HYDROGRAPHY AND METOC BRANCH
MANAGEMENT SYSTEM DOCUMENT

AHO

CHARTING SPECIFICATIONS

(Based on: Chart Specifications of the IHO (S-4), Part B – Medium and Large Scale Charts

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This document must only be used with Edition 4.8.0 of S-4, Part B

Document History

The version status of this document is the same for all pages				
Version	Paragraph Reference	DESCRIPTION OF CHANGE	Date	Authorised
Version 20		**All changes to previous versions incorporated**	**09 May 19**	**DNCP**
	All	Amend AHP20's name from 'Seafarers Handbook' to 'Mariners Handbook'.		DDCQS
	B-125.2, B-450.5	New entry to formalise guidance on how to deal with beacons and buoys clashing against critical soundings (ENC and paper).		DDCQS
	B-128	Amend requirements for a chart to be considered a New Chart or a New edition. Remove reference to 'fully recompiled' charts.		DDCQS
	B-144	First paragraph. Remove contradictory statement regarding the use of blue colour for depth contours.		DDCQS
	B-214	New guidance on when is required to amend corner coordinates of existing paper charts to minutes and decimals of a minute.		DDCQS
	B-241	Review wording regarding guidance for spacing between text lines in a multi-line chart title.		DDCQS
	B-241.1	Section extended to refer to all national crests (AHO, PNG and SI) and not just to the Australian one. For details on sizes and layout a reference to the APCTS has been added.		DDCQS
	B-241.2(I)	Amend section to refer to the new IHO logo introduced by IHO CL 24/2019. For details on sizes and layout a reference to the APCTS has been added.		DDCQS
	B-241.3	Additional guidance on how to construct Papua New Guinea's title on paper charts.		DDCQS
	B-251	Additional guidance on the numbering system in use for Aus, PNG and SI paper charts.		DDCQS
	B-252.2	New Editions – New entry to clarify that, once Edition date is added below Edition number, the 'combined' text block must be re-centred.		DDCQS
	B-254.2	Amend examples given for ENC numbers and chart note references labels to be non-Italics. New guidance making the depiction of larger scale ENC data limits using a solid magenta line optional.		DDCQS
	B-254.2; B-293.6 and B-297.4	Clarify larger scale ENC limits must be omitted from ZOC Diagrams. ZOC limits must be shown instead.		DDCQS
	B-410, B-422	New guidance on the compilation of DEPCNT and SOUNDGs in areas covered by WRECKS objects		DDCQS
	B-415.3	New section to provide guidance on the depiction of Under Keel Clearance (UKC) systems on charts (ENC and paper).		DDCQS
	B-421.1	Delete first paragraph. For guidance refer to S-4. New guidance on the use of the new symbol for land area points (small circle of coastline thickness filled with land tint).		DDCQS
	B-421.2, 421.3 and 421.4	Amend instructions regarding the depiction of underwater rocks on paper charts as per EI 02_2019.		DDCQS
	B-431.1	Include reference to INT1 symbology and S-57 Object and attribute combinations.		DDCQS
	B-437.6	Amended scale at which the GBR, TS and Coral Sea PSSAs are to be shown. From 1: 1 500 000 and larger to 1: 1 500 000 only.		DDCQS
	B-439.5	Additional guidance on the depiction of DSA limits when coincident with GBRMP.		DDCQS
	B-449.5	Information about Historic wrecks moved to section B-422 to align with S-4. New guidance on the depiction of the 'protected zone' limit when it clashes the wreck symbol.		DDCQS
	B-462.8	New guidance on how to depict floating lights (on rafts).		DDCQS
	B-470.5	Deleted paragraph about the depiction of lights on daymarks as content was conflicting with guidance in section 455.9. Readers are now pointed to this section instead.		DDCQS
	B-475.7	Add additional guidance on the depiction of light characteristics corresponding to complex directional lights on paper charts when they do not fit any of the previous examples.		DDCQS
Version 21		**New version to incorporate above amendments.**	**16 Jan 20**	**DDCQS**

PURPOSE

This document details the Australian methodology for use of the Chart Specifications of the IHO (S-4), Part B – Chart Specifications of the IHO – Medium and Large-Scale National and International (INT) Charts, and shall be adhered to when compiling nautical charts by, or for, the Australian Hydrographic Office, regardless of the format that the chart is in. This document adds clarification to and amplifies information contained in S-4, Part B.

