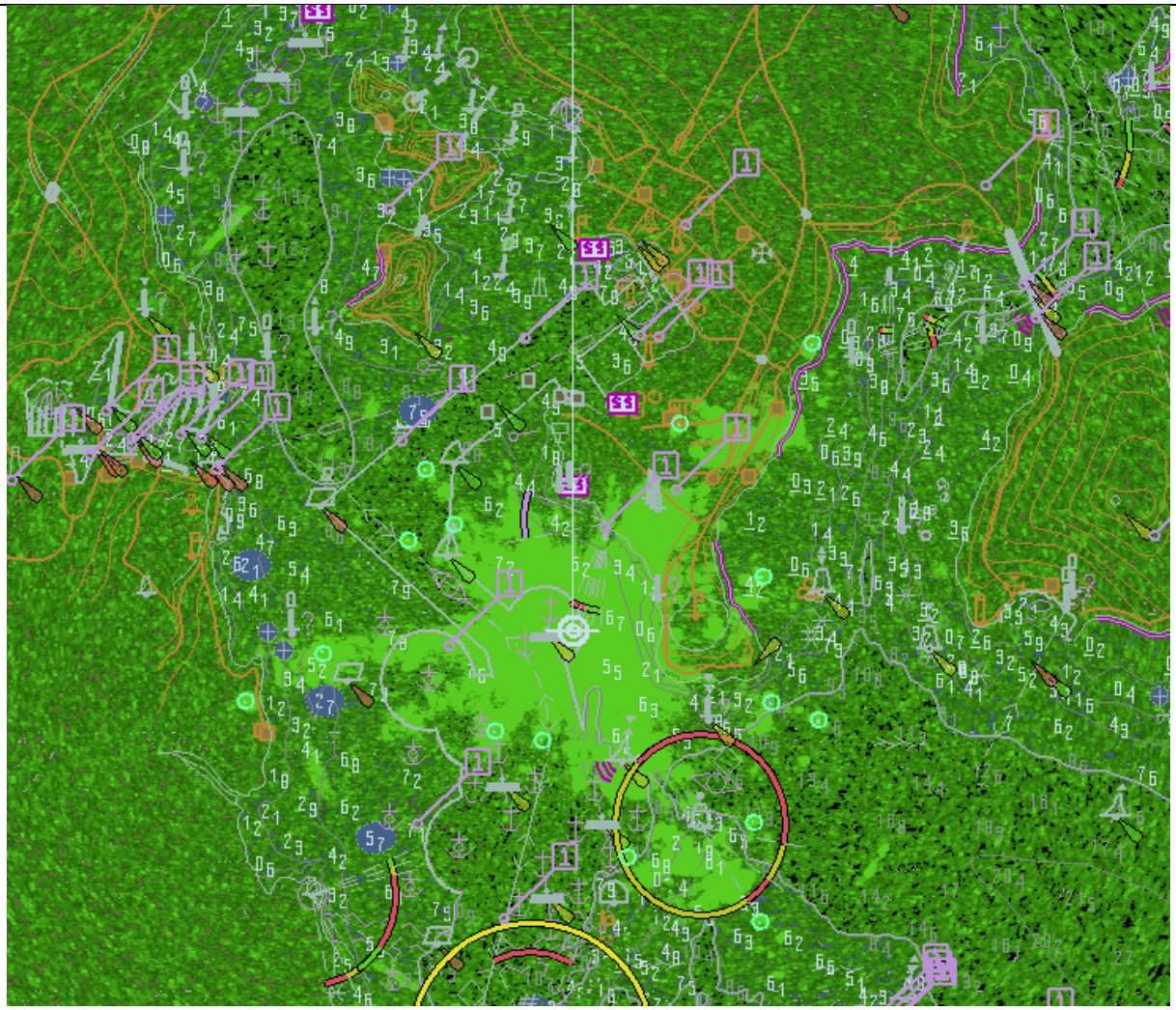


Dusk with radar echoes and tracked targets. Display Category Display Base + Lights



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 SENC features are above radar echoes



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 SENC features are above radar echoes

4.6 Accuracy

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	4.6.1 a)	**IHO Reference**	-
Test description			
True distance and azimuth between two geographical positions a).			
Setup			
Load all cells from: *2.1.1 Power Up\ENC_ROOT*			
Action			
Measure the distance and azimuth between the following two objects: *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 33193.554 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	4.6.1 b)	**IHO Reference**	-
Test description			
True distance and azimuth between two geographical positions b).			
Setup			
As for test 4.6.1a)			
Action			
Measure the distance and azimuth between the following two objects: *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 37326.351 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	4.6.1 c)	**IHO Reference**	-
Test description			
True distance and azimuth between two geographical positions c).			
Setup			
As for test 4.6.1a)			
Action			
Measure the distance and azimuth between the following two objects: *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	4.6.2 a)	**IHO Reference**	-
Test description			
Geographical position from known position and distance/azimuth a).			
Setup			
As for test 4.6.1a)			
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	4.6.2 b)	**IHO Reference**	-
Test description			
Geographical position from known position and distance/azimuth b).			
Setup			
As for test 4.6.1a)			
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	4.6.2 c)	IHO Reference	-
Test description			
Geographical position from known position and distance/azimuth c).			
Setup			
As for test 4.6.1a)			
Action			
From the following position: *Corund Cape Light 32º27.447'S 060º58.599'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 32º 31.958'S 60º 54.337'E*			

4.6.3 Rhumb line distance and azimuth between geographical positions

Test Reference	4.6.3 a)	IHO Reference	-
Test description			
Rhumb line distance and azimuth between two geographical positions a).			
Setup			
Load all cells from: *2.1.1 Power Up\ENC_ROOT*			
Action			
Measure the distance and azimuth between the following two objects: *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 33193.567 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	4.6.3 b)	IHO Reference	-
Test description			
Rhumb line distance and azimuth between two geographical positions b).			
Setup			
As for test 4.6.1a)			
Action			
Measure the distance and azimuth between the following two objects: *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 37326.365 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	4.6.3 c)	IHO Reference	-
Test description			
Rhumb line distance and azimuth between two geographical positions c).			
Setup			
As for test 4.6.1a)			
Action			
Measure the distance and azimuth between the following two objects: *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	4.6.4 a)	IHO Reference	-
Test description			
Geodesic lines and circle, northern quadrant.			
Setup			
As for test 4.6.1a)			
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	4.6.4 b)	IHO Reference	-
Test description			
Geodesic lines and circle, crossing the equator.			
Setup			
As for test 4.6.1a)			
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	4.6.4 c)	IHO Reference	-
Test description			
Geodesic lines southern quadrant.			
Setup			
As for test 4.6.1a)			
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	4.6.5 a)	**IHO Reference**	-
Test description			
Rhumb lines, northern quadrant.			
Setup			
As for test 4.6.1a)			
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	4.6.5 b)	**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	4.6.5 c)	**IHO Reference**	-
Test description			
Rhumb lines, southern quadrant.			
Setup			
As for test 4.6.1a)			
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 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

4.6.7 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	4.7.1	**IHO Reference**	S-52 [3.1.5]
Test description			
Display of symbols in size shown in the IHO Presentation Library.			
Setup			
Load one or more cells from *2.1.1 Power Up\ENC_ROOT*			
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	4.7.2	**IHO Reference**	S-52 16.1
Test description			
Display of the check symbol of the correct size (in mm).			
Setup			
Load the following cell from ECDIS Chart 1 as provided in IHO S-52 Presentation Library: *AA5C1AB1.000*			
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	4.7.3	**IHO Reference**	S-52 [3.1.5]
Test description			
Display of the check symbol of the correct size (in pixels).			
Setup			
As for test 4.7.2			
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	4.7.4	**IHO Reference**	S-52 [3.1.5]
Test description			
Display of text within the chart display and pick report.			
Setup			
Load one or more cells from *2.1.1 Power Up\ENC_ROOT*			
Action			
Observe the chart display. *Pick an object 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	4.7.5	**IHO Reference**	S-52 [5.1]
Test description			
Display of text within the chart display and pick report.			
Setup			
Load one or more cells from *2.1.1 Power Up\ENC_ROOT* *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

Test Reference	4.8	**IHO Reference**	S-52 [2.3.1f, 2.3.1g], 10.6.2

Test description

Display units and chart legend.

Setup

Load cell GB4X0000.000 from 2.1.1 Power Up\ENC_ROOT

Action

Select a position for display applicable chart legend

Results

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.

ECDIS Legend	*Values*
Units for depth	*m*
Units for height	*m*
*Note**:** Units for depth and height: Although the ENC Product Specification of S-57 does not allow any other than metric depths and heights, these two elements shall be stated for clarity for the Mariner.*	
Scale of display	*Selected by Mariner. (The default display scale is defined by the compilation scale which is coded in the sub-field of the DSPM field or CSCALE attribute value of the M_CSCL object.)* *Compilation scale – **52 000***
Data quality indicator	*a. CATZOC attribute of the M_QUAL object for bathymetric data.* *b. POSACC attribute of he M_ACCY object (if available) for non-bathymetric data.*
Note: Due to the way quality is encoded in the ENC, both values (a. and b.) shall be used.	
Sounding/vertical datum	*Sounding datum – **Lowest astronomical tide** Vertical datum – **Mean high water springs** (VERDAT attributes of individual objects shall not be used for the legend).*
Horizontal datum	*HDAT subfield of the DPSM field.* ***WGS 84***
Value of safety depth	*Selected by Mariner (default is 30 m).*
Value of safety contour	*Selected by Mariner (default is 30 m).*
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.	
Magnetic variation	*VALMAG, RYRMGV and VALACM of the MAGVAR object.Item shall be displayed as:* *VALMAG RYRMGV (VALACM)* *For example, 4°15W 1990 (8'E)*
Date and number of latest update affecting chart cells currently in use.	*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***

In addition the following units shall be indicated:

- *position;*
- *distance;*
- *speed.*

4.9 Other Chart Related Functionality

4.9.1 Presentation Library

Test Reference	4.9.1	IHO Reference	S-52 4.3
Test description			
Display of Presentation Library edition number.			
Setup			
N/A			
Action			
Action *Navigate to the appropriate dialog where the Presentation Library edition number can be found.*			
Results			
Presentation Library edition number 4.0 must be displayed.			

4.9.2 ECDIS Chart 1

Test Reference	4.9.2 a)	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-52 Part 1 Section 16.2. 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 Paper Chart Symbols* *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 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-52.*			

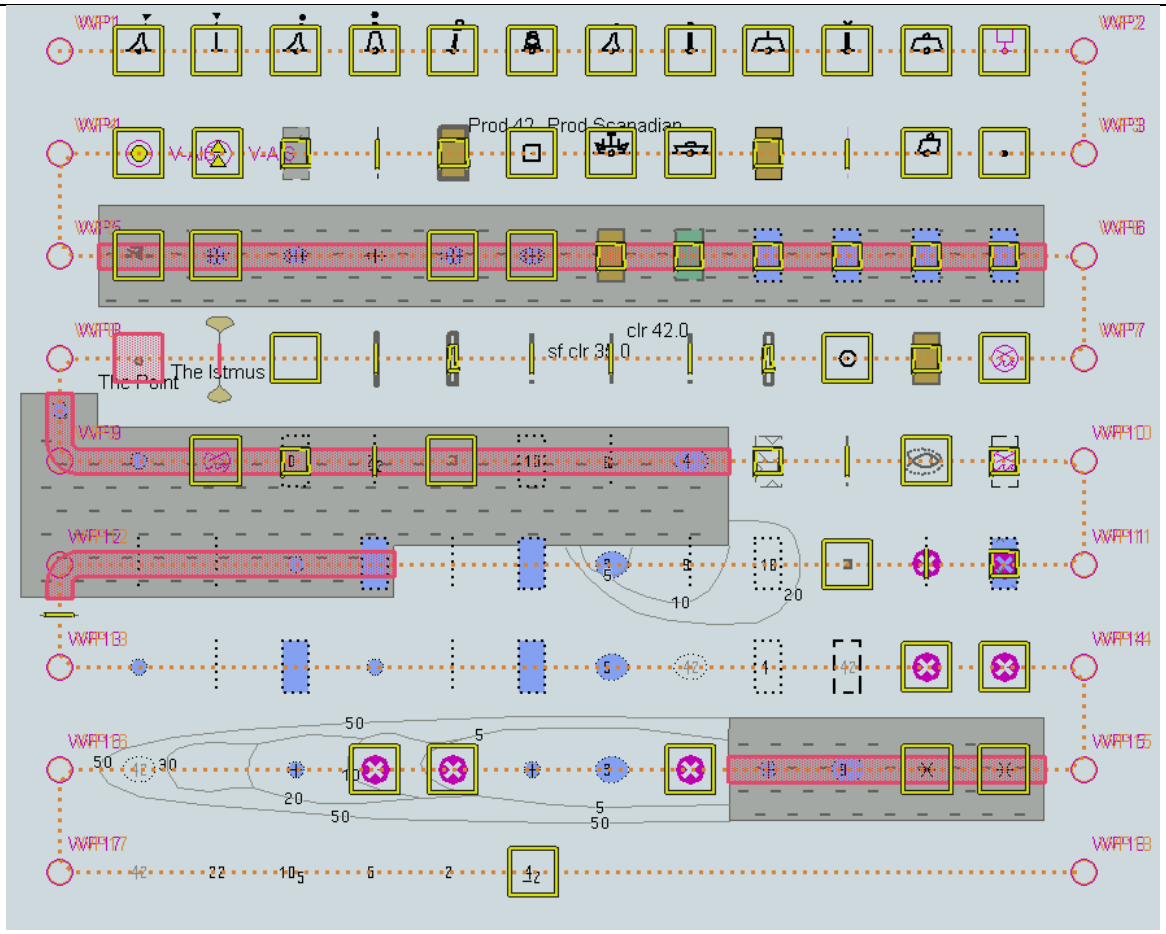
Test Reference	4.9.2 b)	IHO Reference	S-52 18.2.2
Test description			
Interrogation of ECDIS chart 1.			
Setup			

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.

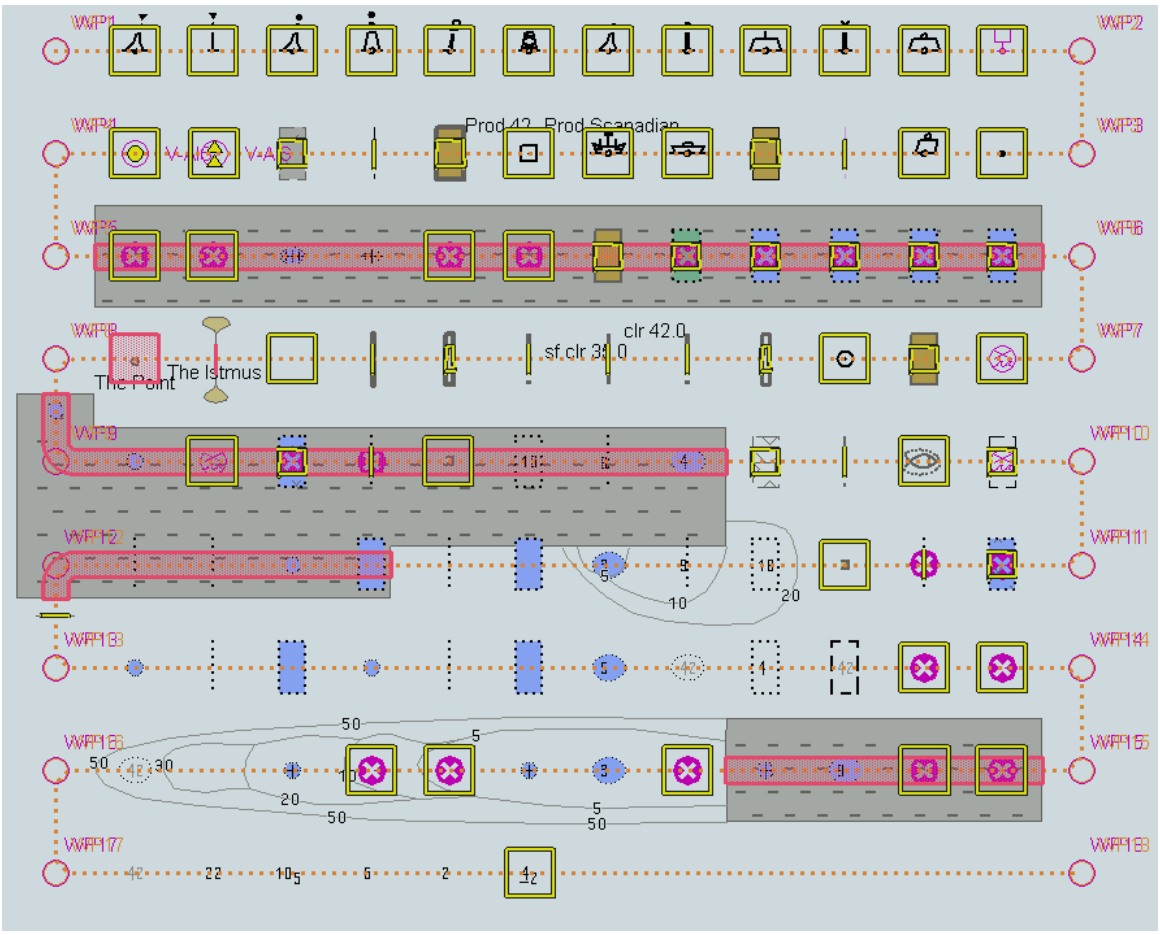
5 Detection and Notification of Navigational Hazards

5.1 Detection and Notification of Navigational Hazards - Basic test

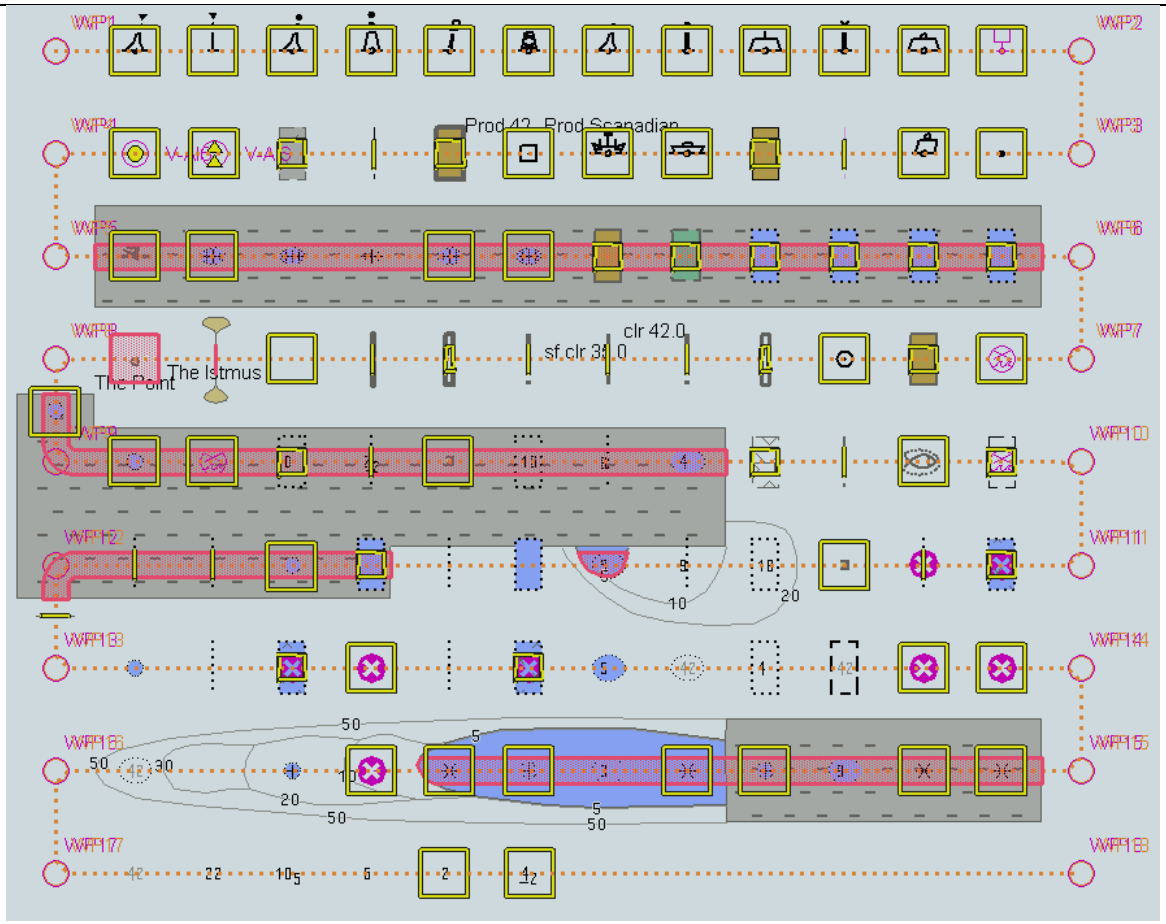
Test Reference	5.1	**IHO Reference**	S-52 10.5.9
Test description			
The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route closer than a user-specified distance from any objects satisfying the conditions for this test as listed in section 10.5.9 of IHO S-52 and included in the test cell AA3NAVHZ.000. *This test is performed by loading the test cell AA3NAVHZ.000, manually creating a route connecting all way points between feature objects marked as WP1 through WP18 and checking display against the corresponding graphical plot*			
Setup			
Load cell AA3NAVHZ.000 from 5.0 Navigational Hazards\ENC_ROOT *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 objects 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 objects with an isolated danger mark when they are wholly located in this area.*			



