

2nd NCWG MEETING
IHB, Monaco 26-29 April 2016

Paper for Consideration by NCWG
UK Paper Chart Generalization Policy

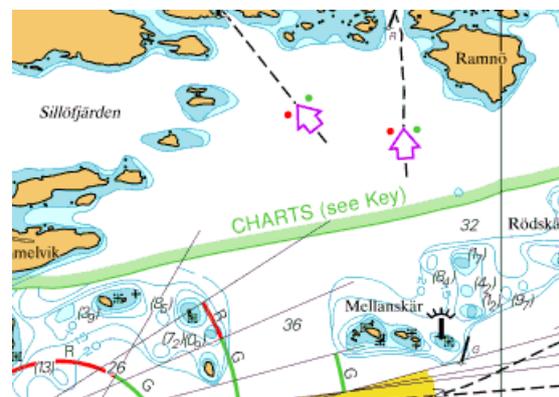
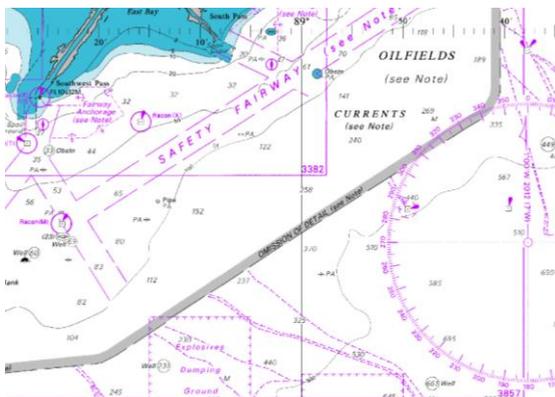
Submitted by:	UK
Executive Summary:	UK is considering a more 'rules-based' policy for generalization of second and smaller scale standard nautical charts (SNC), initially to be applied to charts of the North Sea
Related Documents:	S-4 B-100.5; B-400 to B-404
Related Projects:	None

Introduction / Background:

1. The UK is considering a more 'rules-based' policy for generalization of second and smaller scale charts, initially to be applied to charts of the North Sea. This is aimed at consistency of practice, reduction of unnecessary detail and consequentially, reduced maintenance burden.
2. The paper attached at Annex A is an abbreviated version of the draft policy being considered within UKHO.

Action required of NCWG:

3. The NCWG is invited to:
 - Note this probable development in UKHO charting practice
 - Offer any comments to UKHO
 - Consider what NCWG future action might be, e.g.
 - maintain a watching brief
 - provide comments
 - consider any possible changes required to generalization guidance in S-4
 - consider whether an INT symbol should be recommended for the 'Omission of Detail (OOD) line: Cf GB3849 and SE 621/INT1229 below:

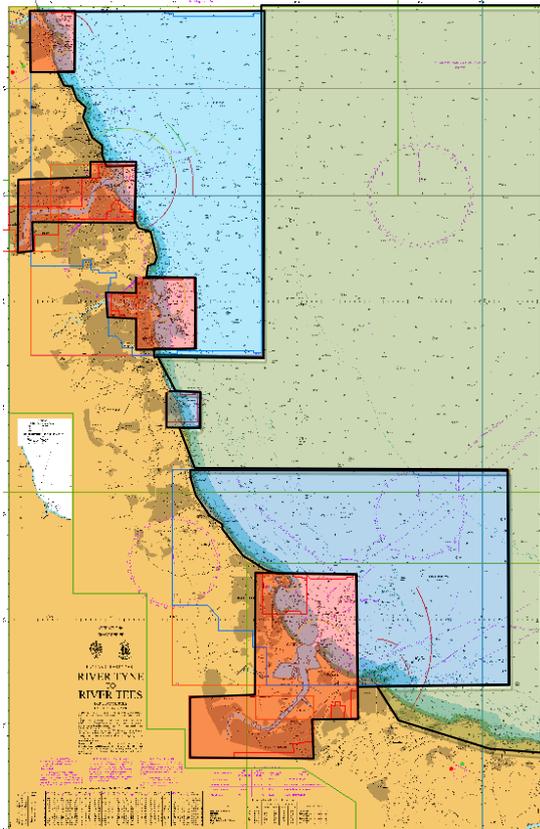


NEW AND IMPROVED GENERALIZATION POLICY FOR ADMIRALTY CHARTS IN UK WATERS.