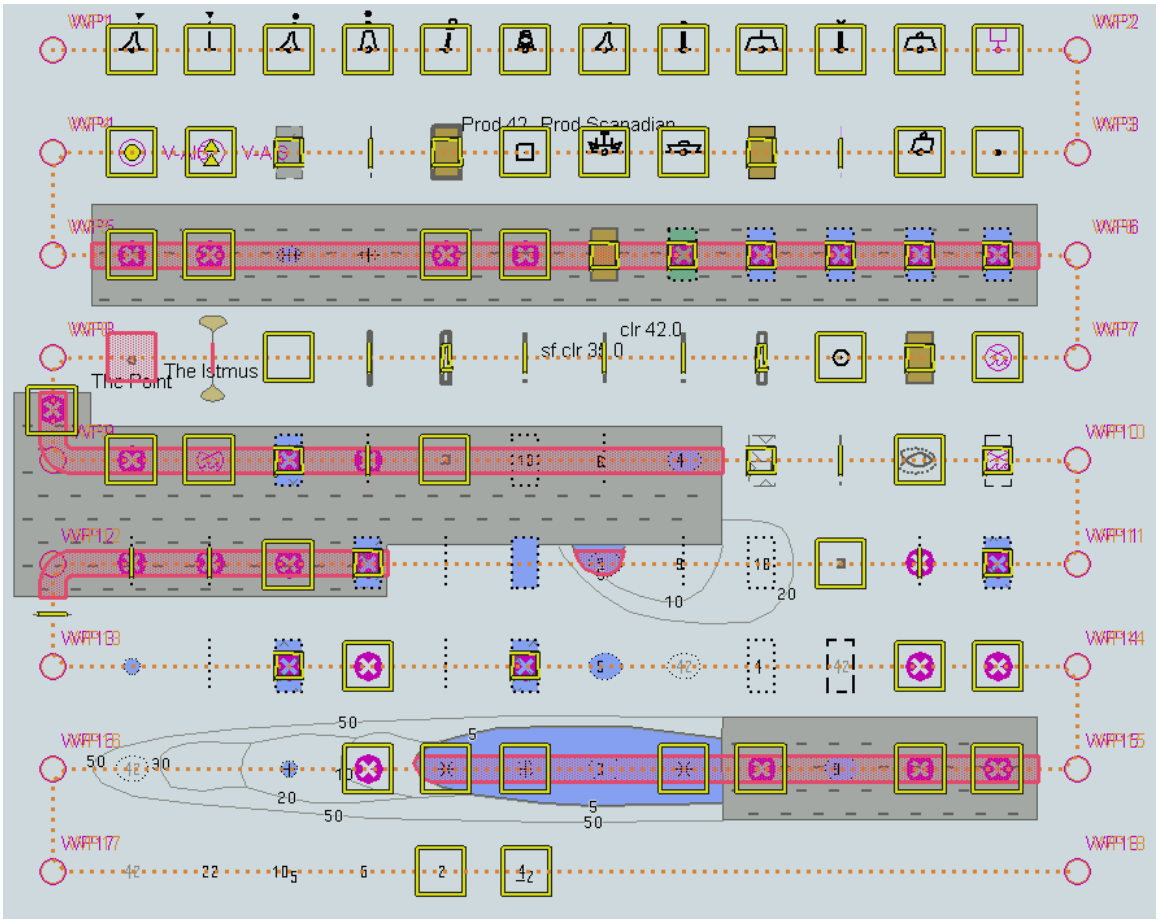
Safety Contour = 0 m, Alternative 1



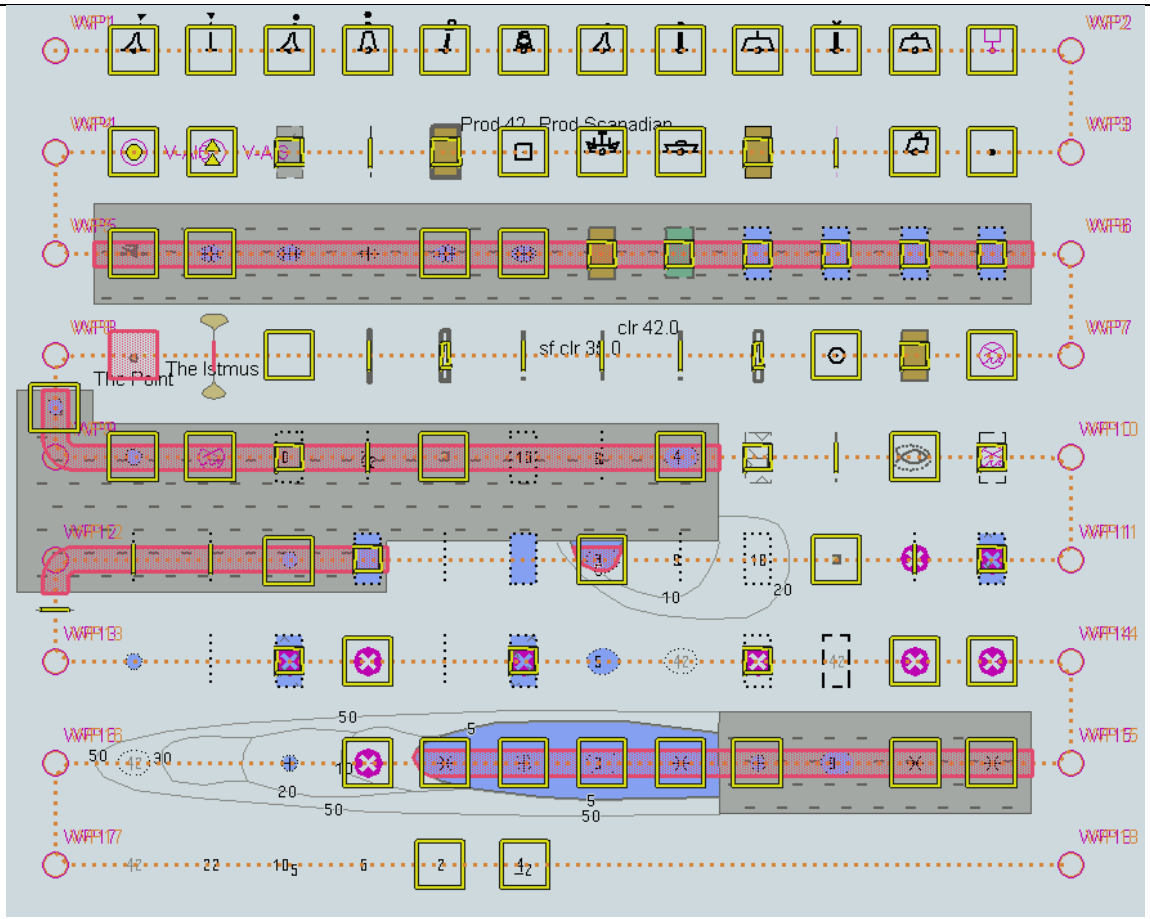
Safety Contour = 0 m, Alternative 2



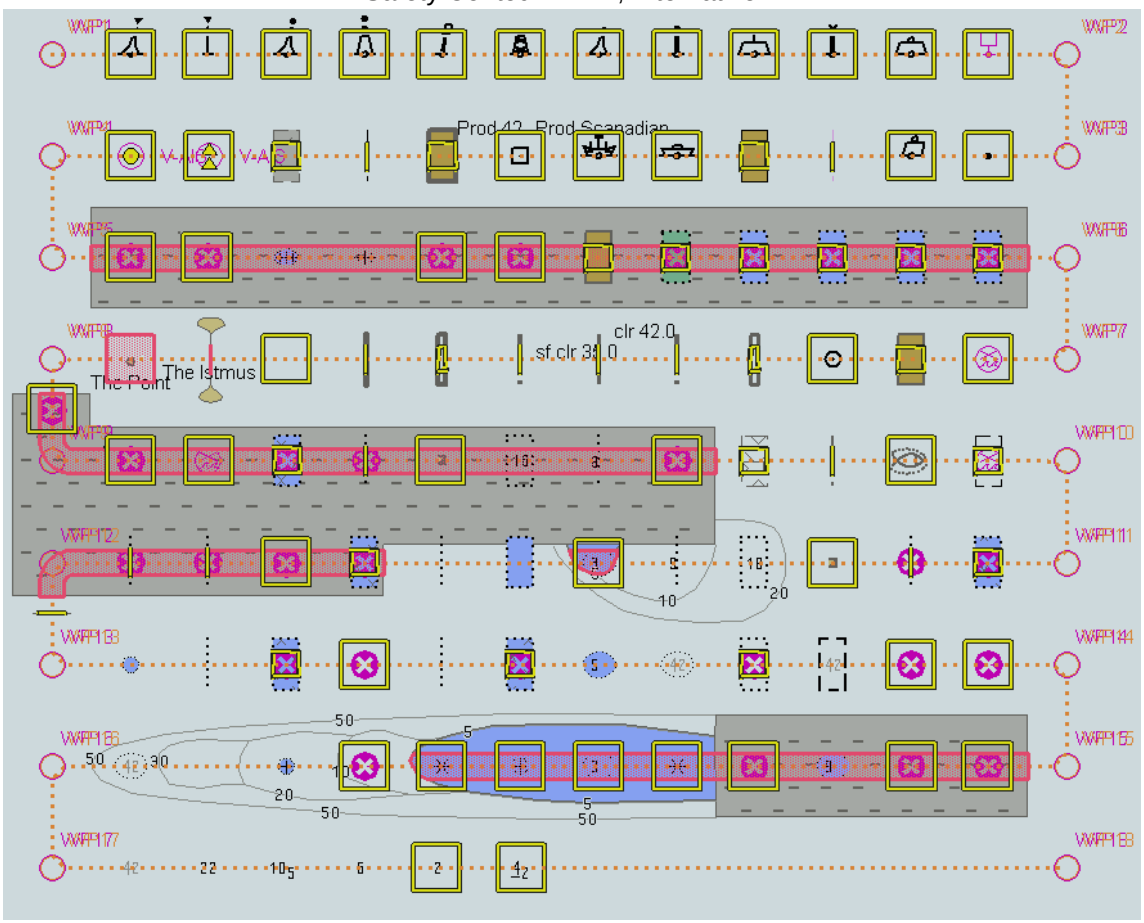
Safety Contour = 2 m, Alternative 1



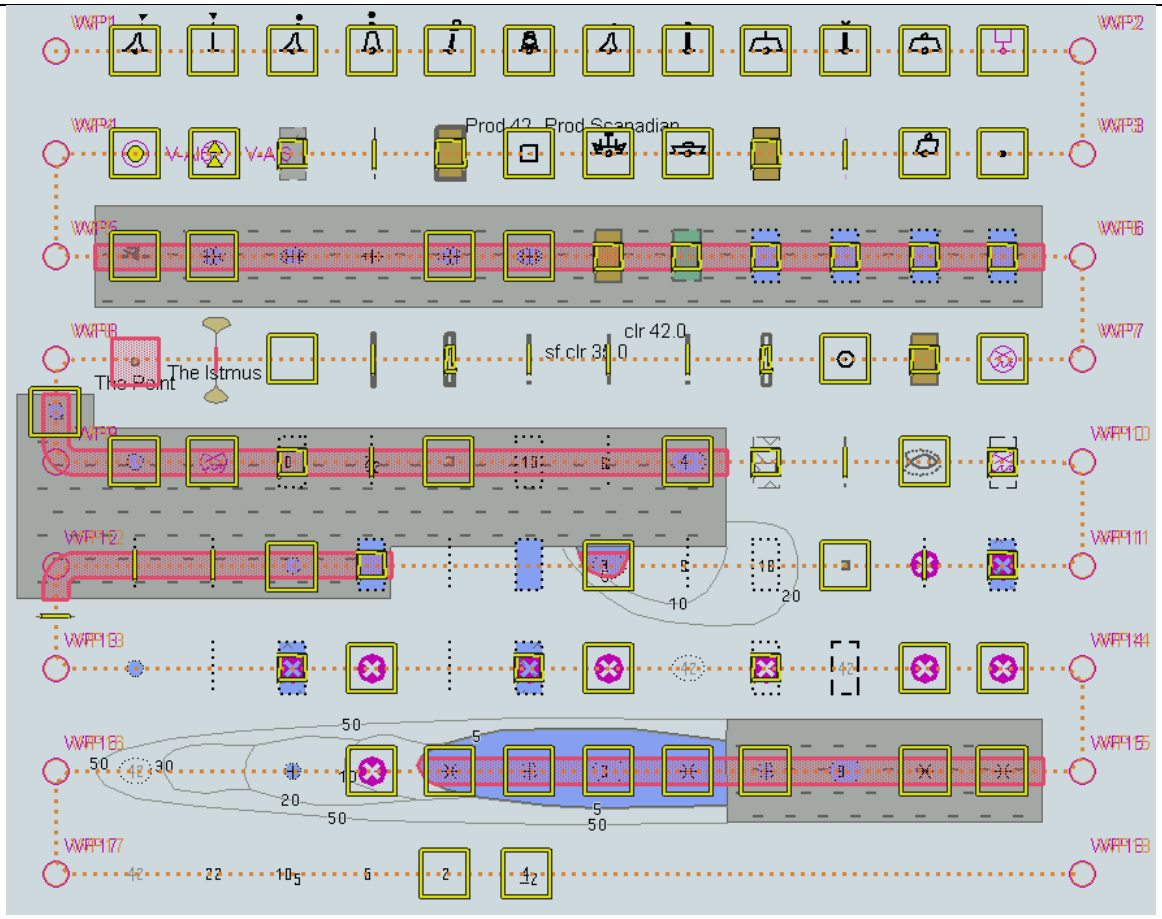
Safety Contour = 2 m, Alternative 2



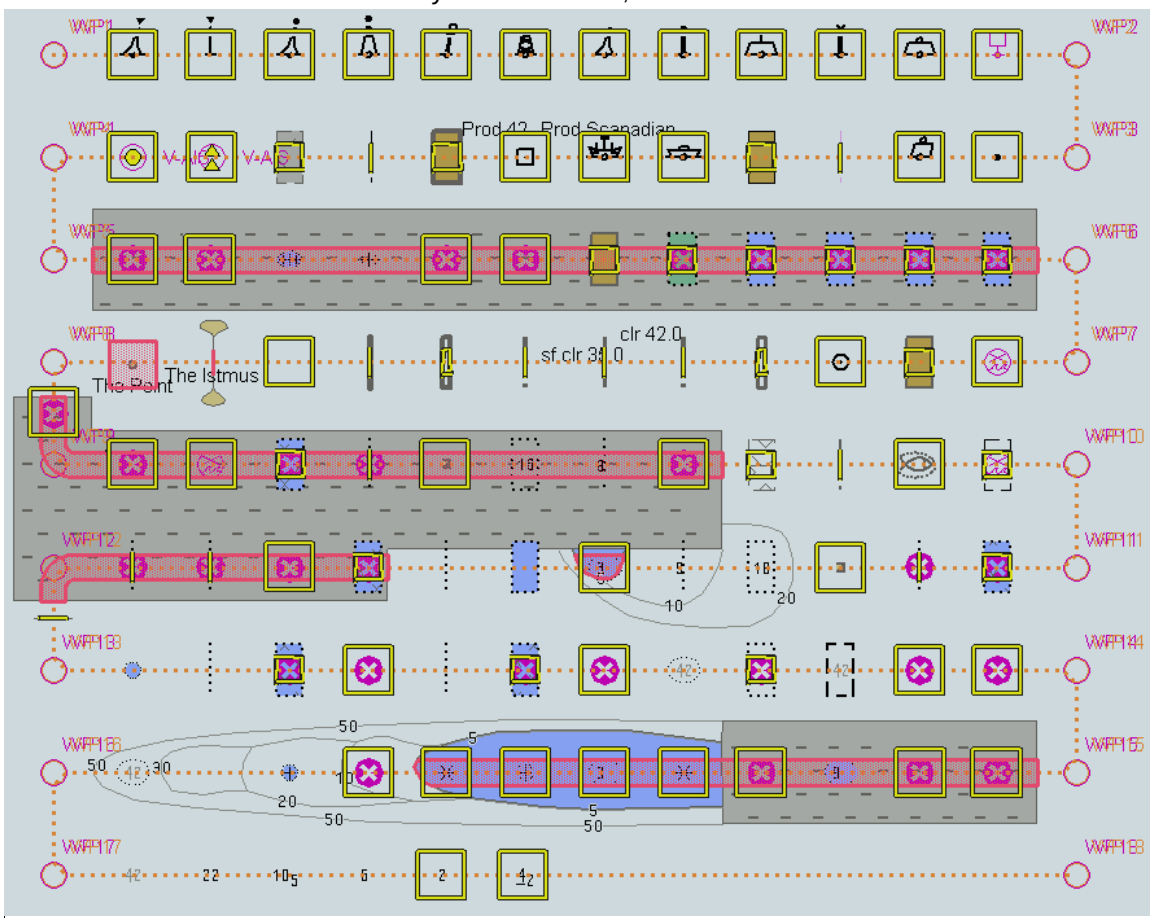
Safety Contour = 4 m, Alternative 1



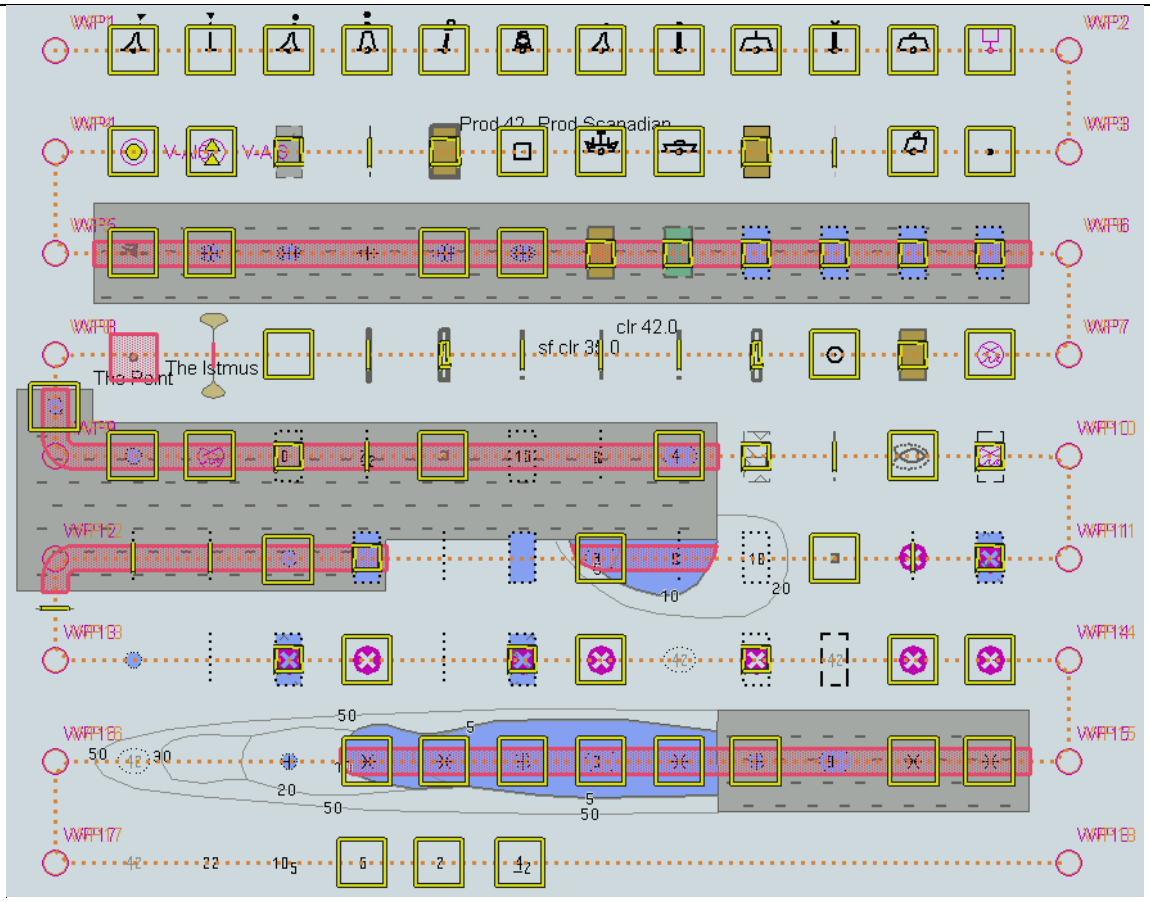
Safety Contour = 4 m, Alternative 2



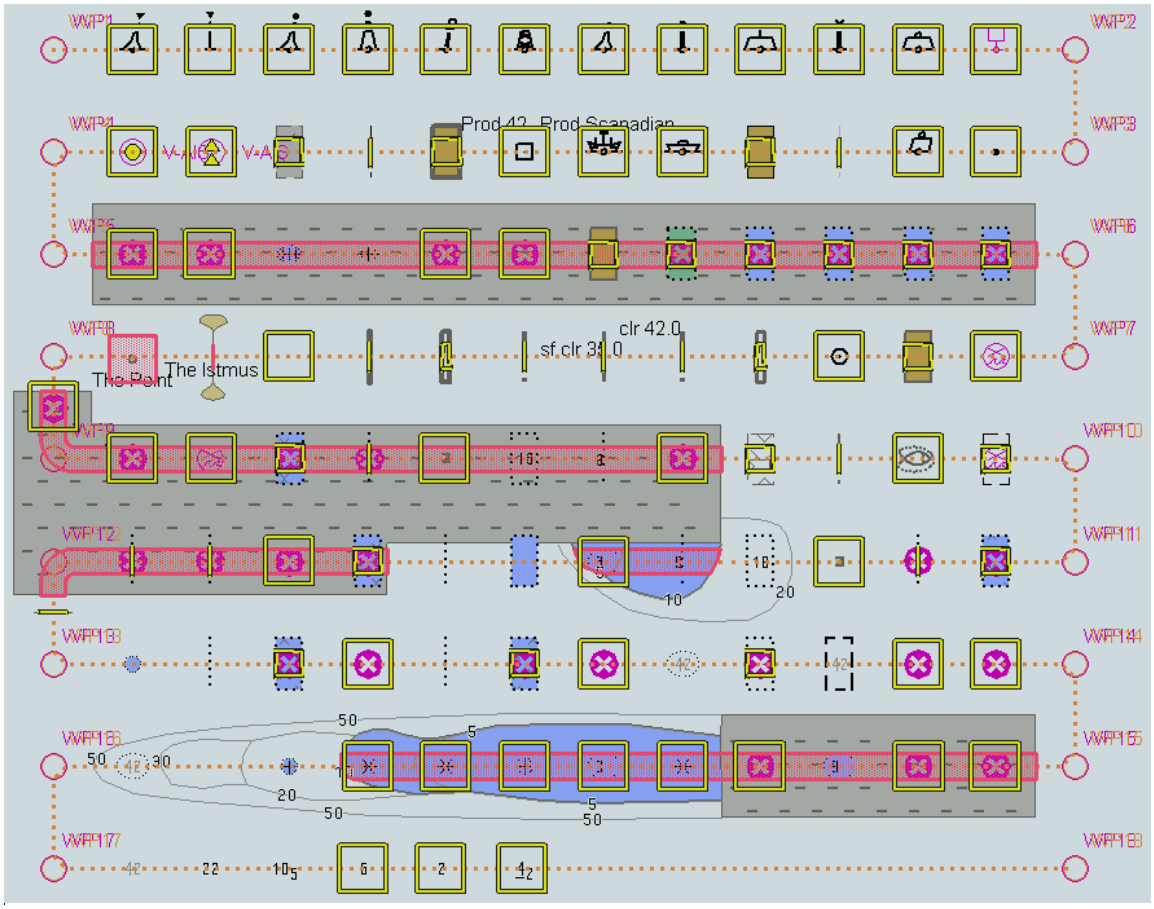
Safety Contour = 5 m, Alternative 1



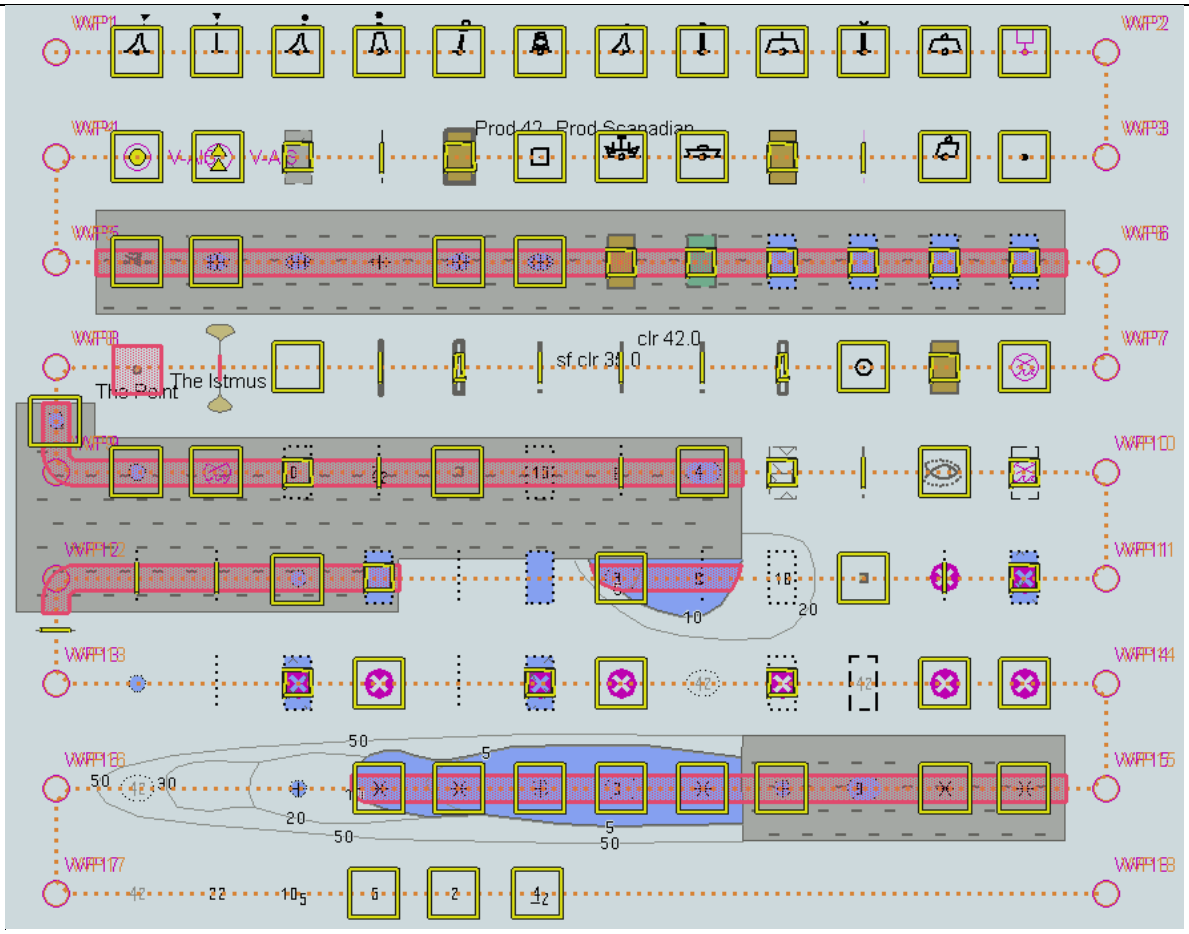
Safety Contour = 5 m, Alternative 2



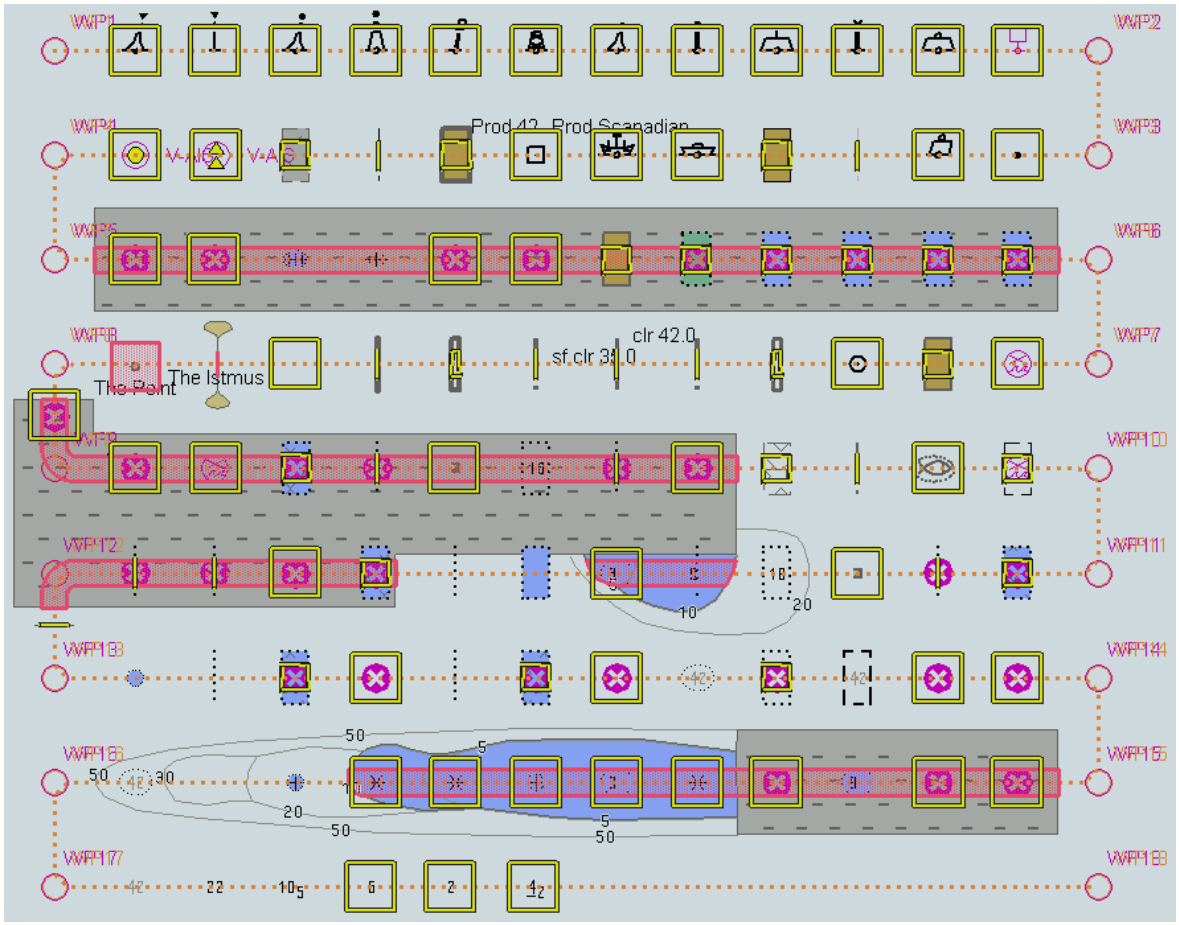
Safety Contour = 6 m, Alternative 1



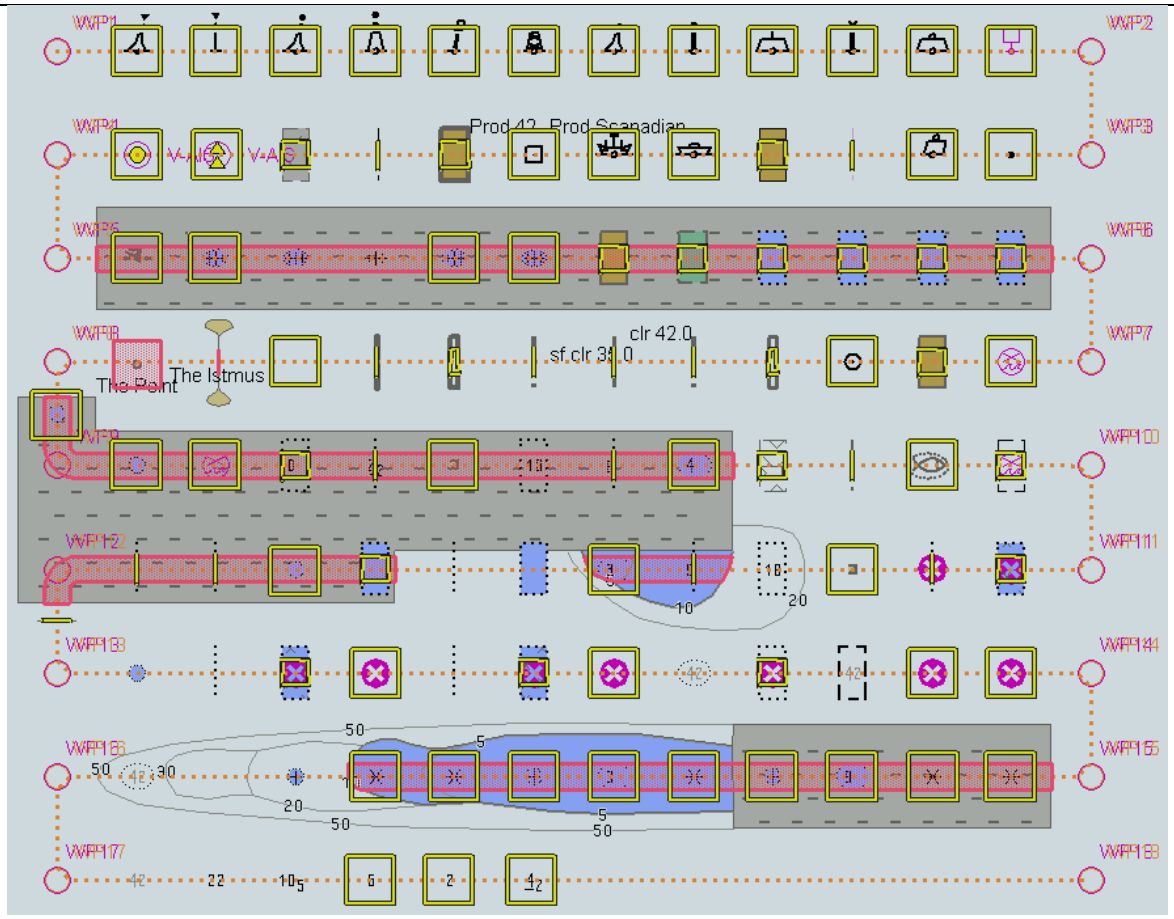
Safety Contour = 6 m, Alternative 2



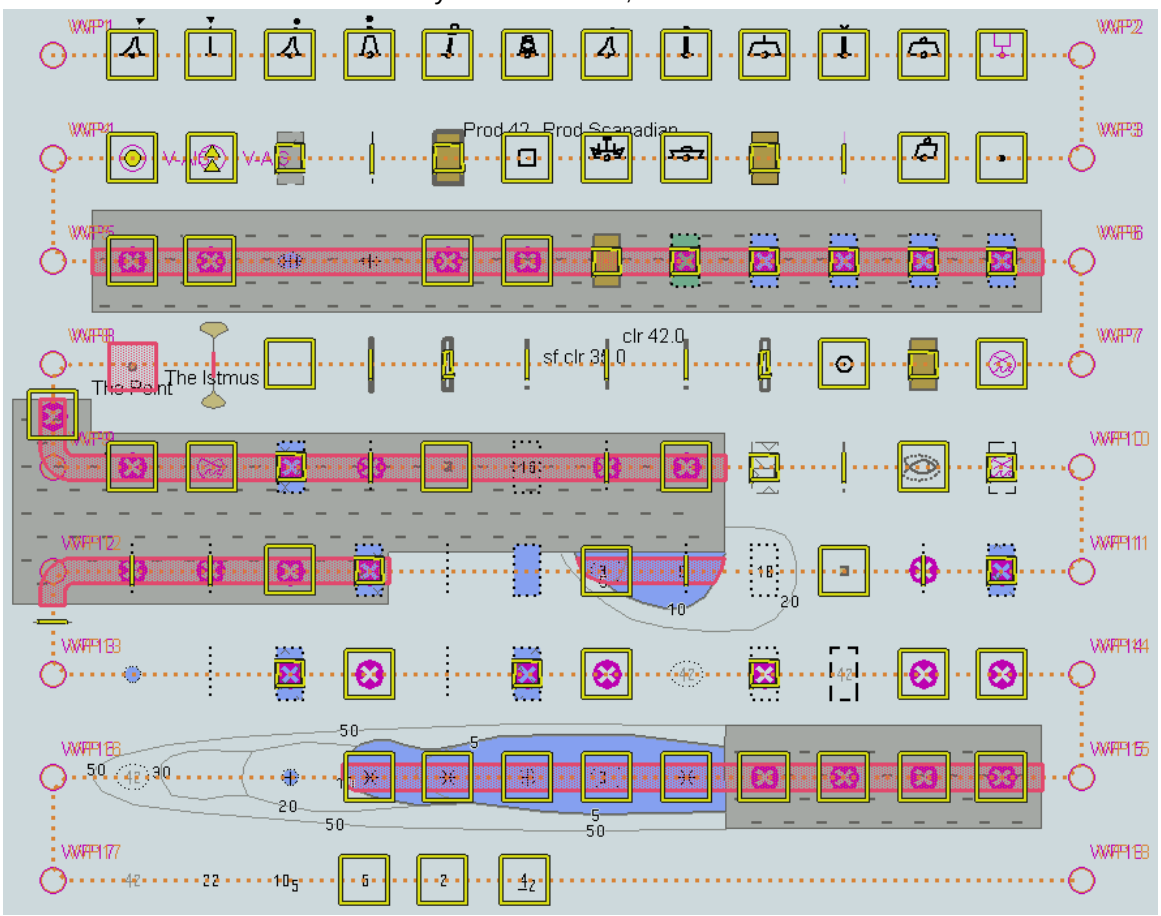
Safety Contour = 8 m, Alternative 1



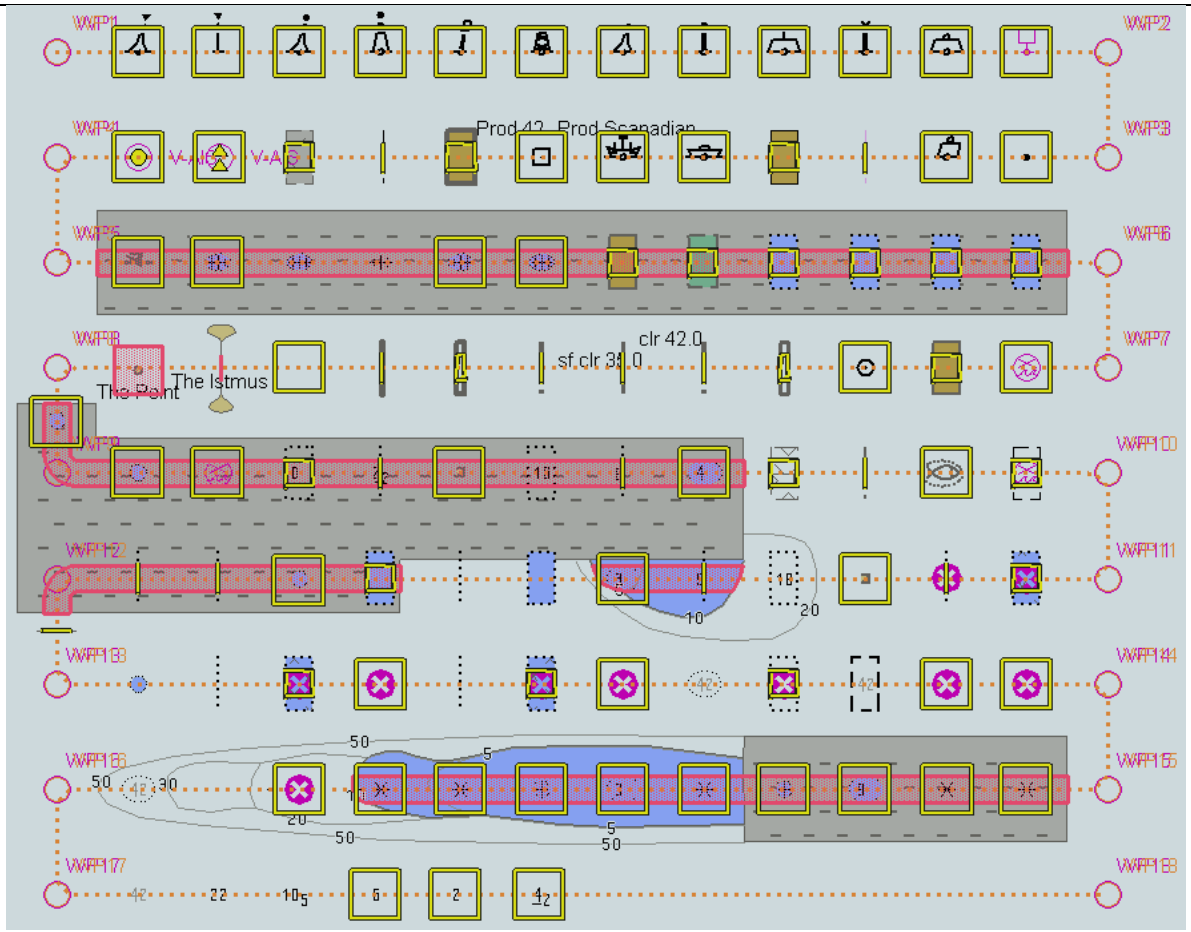
Safety Contour = 8 m, Alternative 2



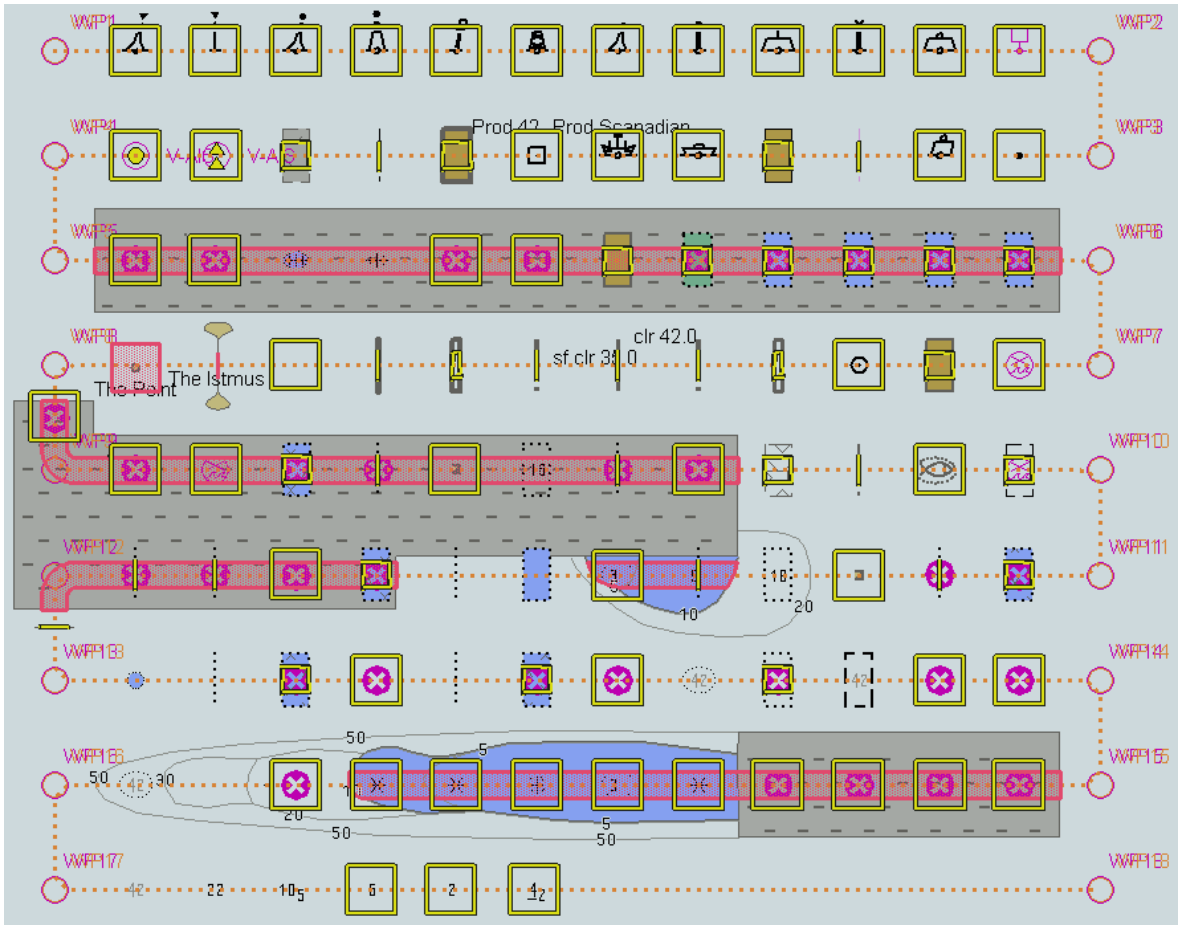
Safety Contour = 9 m, Alternative 1



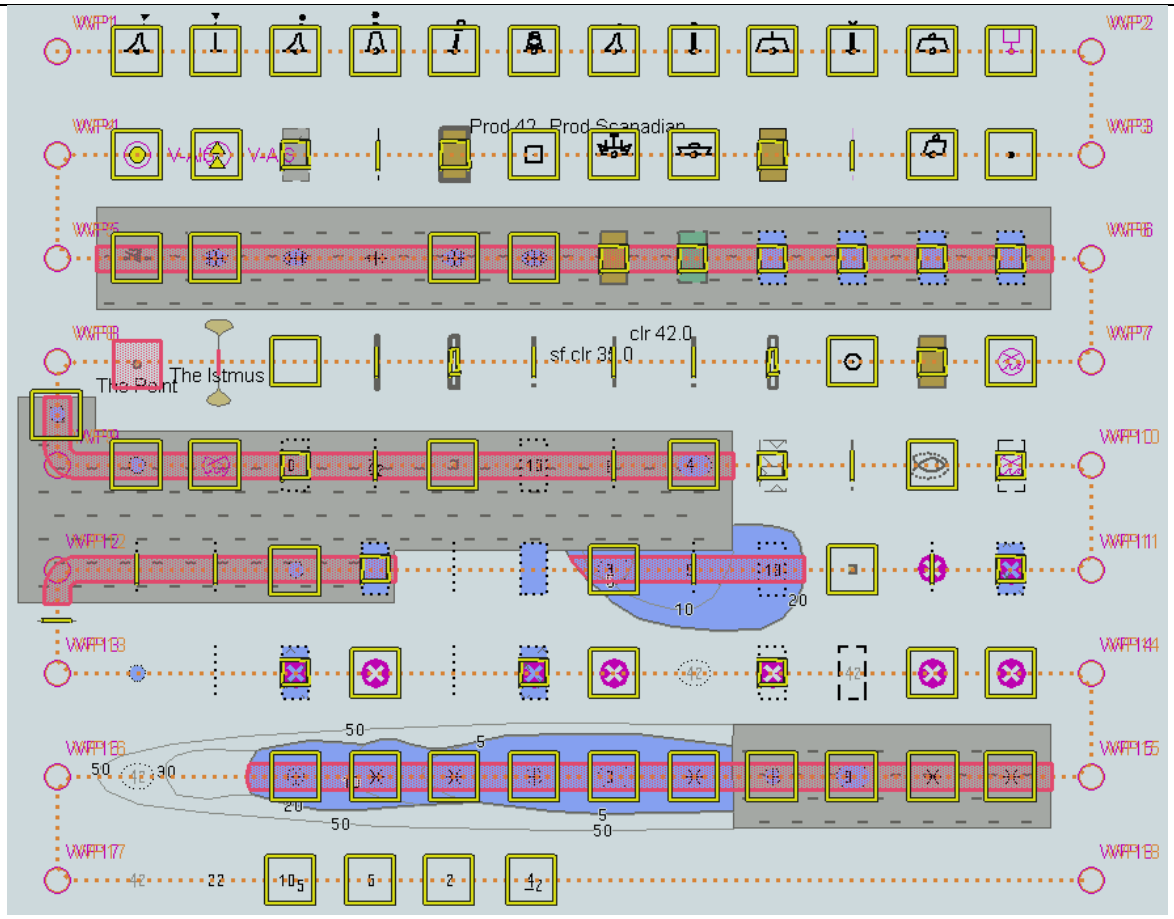
Safety Contour = 9 m, Alternative 2



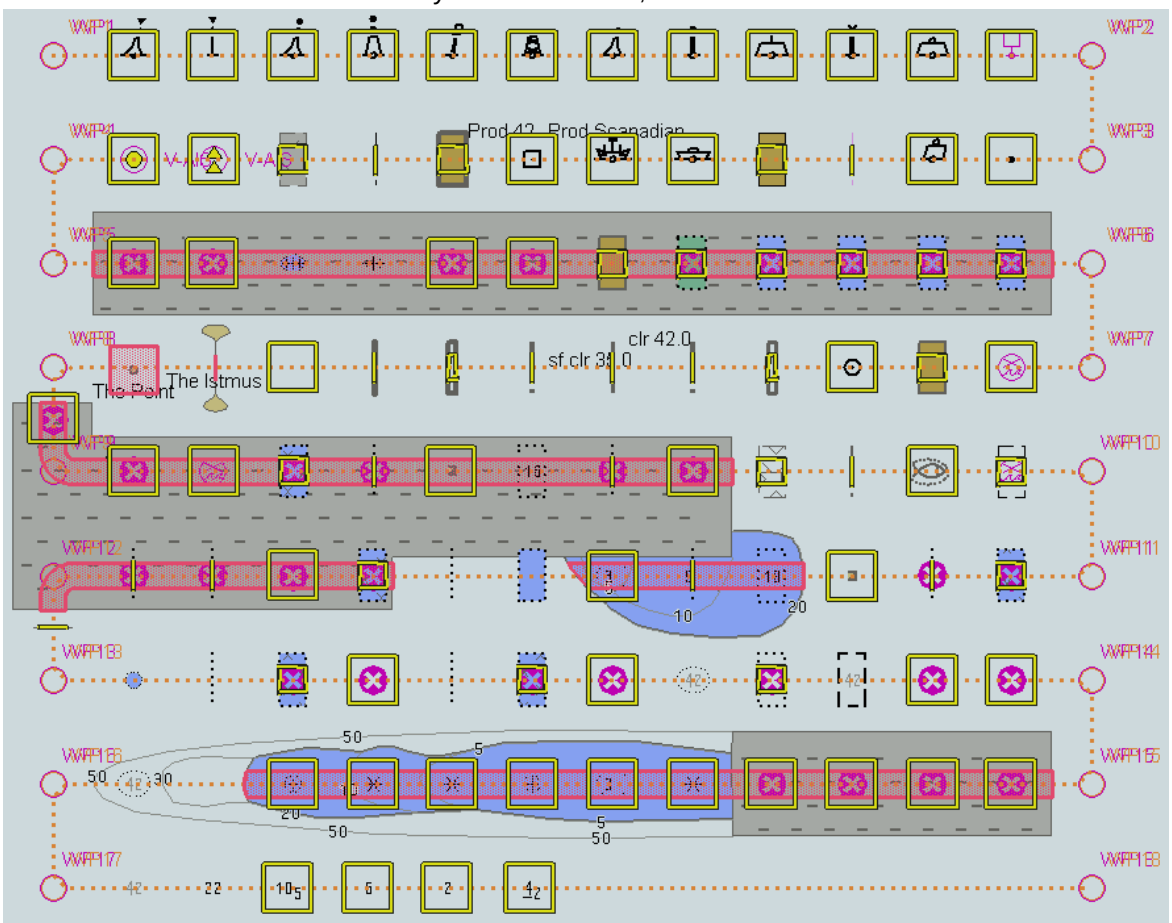
Safety Contour = 10 m, Alternative 1



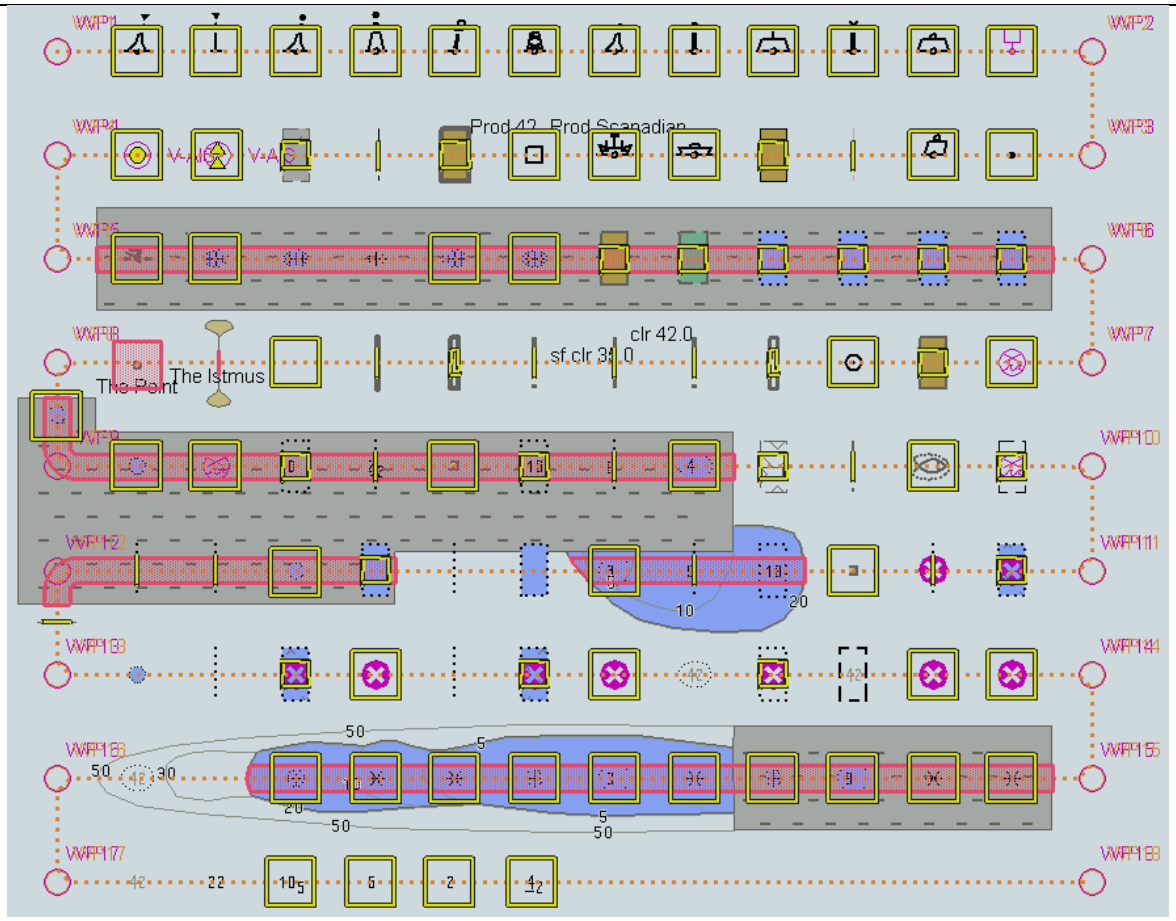
Safety Contour = 10 m, Alternative 2



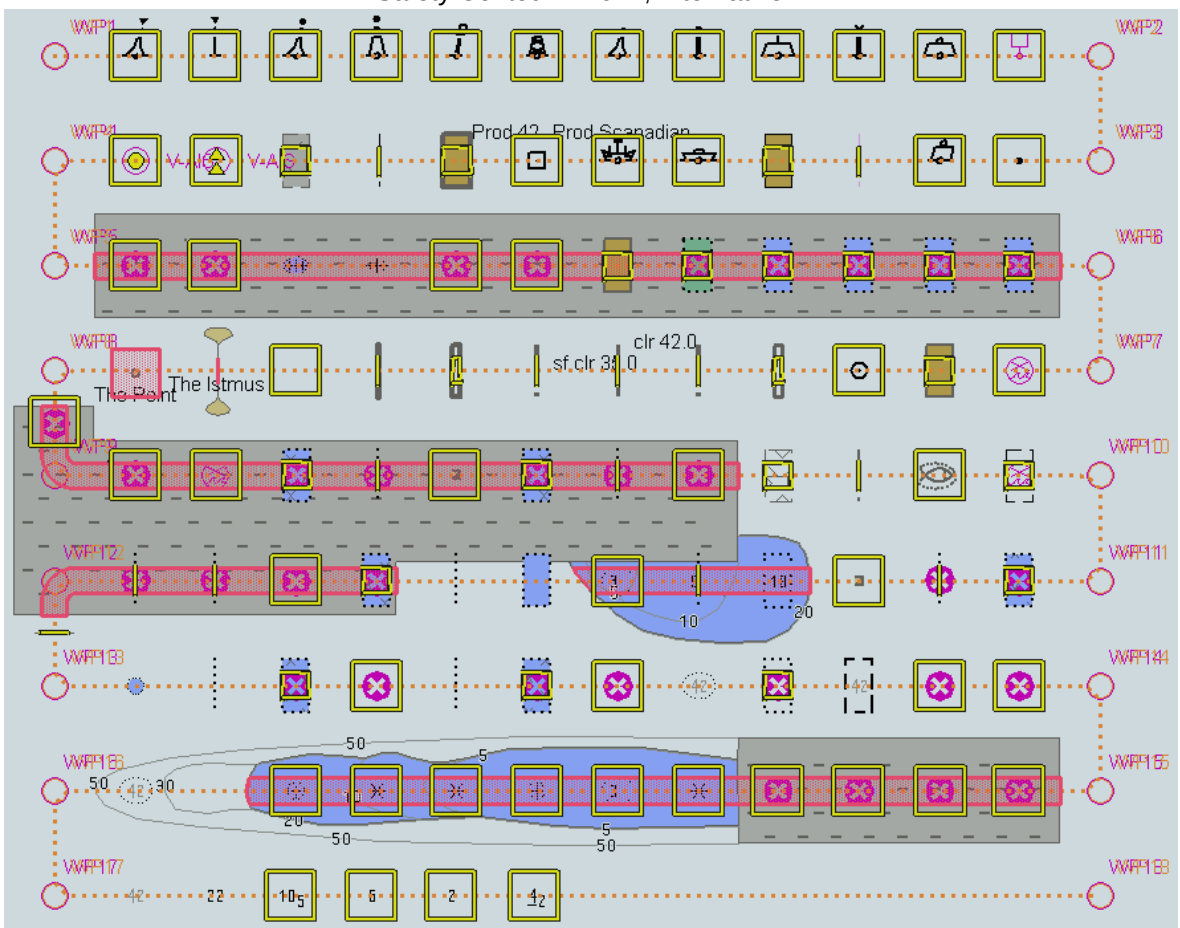
Safety Contour = 11 m, Alternative 1



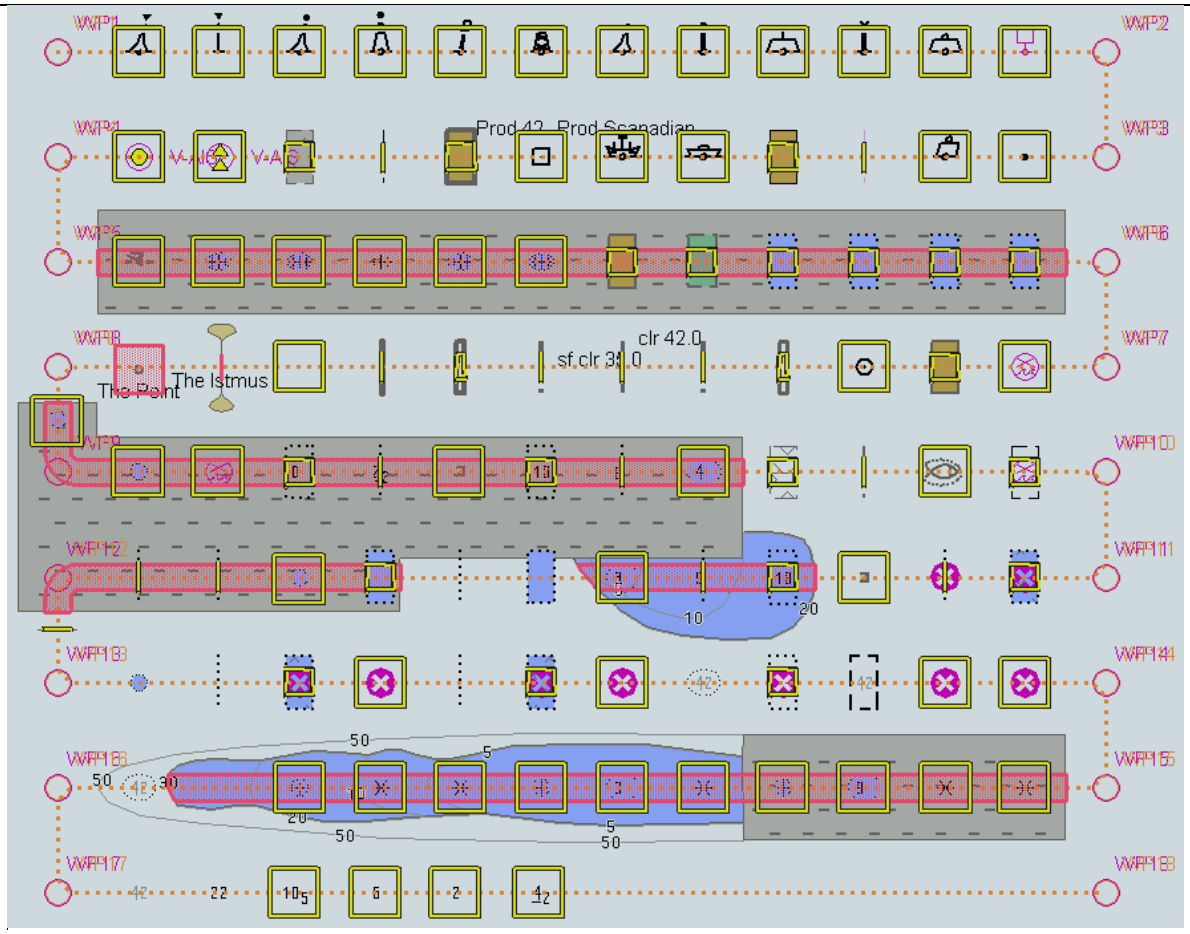
Safety Contour = 11 m, Alternative 2



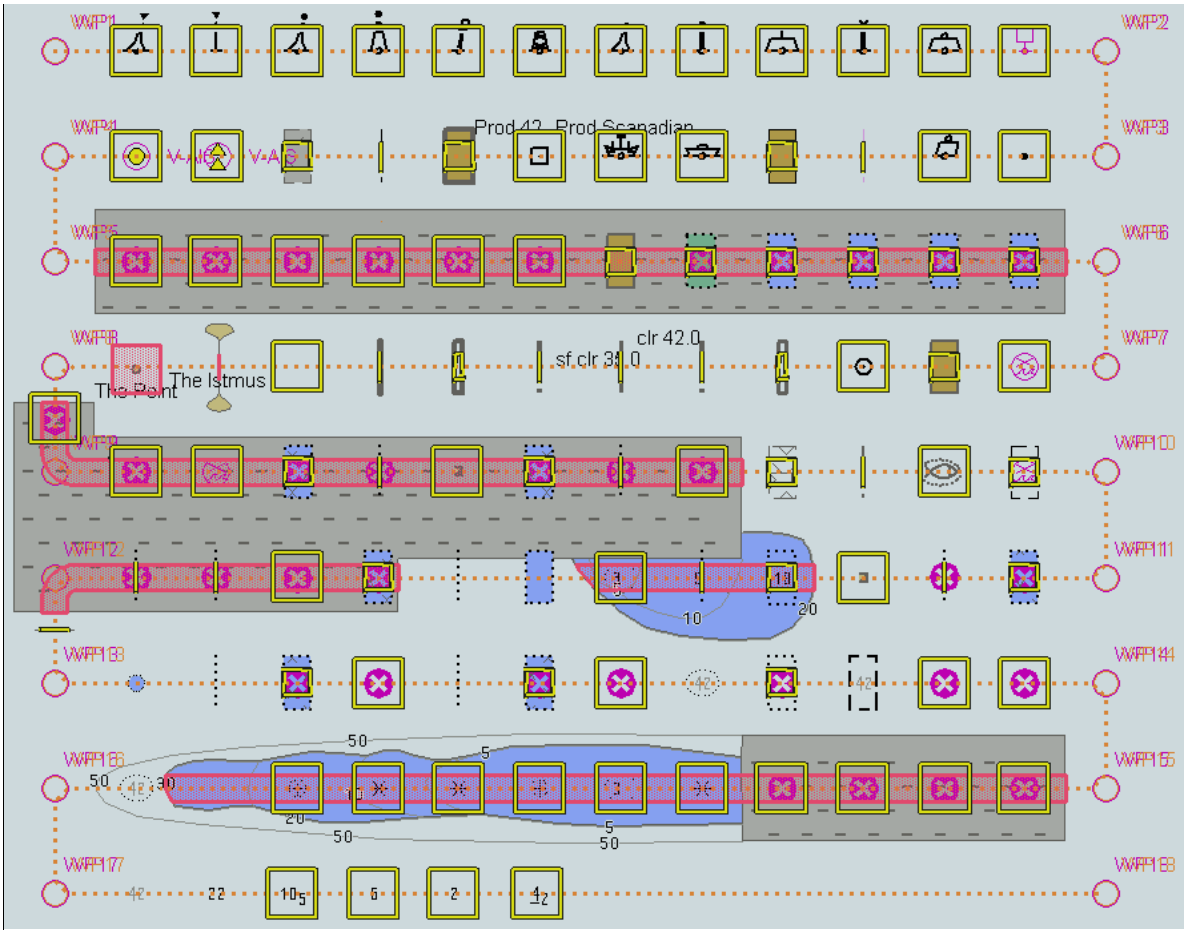
Safety Contour = 16 m, Alternative 1



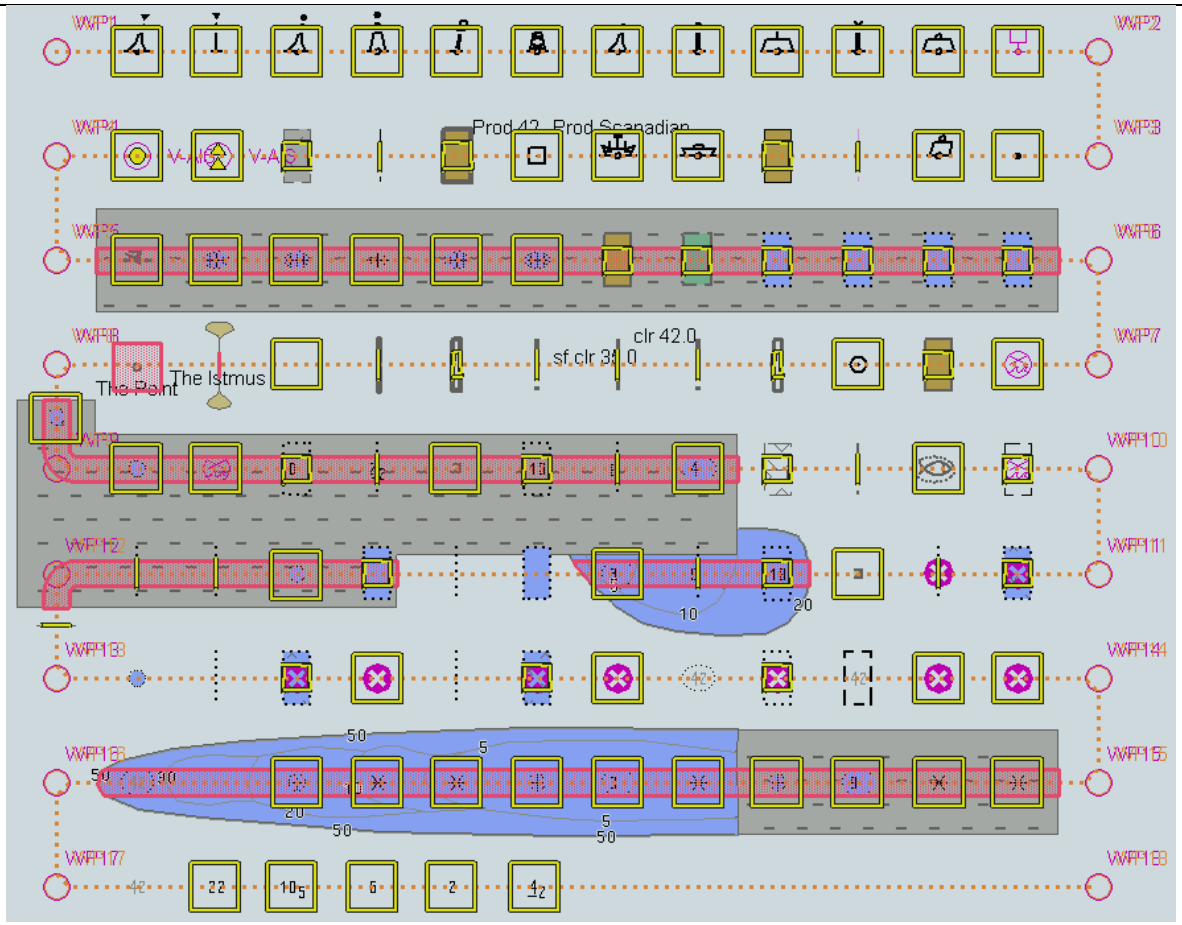
Safety Contour = 16 m, Alternative 2



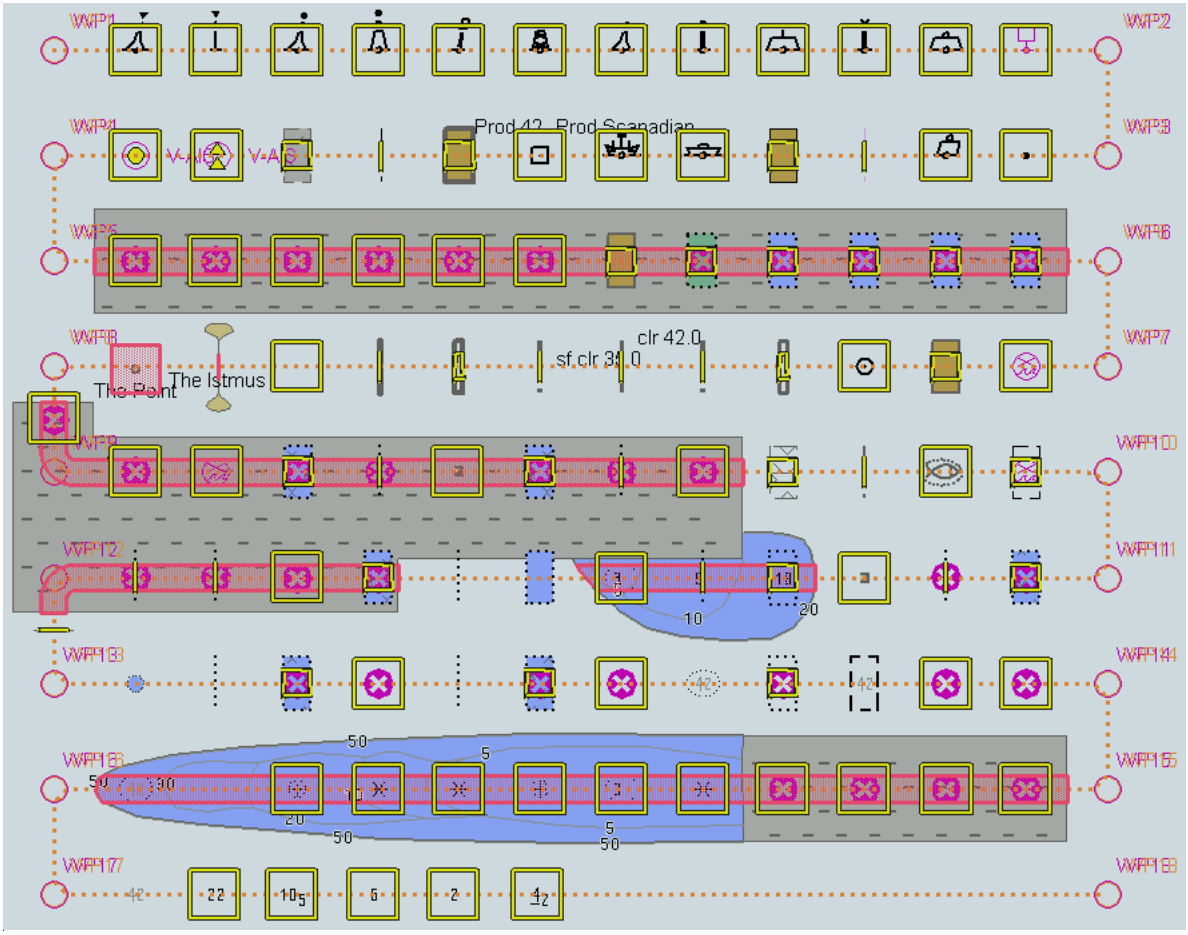