PREFACE.

Throughout this paper we will be making reference to largest scale, second scale, third scale coverage on a paper standard nautical chart (SNC). To remove any confusion, the diagram below explains what this means using the example of Admiralty chart 152,

CHART 152 – 1:75,000



Area where 152 is largest scale

Areas where 152 is second scale ie in areas covered by 1935 and 2567 (1:30,000) and 1624 -4 (1:12,500)

Area where 152 is third scale ie where larger scale charts and plans exist of Blyth, Tyne, Tees etc in the area of 1:30,000 coverage

1. THE PROBLEM.

The generalization of detail (or lack of it) on medium and small scale SNCs in UK waters has long been a widely known and a very significant problem. This problem is probably most pronounced in the North Sea.

Until now, our generalization policy has been vague and somewhat inconsistent. As a result, far too much detail is now shown on some of our smaller scale charts. The impact of this is heavy chart maintenance and long compilation times for new editions. Chart display is cluttered and there is a consequent lack of clarity for chart users and chart maintainers. There is widespread agreement that the problem needs to be resolved, both in UKHO and amongst other members of INT Area D. This proposal is designed to do that.

2. AIM OF THE NEW POLICY.

Any new generalization policy needs to:

- a. Significantly reduce chart maintenance, remove clutter and provide clarity.
- b. Be 'rules-based' ie simple and easy to understand.
- c. It must clarify, once and for all, at what scale-band the SNC changes from being a navigation tool to a planning tool. This will eradicate the ambiguity that exists at the moment and is probably the root cause of the problem.
- d. Reflect modern thinking and align the SNC into the ENC 'model' eg small scale cells cut back and areas of minimal depiction used.

3. METHODOLOGY.

The methodology used in the process of defining a new generalization policy was as follows:

- a. Define the overall purpose of largest scale, second scale, third scale coverage. These definitions will then be used as benchmarks.
- b. Using these benchmarks, map all major charting features to them in the form of a matrix.
- c. Consider how the generalized 'areas' are to be displayed on the face of the SNC and decide the best option.
- d. Test the display and generalization guidance on various charts and define any exceptions.
- e. Define the final generalization policy.
- f. Consider implementation and the way ahead.

Briefly, taking each in turn:

a. DEFINE THE PURPOSE OF EACH SNC SCALE BAND.

In order to define basic generalization rules, the general purpose of each scale band had to be defined. After consultation, the final definitions are as follows:

Largest scale - enough detail to ensure safe navigation for various vessel types and meet navigation and other stakeholder requirements subject to clarity of display at the scale of the chart ie if the largest scale is relatively small then full detail cannot be shown.

Second scale – sufficient detail for safe navigation, in all but the most complicated areas. Non critical features generalized. This caters for leisure craft and the situation where the second scale Admiralty chart is the first scale INT chart.

Third Scale – Planning and situational awareness only. Not enough detail to navigate on; larger scales will need to be used for safe navigation.

Fourth Scale (plus) – Planning purposes only.

b. FEATURE MAPPING/ GENERALIZATION MATRIX

With these definitions agreed, it was then a relatively straightforward task to map all the major charting features against each scale band and describe how they should be ideally depicted. The results of this work are given in Appendix A as a Generalization Matrix. The adoption of this generalization matrix will lead to a much more objective and 'rules-based' approach to the generalization process and greatly simplify it.

c. DISPLAY

The next major task was to consider how our new recommended policy should be displayed on the face of the SNC. The goal here was clarity and simplicity ie making it immediately obvious to chart users (and maintainers) where generalization has occurred on any SNC and which features have been removed.

After due consideration, it was felt that the dividing line between second and third scale *ie where an SNC switches from being a navigational tool to a planning tool* is the critical line of concern. Again, after further consideration, it was decided the most effective way to show this was to simply draw an Omission of detail (OOD) line along this border accompanied by a note explaining what detail has been removed. A precedent for this has actually already been set on Admiralty charts in the Gulf of Mexico (eg GB3849 – but see SE 621/INT1229).