Safety Contour = 21 m, Alternative 1



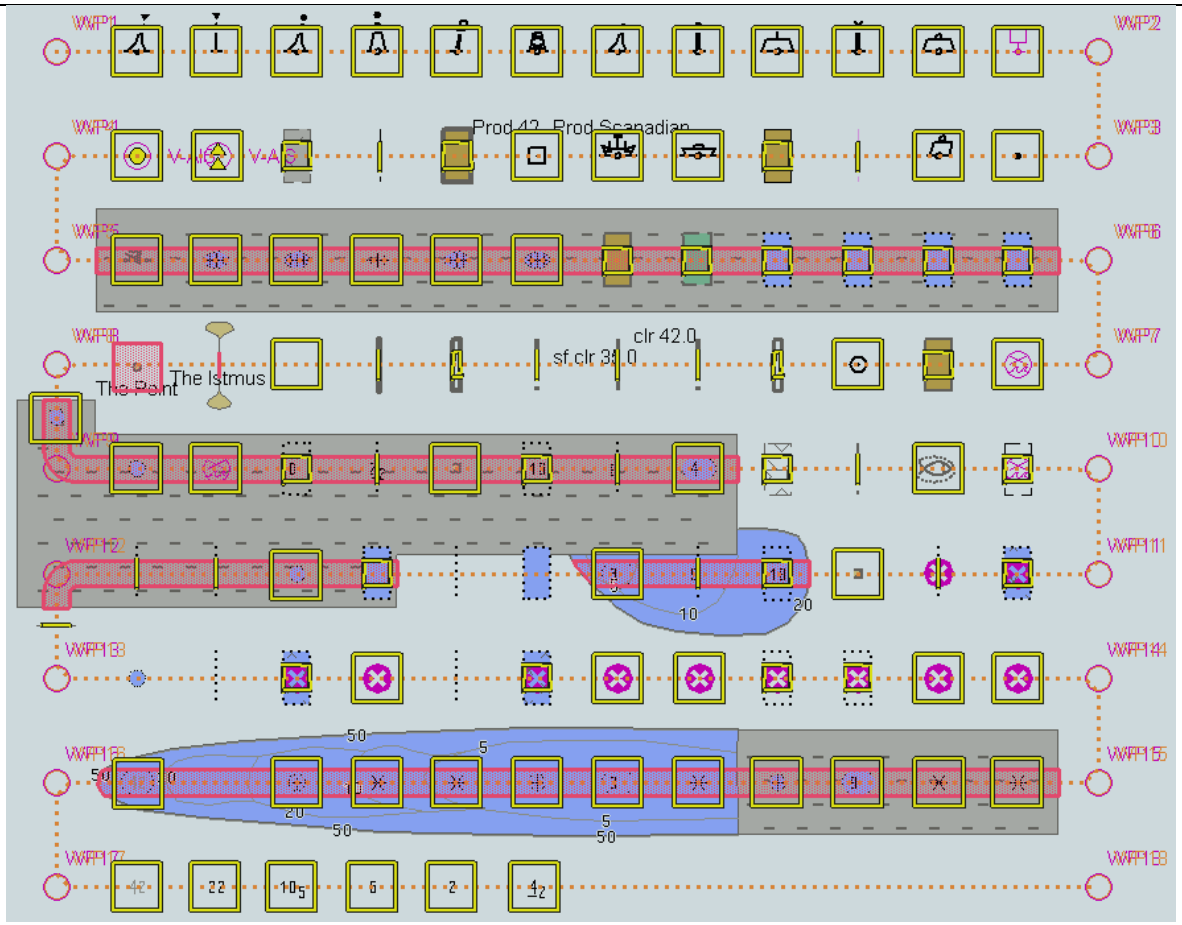
Safety Contour = 21 m, Alternative 2



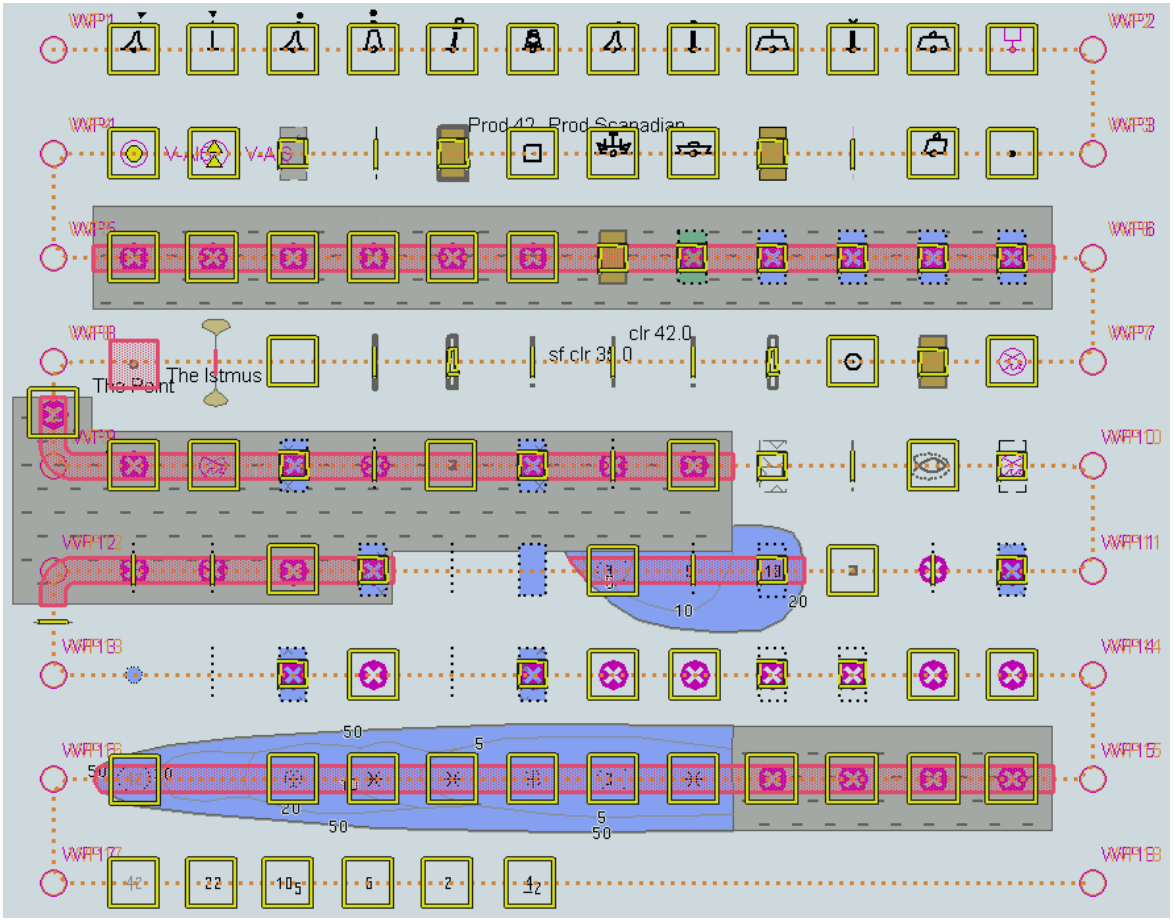
Safety Contour = 31 m, Alternative 1



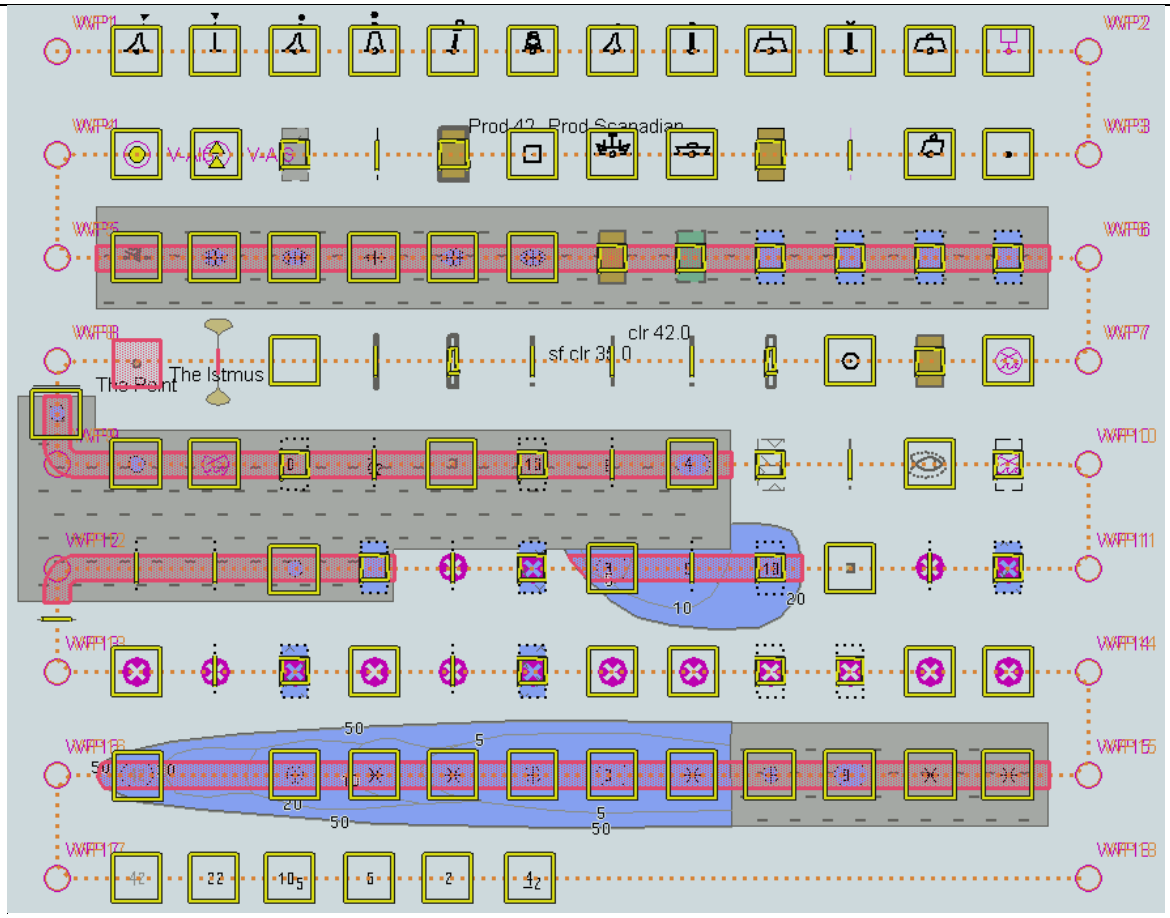
Safety Contour = 31 m, Alternative 2



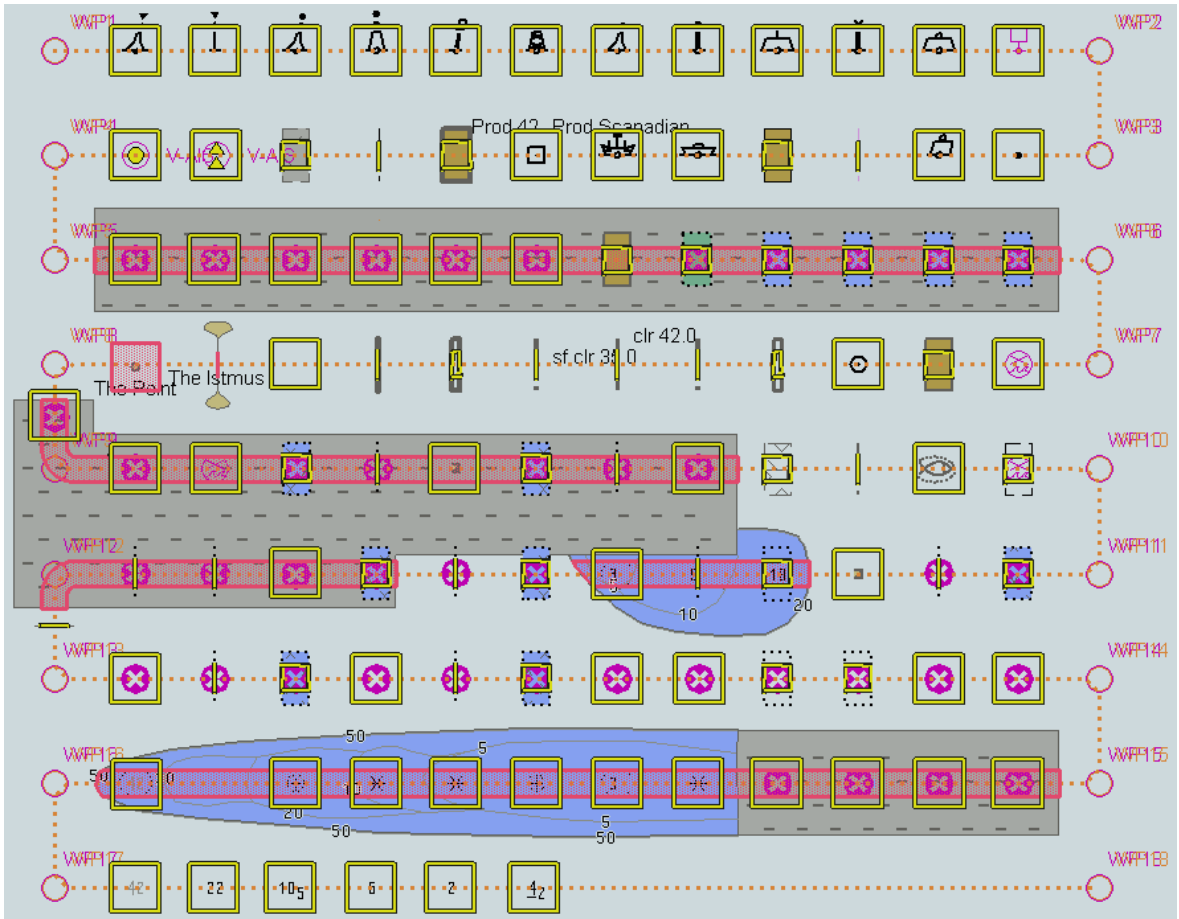
Safety Contour = 42 m, Alternative 1



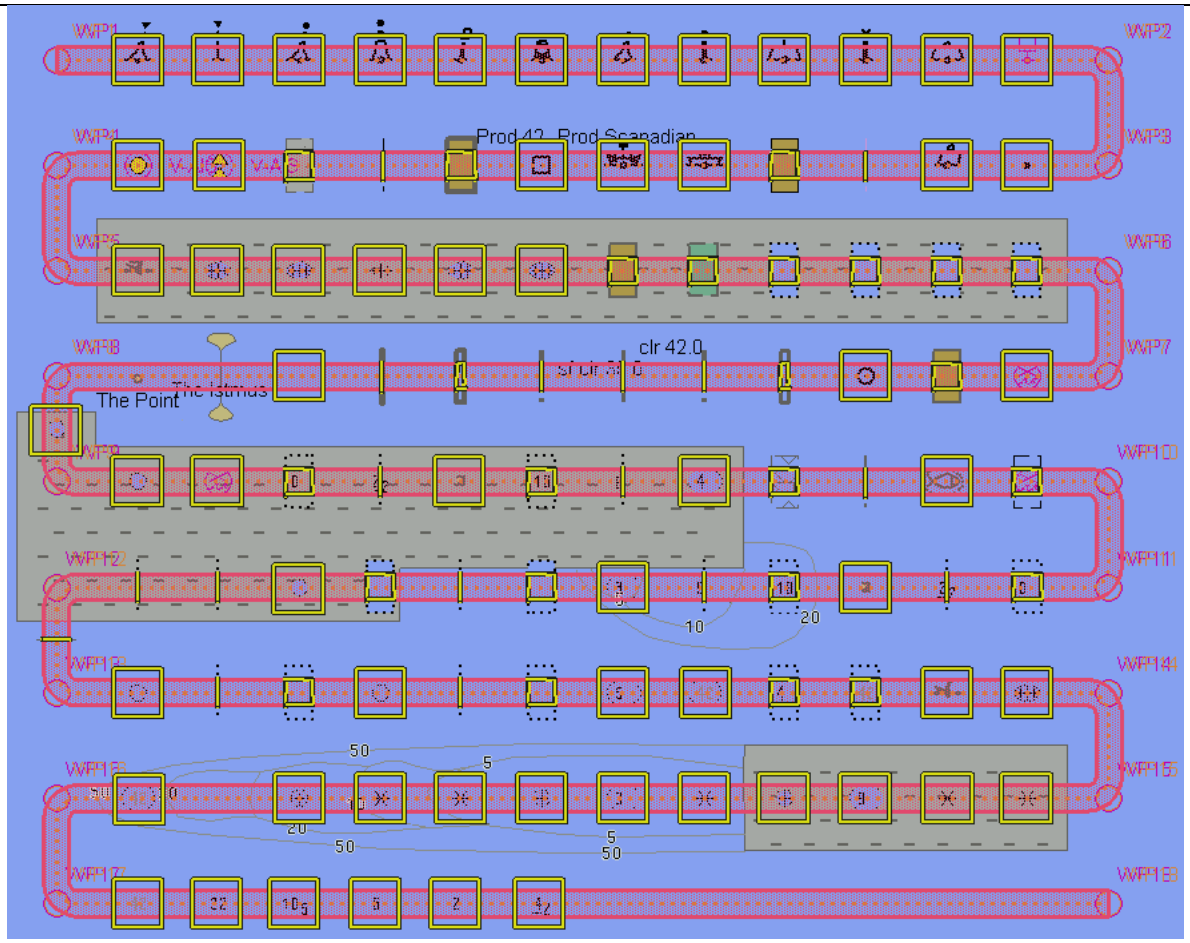
Safety Contour = 42 m, Alternative 2



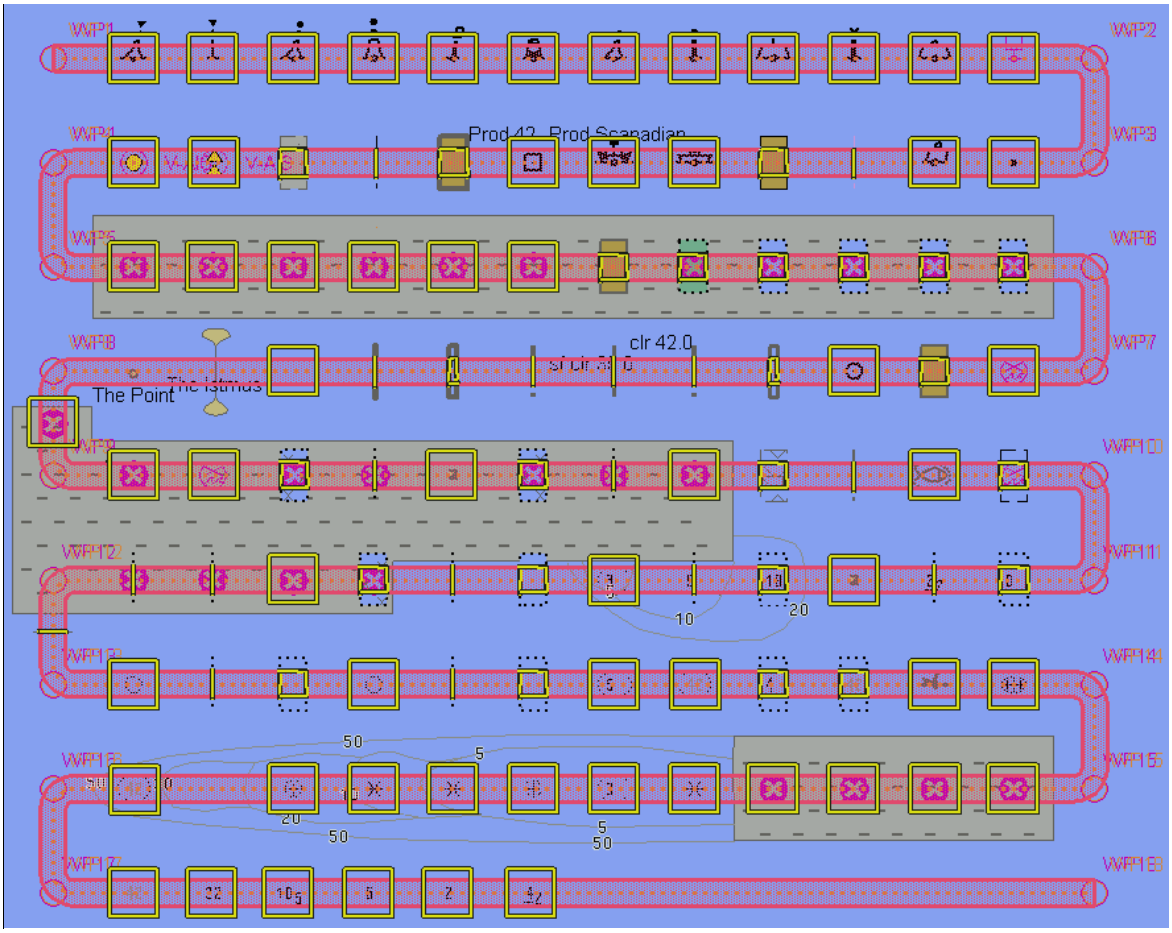
Safety Contour = 50 m, Alternative 1



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	5.2	IHO Reference	S-52 10.5.9

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 AA2OVRVU.000 and AA3NAVHZ.000, manually creating a route connecting all way points between feature objects marked as WP1 through WP8 and checking display against the corresponding graphical plot.

Setup

Load cell AA3NAVHZ.000 from 5.0 Navigational Hazards\ENC ROOT
Load cell AA2OVRVU.000 from 5.0 Navigational Hazards\Overview\ENC ROOT
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

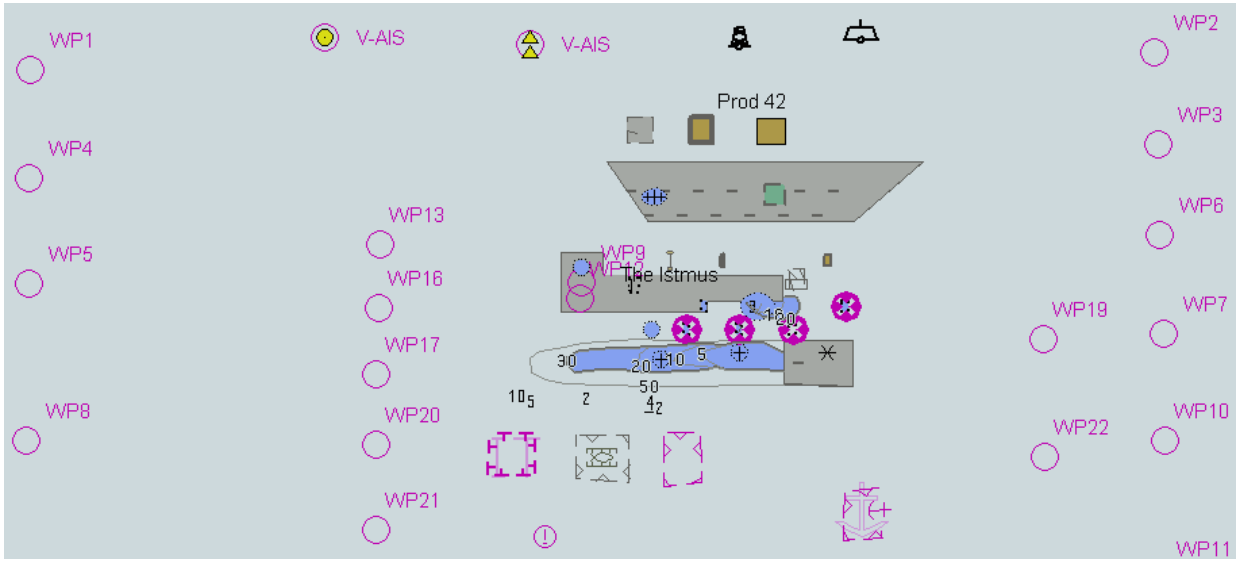
Action

Select position 39°57.000'N 104°49.000'W at compilation scale (1:350 000) of AA2OVRVU.
1) View chart before route planning.
2) Manually create a route connecting all way points between feature objects 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.

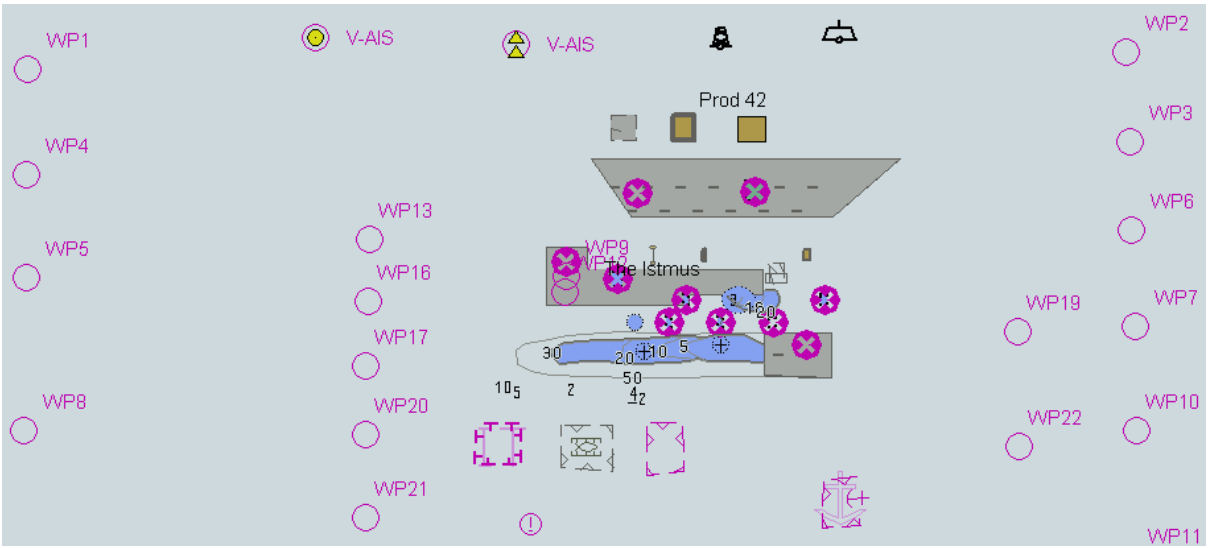
Results

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

1) Situation before route planning. Chart AA2OVRVU displayed as it is-

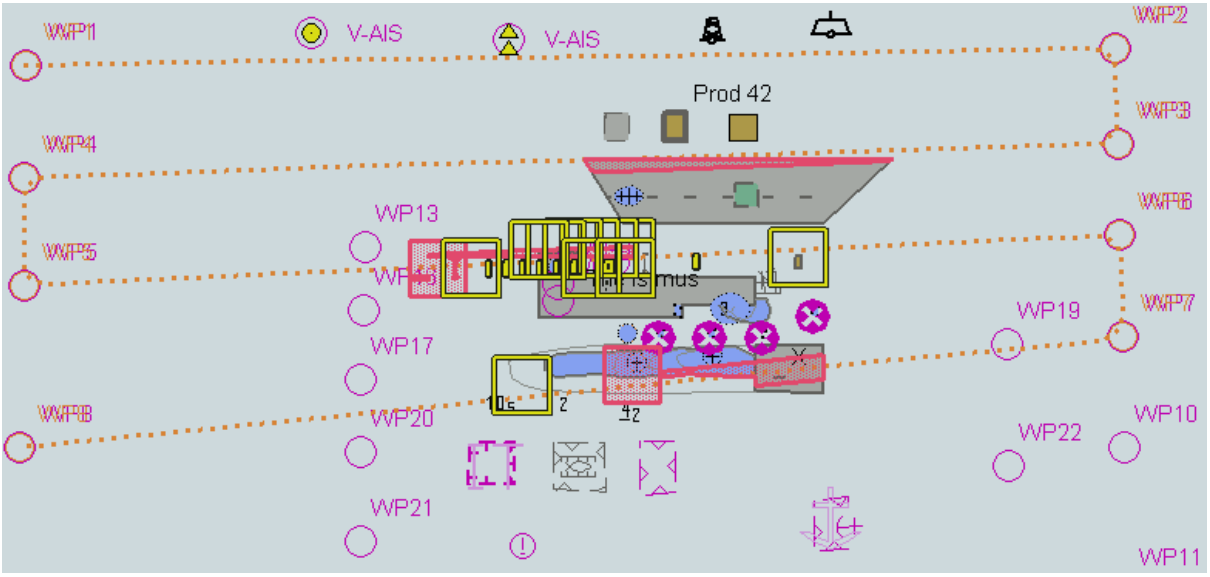


Alternative 1

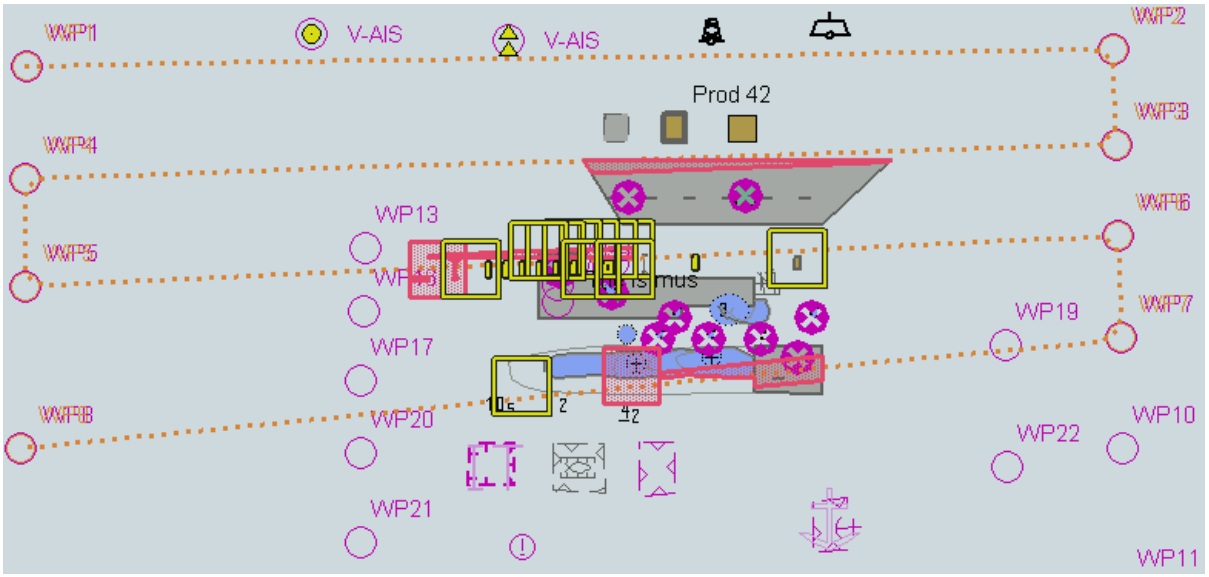