The proposed wording of the note is as follows:

OMISSION OF DETAIL

In the area between the limit marked  and the coastline, this chart should only be used for planning purposes as features such as depths, platforms, wrecks, pipelines, minor aids to navigation and cables have been omitted. Larger scale charts are available for mariners intending to navigate in this area.

d. TESTING AND IDENTIFICATION OF EXCEPTIONS.

The above policy was then tested on numerous charts in the North Sea to see whether it met its objectives and to identify any issues.

The guidance in Appendix A did not raise any particular concerns but it became apparent that strictly limiting the OOD line to the extent of third scale coverage was too simplistic to adopt as a uniform policy as various issues were raised. To counteract these issues several exceptions were identified which are to be considered by the Geographic Managers when defining the extent of the OOD line. These exceptions are as follows:

1. The OOD line will only be drawn around 'larger' areas of third scale coverage. Small areas around bays and estuaries will not be shown to avoid cluttering the chart unnecessarily.
2. Offshore 'Through' Traffic – the OOD line should avoid crossing any known offshore coastal routes for large vessels. This is to avoid such vessels having to continually switch scale paper charts as they follow the coast. Note: It is recommended that historical AIS data is used to ensure this.
3. Buffer Zone - the OOD may need to be shrunk slightly to allow for a narrow 'band' of detail (at least 1cm at chart scale) within third scale coverage. This allows for the safe transition from first to third scale when the second scale is not available eg where it is not an INT chart.
4. Complexity – where the resultant OOD line shows a complicated display of second/ third scale 'pockets' it is to be simplified to create a clear and unambiguous picture.
5. Clash with area features – clashes with major area features such as oilfields and Traffic Separation Schemes are to be avoided as two displays of the same feature will result.

Whether the OOD line is brought landward or seaward of the feature depends on the type of feature and its importance.

6. Chart integrity – where the placement of the OOD line creates issues with the integrity of subsequent smaller scale charts ie multiple smaller scales showing exactly the same generalized detail, a review of those charts may be needed. If deemed to be still required in the chart series, the position of the OOD line may then require amendment on a chart ie moving it landward to avoid duplication of display.

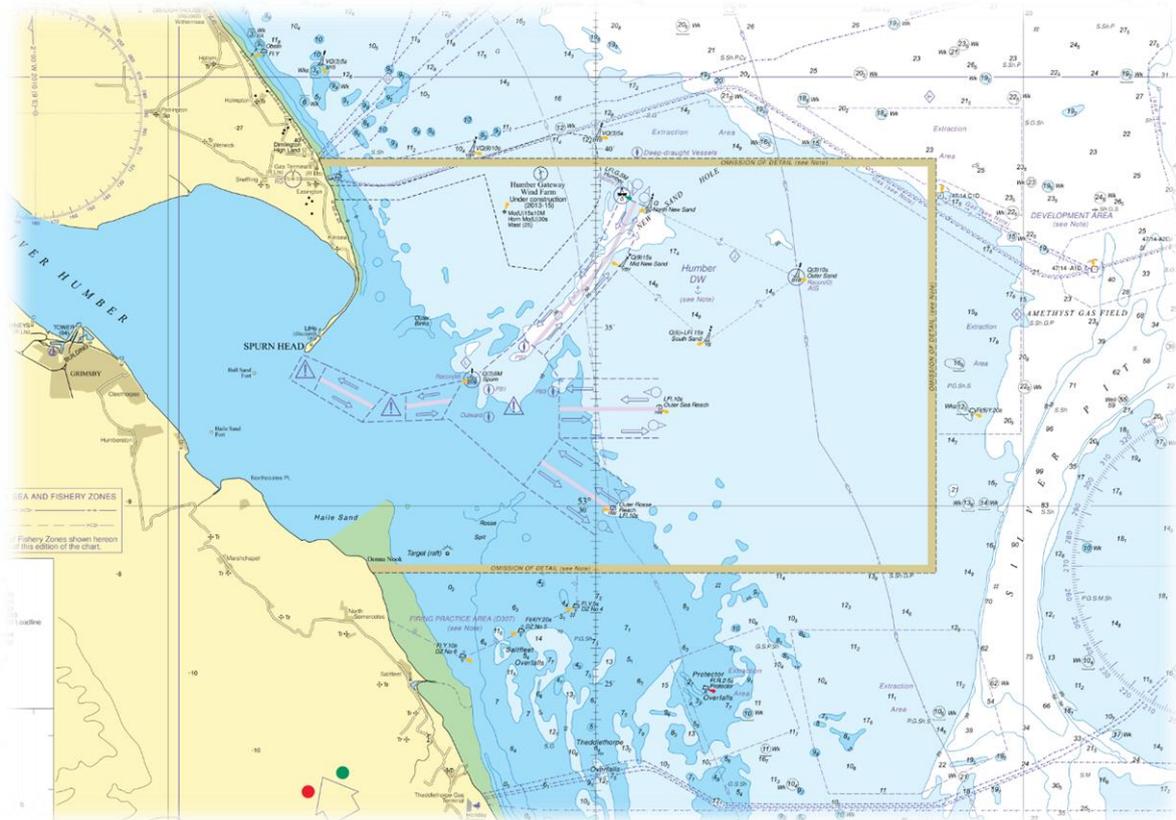
7. Chart value – similar to 6. A balance between the percentage of a chart that shows navigable (useful?) detail and that which shows generalized planning information is required. Too much of the latter and the value of a chart will start to be questioned. For very small scale charts, which are at least third scale across most of their area, there will possibly be a need to retain a sparse coverage of depths and contours to avoid them becoming obsolescent as a chart eg Admiralty chart 2.