Alternative 2

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



Alternative 1



Alternative 2

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

Test Reference	5.3	IHO Reference	S-52 10.5.9

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 objects satisfying the conditions for this test (as listed in section 10.5.9 of IHO S-52 and included in the test cell AA3NAVHZ.000) that is shallower than the Mariner's safety contour.

This test is performed by loading the test cell AA3NAVHZ.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

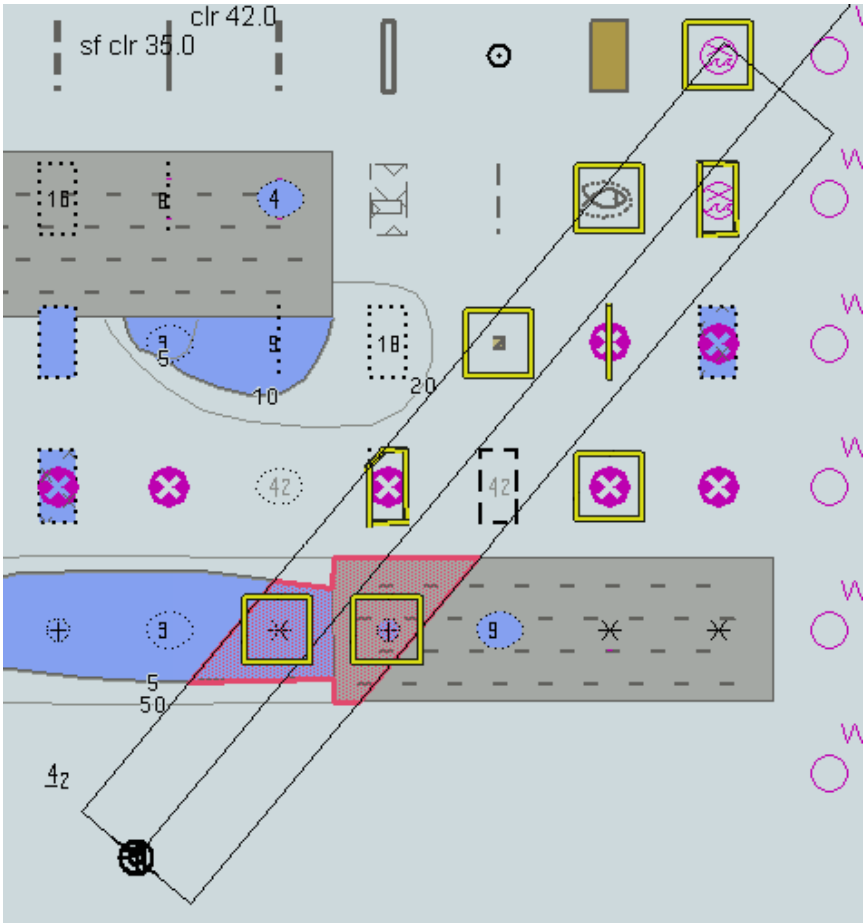
As for test 5.1
Select all Text groups

Action

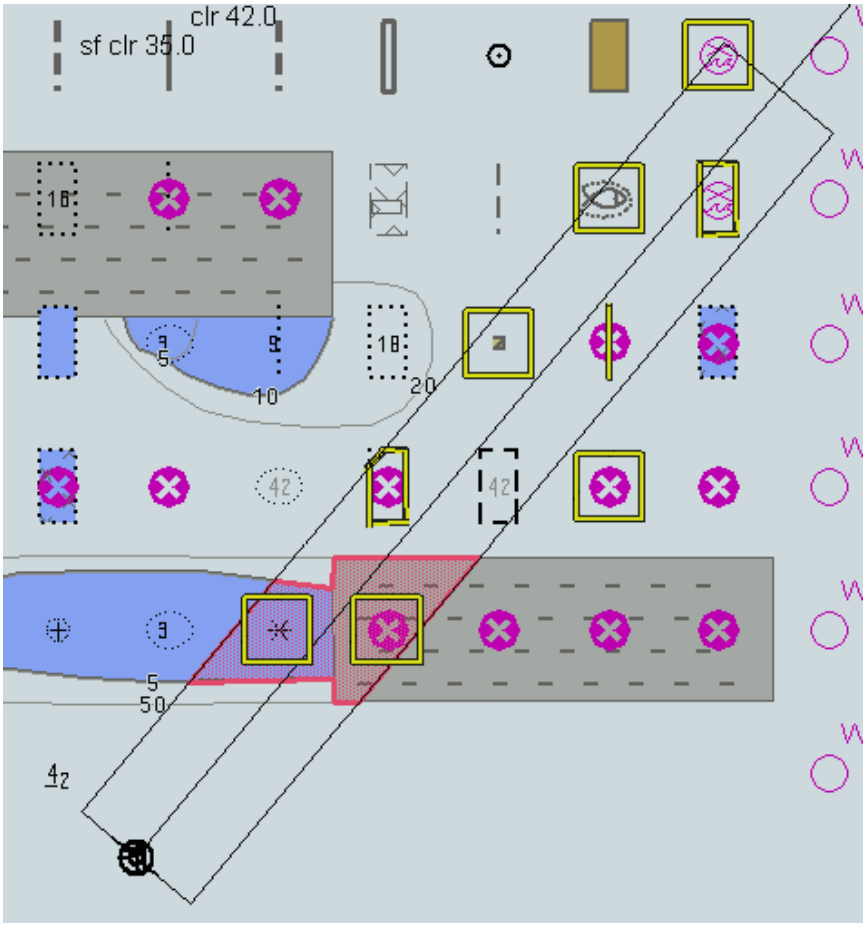
Check ENC symbols shown in the ECDIS for each Safety Contour setting against the corresponding graphical plot.

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



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	5.4	IHO Reference	S-52 10.5.9

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 AA2OVRVU.000 and AA3NAVHZ.000, manually creating a route connecting all way points between feature objects marked as WP1 through WP8 and checking display against the corresponding graphical plot.

Setup

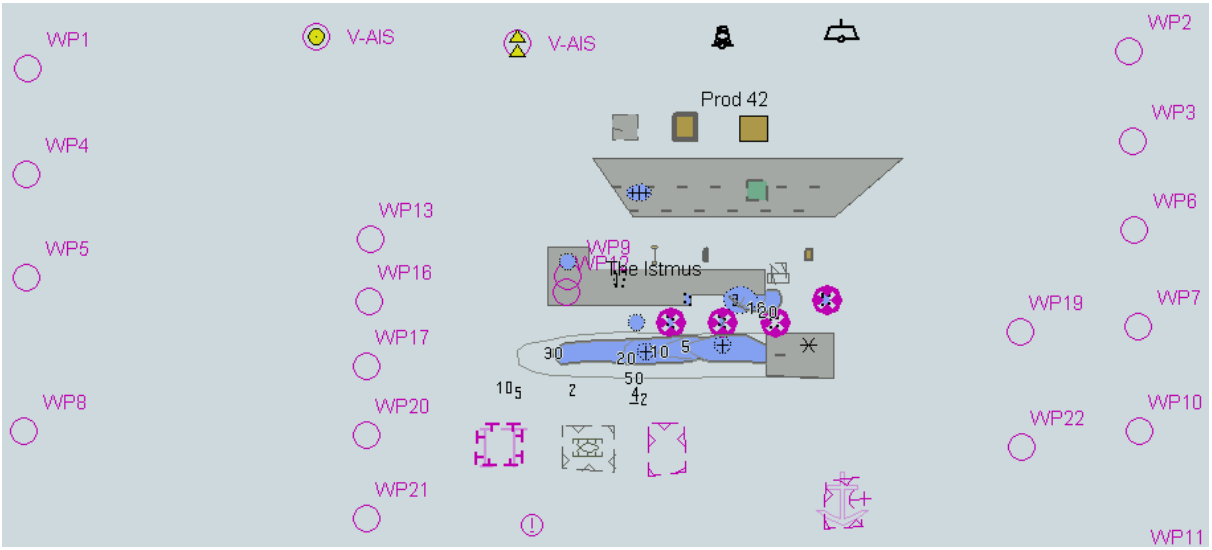
Load cell AA3NAVHZ.000 from 5.0 Navigational Hazards\ENC ROOT
Load cell AA2OVRVU.000 from 5.0 Navigational Hazards\Overview\ENC ROOT
Select Display Category Other
Set the Safety Contour value to 30 m
Set the Safety Depth value to 30 m
Select Symbolized Boundaries
Select Paper chart symbols
Select all Text groups

Action

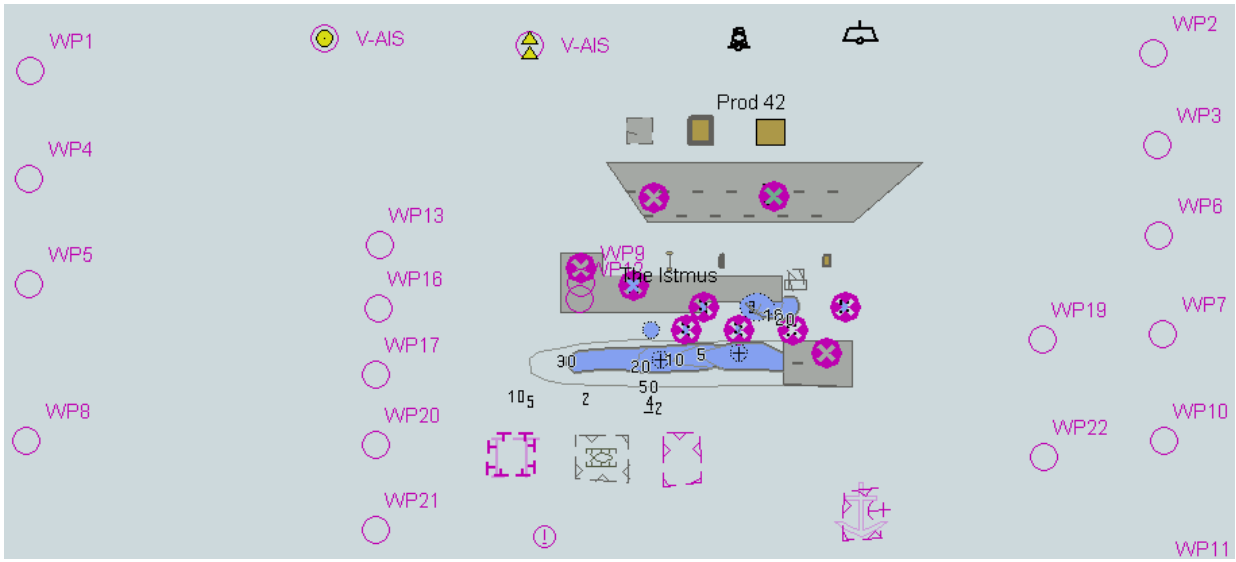
Select position 39°57.000'N 104°49.000'W at compilation scale (1:350 000) of AA2OVRVU.
Set simulated own ship for 39°49.587'N 104°54.930'W with heading set for 10.0°
Select size of own ship check area as 1.0 NM width and 8.0 NM length.

Results

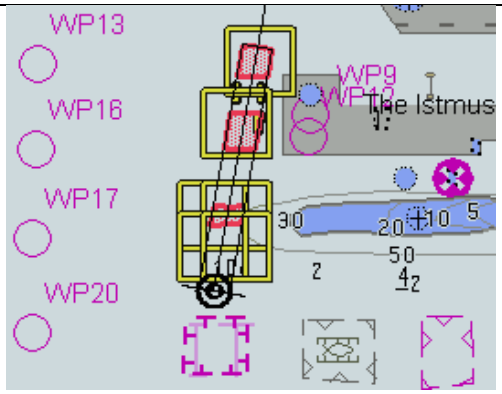
The ENC in the ECDIS should match the corresponding graphical plot shown below.



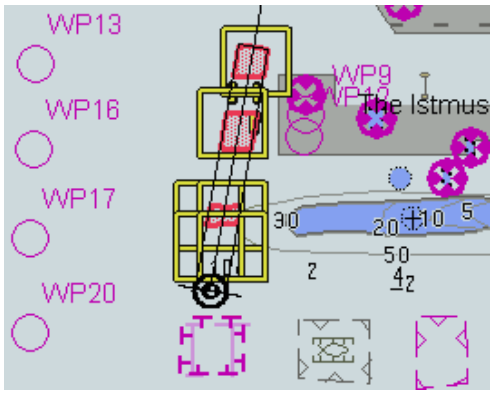
1) Situation before route monitoring. Chart AA2OVRVU displayed as it is. Presentation alternative 1



Situation before route monitoring. Chart AA2OVRVU displayed as it is. Presentation alternative 2



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



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	6.1	IHO Reference	S-52 10.5.10

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 objects satisfying the conditions for this test are listed in section 10.5.10 of IHO S-52 and are included in the test cell AA3ARSPC.000.

This test is performed by loading the test cell AA3ARSPC.000, manually creating a route connecting all way points between feature objects marked as WP1 through WP4 and checking display against the corresponding graphical plot.

Setup

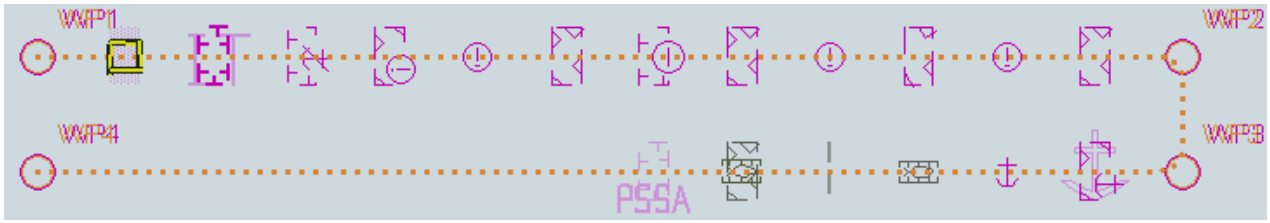
Load cell AA3ARSPC.000 from 6.0 Special Conditions\ENC_ROOT
Select Display Category Other
Set the Safety Contour value to 0 m
Set the Safety Depth value to 30 m
Select Symbolized Boundaries
Select Paper chart symbols
Manually create a route connecting all way points between feature objects marked WP1 through WP4
Set user-specified distance for indication of areas with special condition as 0.1 NM

Action

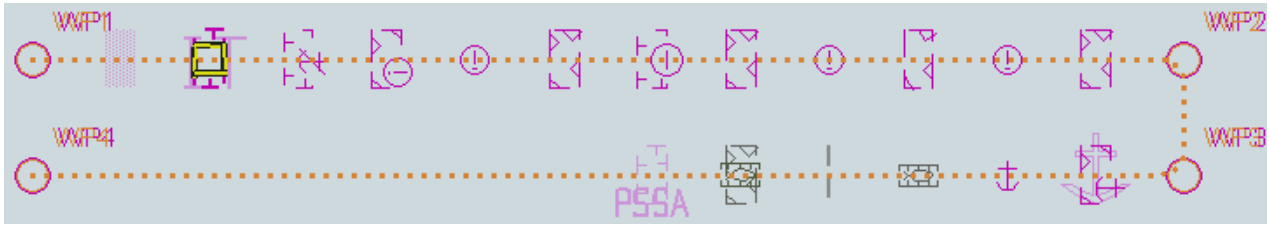
Check ENC symbols shown in the ECDIS against the corresponding graphical plot. selecting one by one each special condition for the test

Results

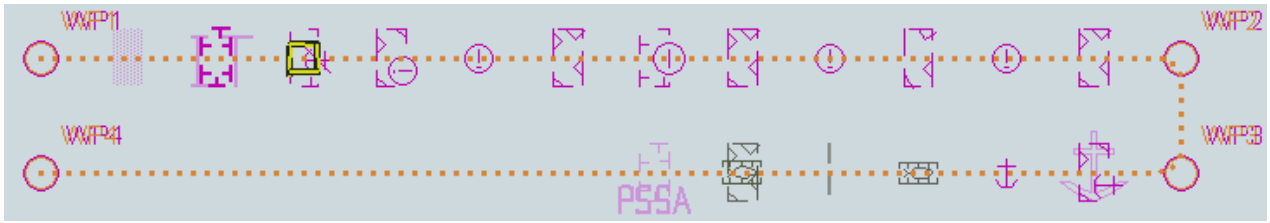
The ENC in the ECDIS should match the corresponding graphical plot shown below.



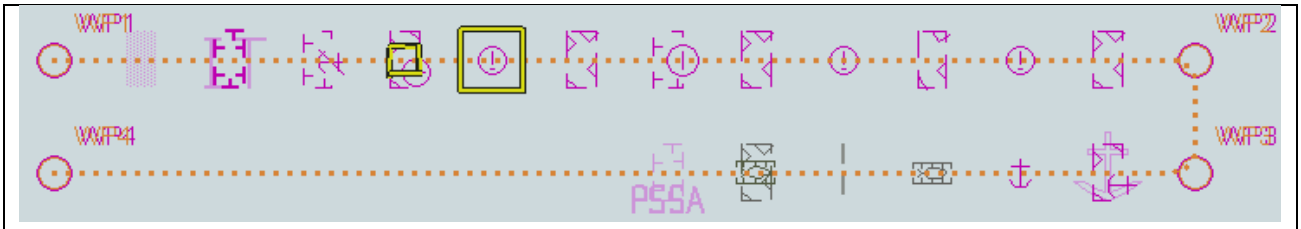
Selected: Traffic separation zone



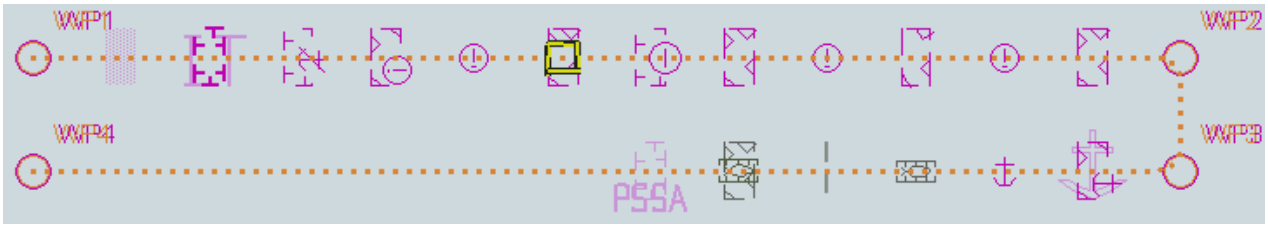
Selected: Inshore traffic zone



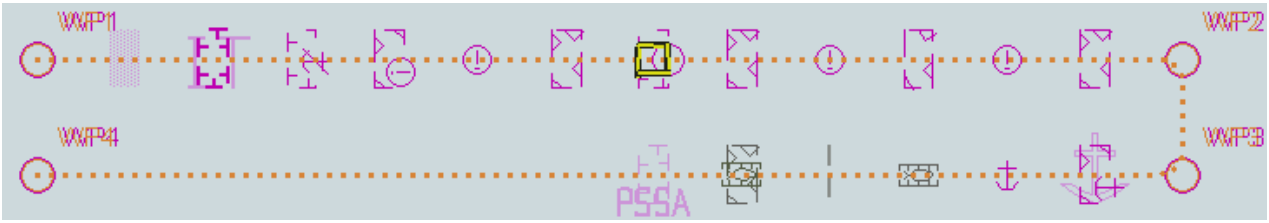
Selected: Restricted area



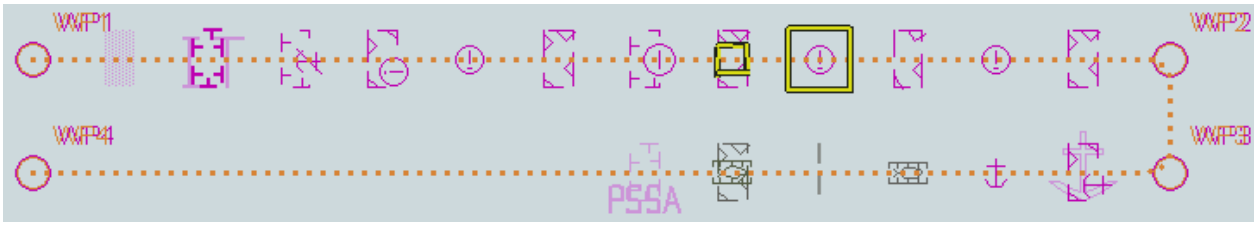
Selected: Caution area



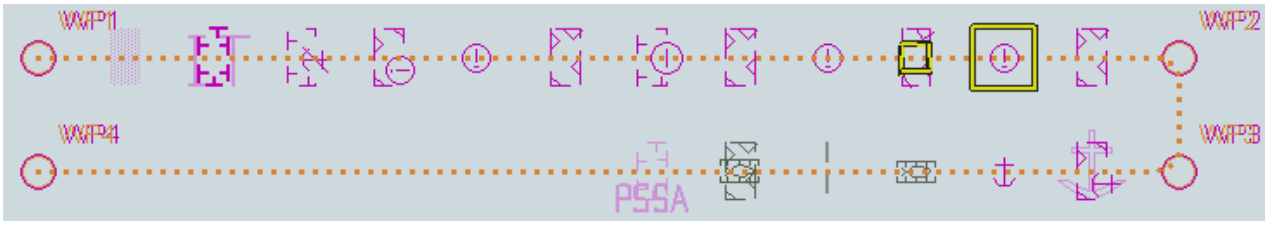
Selected: Offshore production area



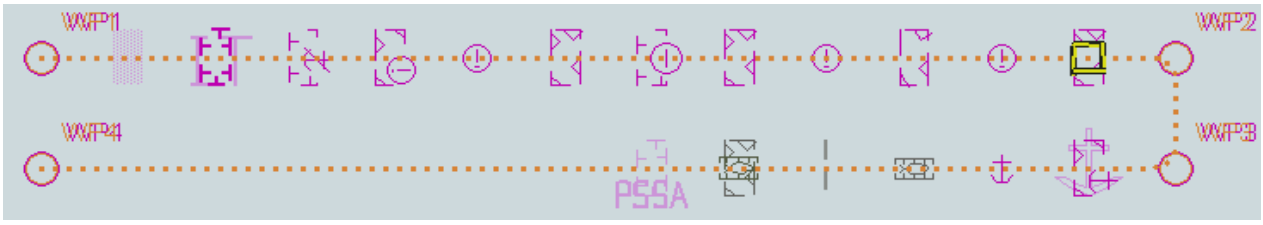
Selected: Area to be avoided



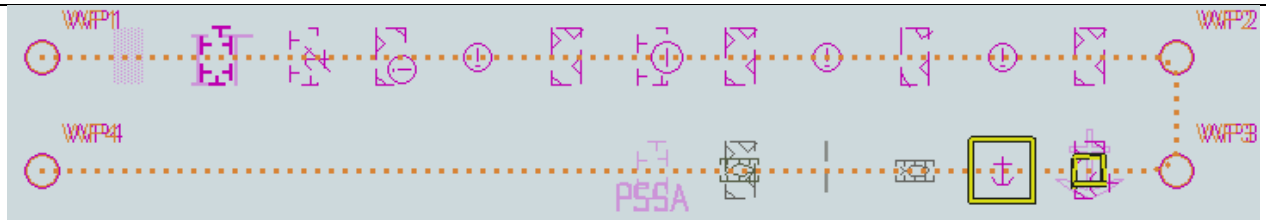
Selected: Military practice area



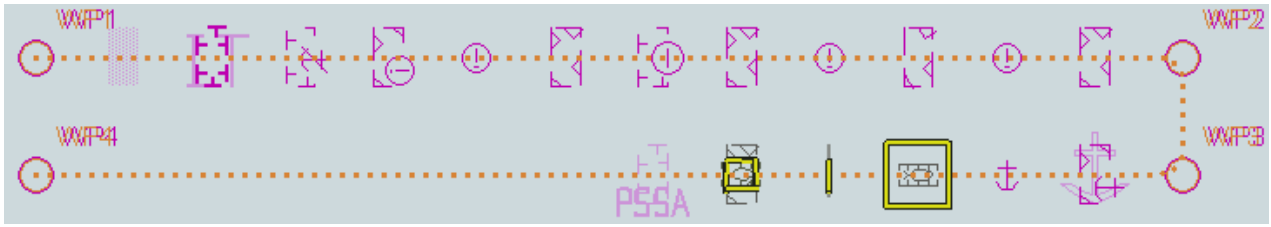
Selected: Seaplane landing area



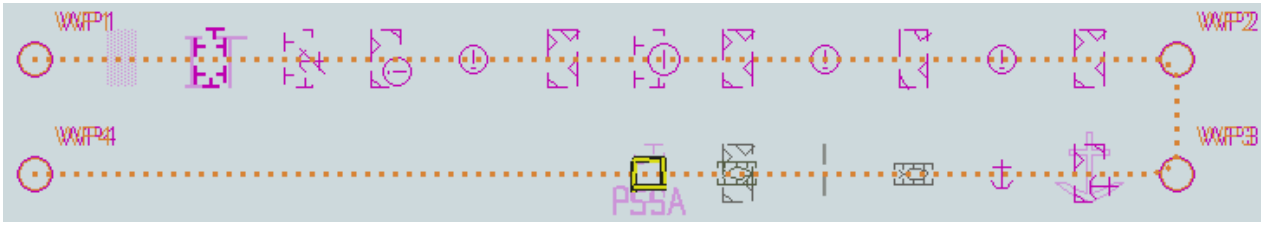
Selected: Submarine transit lane



Selected: Anchorage area



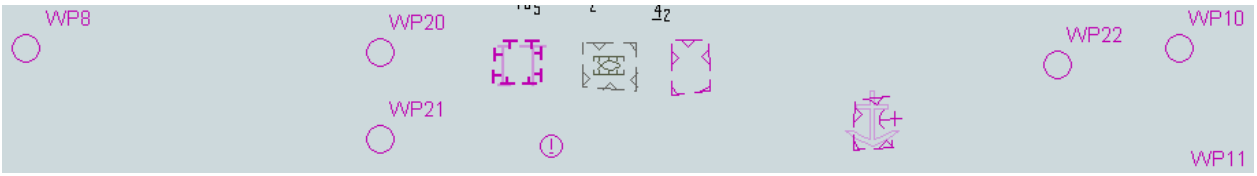
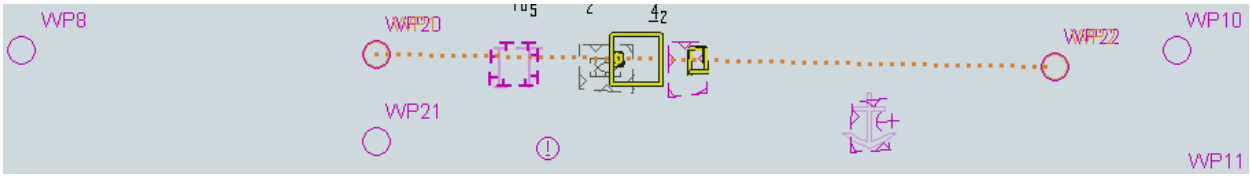
Selected: Marine farm/aquaculture



Selected: PSSA (Particularly Sensitive Sea Area)

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

Test Reference	6.2	**IHO Reference**	S-52 10.5.9
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 AA2OVRVU.000 and AA3ARSPC.000, manually creating a route connecting way points between feature objects marked as WP20 and WP22 and checking display against the corresponding graphical plot.*			
Setup			
As for test 6.1 and in addition load cell AA2OVRVU.000 from 5.0 Navigational Hazards\Overview\ENC_ROOT *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*			

Action
Select position 39°45'•000N 104°49'•000W at compilation scale (1:350 000) of AA2OVRVU. *1) View chart before route planning.* *2) Manually create a route connecting two way points between feature objects 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 AA2OVRVU 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.*

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

Test Reference	6.3	IHO Reference	S-52 10.5.10

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 objects satisfying the conditions for this test are listed in section 10.5.10 of IHO S-52 and are included in the test cell AA3ARSPC.000.