8. Local Safety factors – if a safety risk is created by the omission of a feature when applying the new policy, the rules are to be over ridden and the feature included eg an isolated platform lying out to sea but just inside the corner of the OOD line

e. FINAL RECOMMENDED POLICY.

Generalization of detail on smaller scale Admiralty charts will be conducted wherever possible through use of an Omission of Detail line. This cartographic line will generally encompass the areas where the chart becomes third scale; however, numerous exceptions will need to be considered and applied. It is recommended that a cartographic specialist such as the Geographic Manager (a UKHO senior cartographer role, usually responsible for chart specifications) defines the position of the OOD line. Once defined, detail behind the line will then be omitted or generalized in accordance with the guidance as given in Appendix A.

Chart 1190 with the proposed generalization policy applied would look as follows:



Please note that the OOD line is to be grey in colour (urban stipple) to distinguish it from other features and tie in with Admiralty charts in the Gulf of Mexico.

These proposals have been discussed and approved in Operations by GM RT1W, GDAM and the Paper Standards Manager (specific job titles in UKHO). In Commercial they have been approved by SNC Product Manager who has expressed the opinion this policy should be implemented as a matter of priority and ahead of any prospective chart rescheme in the North Sea. They have also been shown to the Secretary IHO-Nautical Cartography Working Group (NCWG) whose comments have been incorporated.

The overall benefits of this policy will largely be internal, however, chart users will see improved clarity, less ambiguity and reduced NM corrections.

8. NEXT STEPS/ IMPLEMENTATION/ APPROVAL

It is hoped that this Generalization Policy can eventually be applied to any area where UKHO has primary charting responsibility and where chart maintenance is heavy. The intention is to start in UK waters, probably in the North Sea first.

The preferred option would be to apply it systematically in chart scale order. However, the policy could be applied immediately to any new edition in UK waters. GMs would start the process by defining the position of the OOD line in the new edition specifications and the compiler would simply apply the new rules, as in Appendix A.

Looking further ahead, if the policy proves successful, it will then be taken to fellow members of INT Area D for their approval and implementation. As INT Chart Coordinator for that region, I believe I have the authority to progress such an initiative. This will extend the policy

to a regional rather than national level which in turn may pave the way for more general adoption.

Andrew Hinton.
RT1E Geographic Manager & INT Area D Coordinator
23rd October 2015.

APPENDIX A: Generalization MATRIX.