This test is performed by loading the test cell AA3ARSPC.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

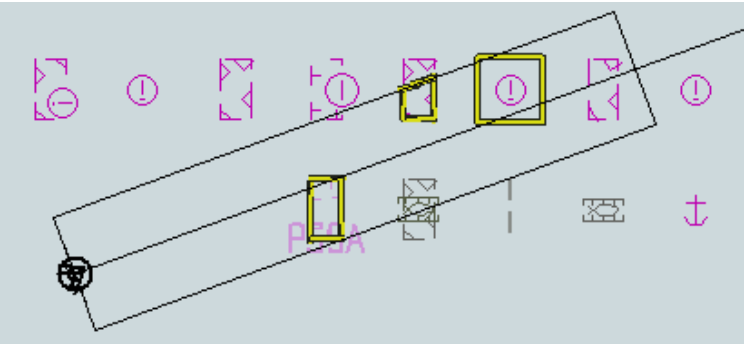
As for test 6.1

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.

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

Test Reference	6.4	IHO Reference	S-52 10.5.9

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 AA2OVRVU.000 and AA3ARSPC.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

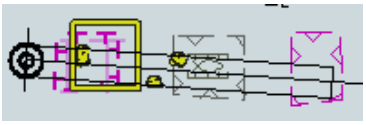
As for test 6.2

Action

Select position 39°45'•000N 104°49'•000W at compilation scale (1:350 000) of AA2OVRVU. 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

7 Detection and Notification of the Safety Contour

7.1 Detection and Notification of the Safety Contour - Basic test

Test Reference	7.1	IHO Reference	S-52 10.5.12

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 objects satisfying the conditions for this test are listed in section 10.5.12 of IHO S-52 and are included in the test cell AA3SAFCO.000.

This test is performed by loading the test cell AA3SAFCO.000, manually creating a route connecting all way points between feature objects marked as WP1 through WP4 and checking display against the corresponding graphical plot.

Setup

Load cell AA3SAFCO.000 from 7.0 Safety Contour\ENC_ROOT
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 feature objects marked WP1 through WP4
Set user-specified distance for detecting of Safety Contour as 0.1 NM

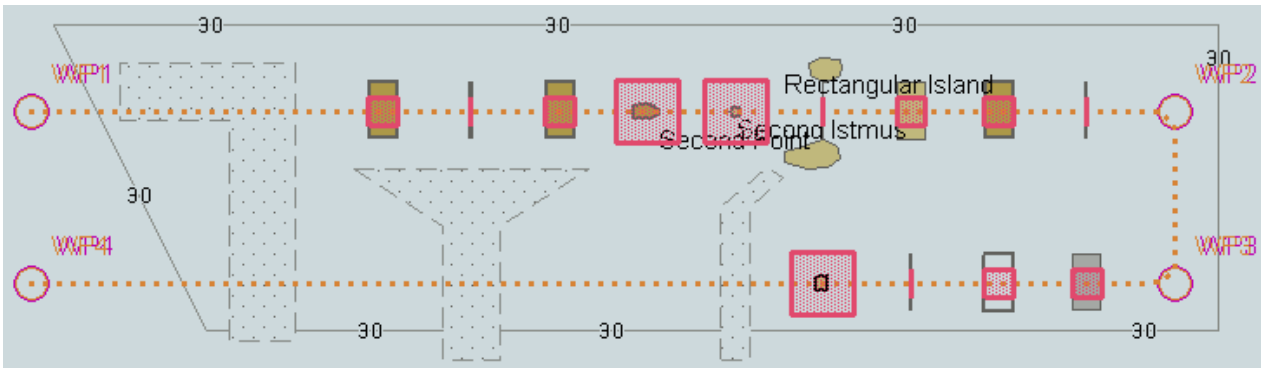
Action

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

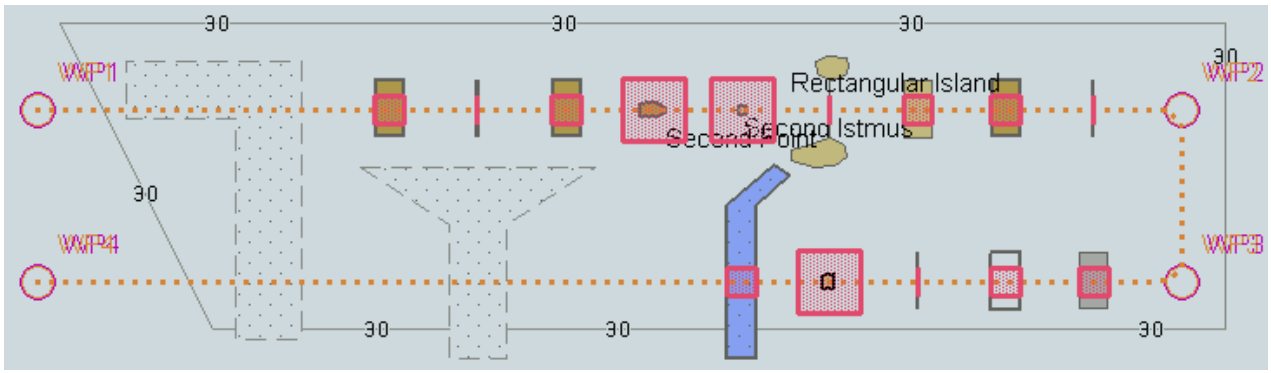
Repeat sequentially for Safety Contour value 0m, 6m, 11m, 13m, 43m.

Results

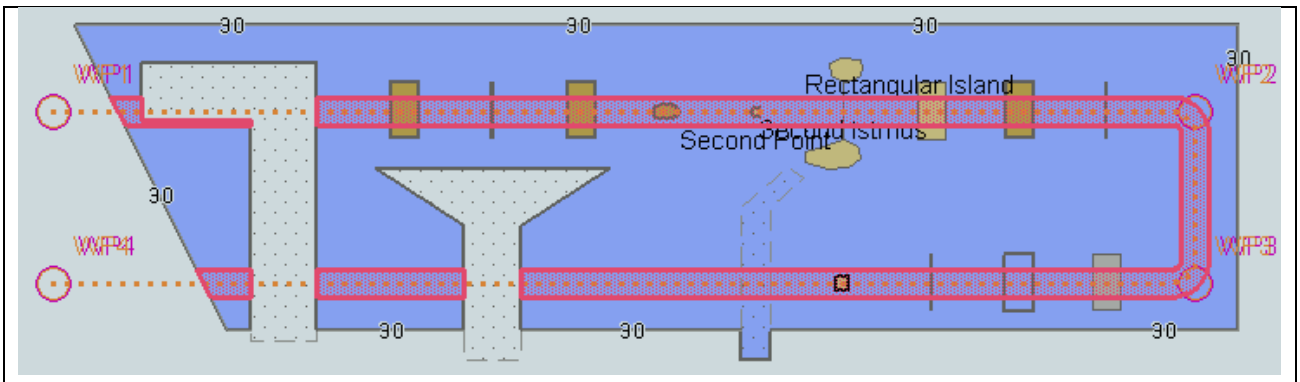
The ENC in the ECDIS should match the corresponding graphical plot shown below.
Note: To increase the prominence of dangers in unsafe waters it is permitted to highlight objects with an isolated danger mark when they are wholly located in this area.



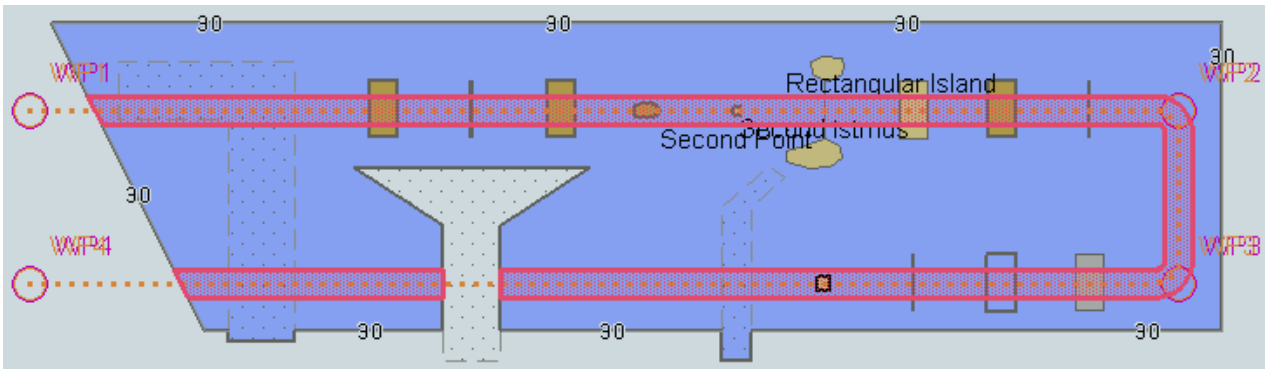
Safety Contour = 0 m



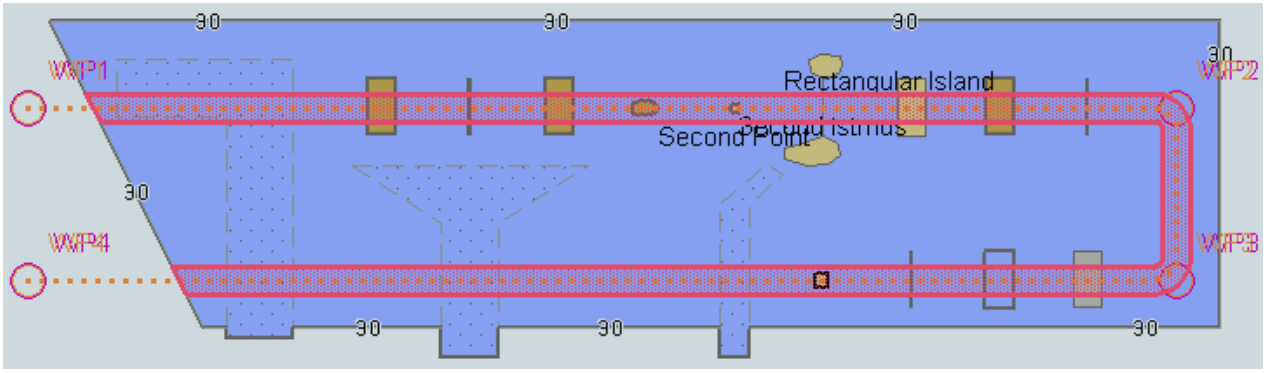
Safety Contour = 6 m



Safety Contour = 11 m



Safety Contour = 13 m



Safety Contour = 43 m

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

Test Reference	7.2	IHO Reference	S-52 10.5.9

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 AA2OVRVU.000 and AA3SAFCO.000, manually creating a route connecting way points between feature objects marked as WP11, WP24, WP25 and WP26 and checking display against the corresponding graphical plot.

Setup

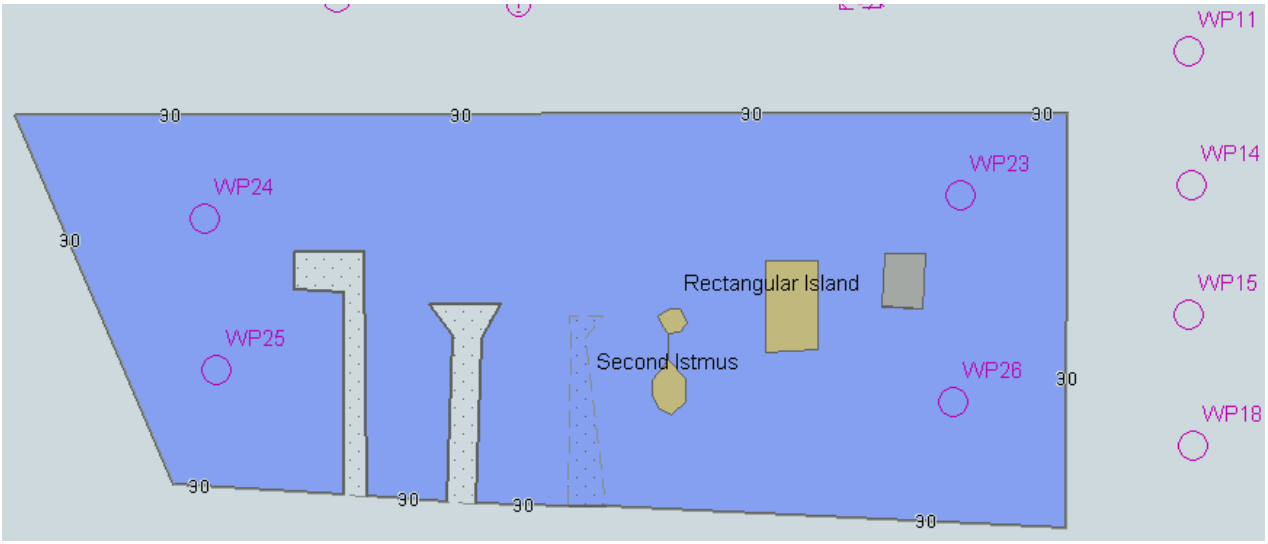
As for test 7.1 and in addition load cell AA2OVRVU.000 from 5.0 Navigational Hazards\Overview\ENC_ROOT
Select Display Category Other
Set the Safety Contour value to 11 m
Set the Safety Depth value to 30 m
Select Symbolized Boundaries
Select Paper chart symbols
Select Contour label

Action

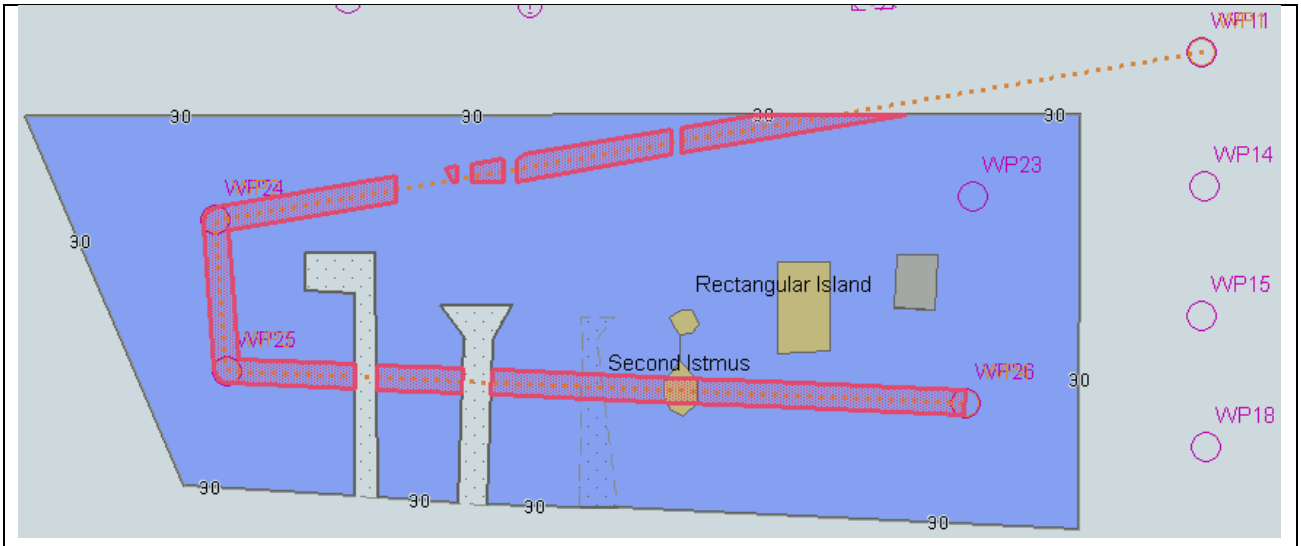
Select position 39°27'•000N 104°49'•000W at compilation scale (1:350 000) of AA2OVRVU.
1) View chart before route planning.
2) Manually create a route connecting way points between feature objects marked WP11, WP24, WP25 and WP26. Set user-specified distance for indication navigational hazards as 0.5 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 AA2OVRVU displayed as it is



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

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

Test Reference	7.3	IHO Reference	S-52 10.5.12

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 objects satisfying the conditions for this test are listed in section 10.5.12 of IHO S-52 and are included in the test cell AA3SAFCO.000.

This test is performed by loading the test cell AA3SAFCO.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

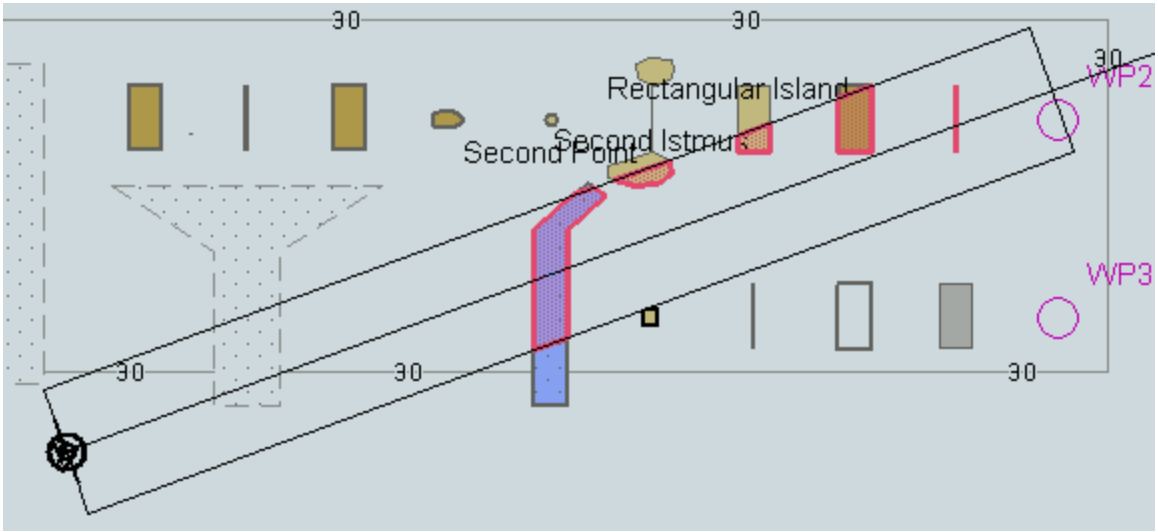
As for test 7.1
Select all Text groups
Select Contour label

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.

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

Test Reference	7.4	IHO Reference	S-52 10.5.9

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 objects satisfying the conditions for this test are listed in section 10.5.12 of IHO S-52 and are included in the test cell AA3SAFCO.000.

This test is performed by loading the test cells AA2OVRVU.000 and AA3SAFCO.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

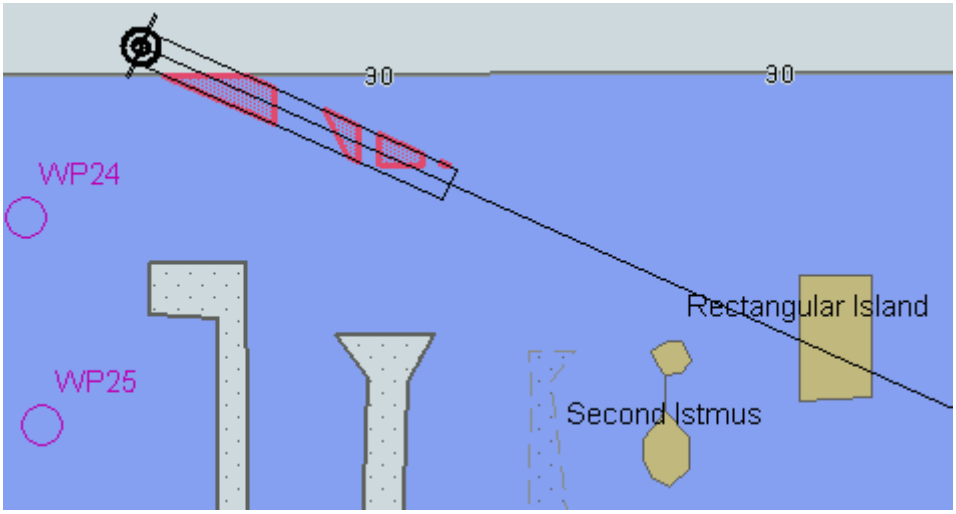
As for test 7.2

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.

Page intentionally left blank