FEATURE TYPE.	LARGEST SCALE <i>ALL DATA SHOWN FOR NAVIGATION (DEPENDENT ON SCALE) AND TO MEET STAKEHOLDERS' REQUIREMENTS eg platform designations</i>	SECOND SCALE <i>SUFFICIENT DETAIL TO NAVIGATE AND ANCHOR IN ALL BUT THE MOST COMPLICATED AREAS. NON CRITICAL FEATURES GENERALISED.</i>	THIRD SCALE <i>PLANNING AND SITUATIONAL AWARENESS, LARGER SCALES TO BE USED FOR NAVIGATION.</i>	FOURTH SCALE AND SMALLER <i>PLANNING PURPOSES ONLY</i>
DEPTHS/ CONTOURS	Full hydrography to allow for safe navigation apart from areas where scale of chart will not allow ie too small a scale or where highly changeable areas where local guidelines may apply.	Sufficient hydrography to navigate in open water, main channels and anchorages Contours generalised - small offlying shoals encompassed. More open sounding density over shoals.	Purposely not enough depths to navigate on. Contours and colour tints used to describe underlying hydrography, no qualifying depths needed. Blued out completely in enclosed waters. Generally no depths shown apart from offshore anchorage areas or, in rare cases, critical or controlling depths in main channels. Latter subject to local factors. Note: Contours to be shown as displayed on the associated HDB NAV band ie no further generalization required.	Same model as third scale display across but greater use of Blued out areas behind certain contours along coast as well as enclosed waters. Where issues of chart integrity and value are present a generally sparse scattering of depths is to be considered but not of sufficient density to allow for navigation.
WRECKS/ OBSTRUCTIONS/ FOULS	All shown dependent on INT 1	Wherever possible Foul/ Obstruction Areas and Wreck areas shown with least depth. NDW with no depth over not shown ? Remove fouls wherever possible	None shown unless of critical importance.	None shown
OIL AND GAS/ WINDFARM	All shown, designations of platforms	All - but grouped together wherever possible - ie platforms grouped, even oilfields grouped where small scale - no designations of platforms	Shown as Maritime limit and Oilfield/ Windfarm name . Where oilfields are small and numerous cover by general maritime limit. Note: where Fields extend into second scale depict the feature as if it were second scale.	Maritime limit and Oilfield/ Windfarm name . Grouped together wherever necessary with legend 'Oilfields'
PIPELINES/ CABLES	All shown as per IHO-S4.	All - but consider inserting cable/ pipeline areas. Disused cables and disused pipelines not to be shown ?	None - pipelines and cables to be cut off on the OOD line.	None

LIGHTS/ BUOYS	All - names, all details, full light descriptions	Most buoys and lights shown and named dependent on scale. Certain minor buoys away from main shipping channels not shown eg mooring buoys, special buoys, 2xFR. Abbreviated wherever possible.	Only major lights (>10M) or lights whose range extends beyond OOD area and are significant shown. All lights included are to be named and abbreviated light description given. Only major buoys eg cardinal marks close to shipping lanes. On the SD insert legend 'Refer to larger scales'	Certain major aids to navigation shown with names and abbreviated descriptions.
Source Diagram/ M_SREL	Show graphical extents of surveys - combining where possible.	Show graphical extents of surveys - combining where possible.		Dependent on scale - if larger than 1:500,000 insert legend Refer to larger scales.
NAMES	All appropriate names shown dependent on scale of the chart as per IHO S-4	All appropriate names shown dependent on scale of chart as per IHO S-4	All appropriate names shown for planning purposes eg Major banks, headlands, bays, channels, ports, oil and gas fields, lights, buoys, anchorages, etc	Names limited to geographical features eg Headlands, channels, banks, ports and major features such as TSS schemes, anchorages etc.
OTHER FEATURE TYPES				
AIS	Shown	Shown	Shown	Consider showing if significant
Pilot pick up point	Shown and named	Shown and named	Shown and named if significant	Consider showing if significant
Radio Reporting	Shown and named	Shown and named	Shown and named if significant	Consider showing if significant
Anchorage Area (No anchorage areas)	Shown and named	Shown and named	Shown and named if significant	Consider showing if significant
Port Limits/ Pilotage area	Shown	Shown	Shown if significant	Consider showing if significant
TSS/ ATBAs/ Rec Routes	Shown	Shown	Shown	Consider showing if significant
Precautionary Areas	Shown	Shown	Shown	Consider showing if significant
EXTRACTION AREAS	Shown	Not shown ?	Not shown	Not shown
Firing Practice Areas	Shown and named	Shown	Shown if significant	Not shown
Tidal Diamonds/ Tidal stream	Shown	Shown	Limited number shown	Limited number shown