SCOPE

This document is to be used in conjunction with the Chart Specifications of the IHO (S-4), Part B – Medium and Large-Scale National and International (INT) Charts. It contains additional guidance to the IHO standard to provide clarity where necessary, and where an IHO specification may not be mandatory. Where this document contains no additional guidance beyond that contained in the parent IHO publication, the IHO publication is to be used without modification.

MAINTENANCE AND RESPONSIBILITIES

Periodic updates will be made following approval via the AHO Charting Technical WG and will be added to the Document History pages at the front of this document. Errors and corrections are to be brought to the attention of the Deputy Director Charting Quality Assurance, Standards and Specifications (DDCQS).

This document shall adhere to maintenance procedures applicable to all documents within the AHO Quality Management System.

Major amendments and/or clarifications shall be submitted to a CTWG for discussion and approval. Once approved, the changes must be applied to the DRMS by DDCQS. When changes are of such limited impact as to warrant lesser consultation DDCQS shall amend this document and record the change in the 'Document History' table without the need for a CTWG meeting.

When the extent of the changes approved by the CTWG requires immediate communication to CPM staff, this must be done by means of an "Encoding Instruction" (EI). It is expected that a new version of the ACS would be published twice a year and that any existing EI will be included into the main document at that stage. The resulting new version of this document shall then be jointly approved by DDCQS and DNCP, then by the Quality System Manager or delegate

.

Within the draft of future (unpublished) versions of this document in the DRMS, all changes shall be entered via 'track changes', with the changes only accepted following referral to the Charting Technical WG. Once agreed, the individual changes shall be accepted, text turned to black, and then a new version of the document published.

New editions of the official Chart Specifications of the IHO (S-4), Part B – Medium and Large-Scale National and International (INT) Charts, may be produced as deemed necessary by the Nautical Cartography Working Group (NCWG). A revision of the AHO Charting Specifications will be done on release of all revised versions of S-4.

AHO Chart Specifications

referenced to S-4 Part B, Section

100

General

Table of Contents

B-100 Chart Specifications of the IHO for Medium and Large Scale National and International (INT) Charts

B-100.1 S-4 Part B provides

B-100.2 When S-4 was originally prepared

B-100.3 The role of S-4 Part B is therefore twofold

The AHO specifications are more than “specific guidance” and are the specifications to be adopted and used. Choices (defined as “should” or “may” in the IHO S-4 Part B – see B-120.4) will be removed whenever practical.

B-100.4 The primary purpose of nautical charts

B-100.5 Compilation procedure: largest scale first

When charting a particular geographic area, the largest scale Chart required in the area should be compiled first, then compilation should proceed through the scales to the smallest scale. This is to ensure consistency between Charts covering the same area, and provide consistency and economy in Notices to Mariners.

Where it is not possible to compile the largest scale first (e.g. where a New Edition of a Chart being converted to modern units and datums is required urgently and the larger scale Chart is not), the larger scale Chart must be compiled at the first possible opportunity. This circumstance must be avoided wherever possible, and the planning of Chart Production Programs must take this into account.

B-101 Specifications: Origin and Principles

B-101.1 The working procedure

B-101.2 Basic compilation principles

B-101.3 A general review

B-102 Purpose of the Specifications

B-102.1 Standardisation

B-102.2 Complete standardisation

B-103 Scope of the Specifications

B-103.1 Scale of Charts covered by the Specifications

B-103.2 General content of Charts

B-103.3 Detailed content of charts

B-103.4 Digital Charts

B-103.5 Charts for small craft

B-110 Standardisation Levels

Text, line and symbol specifications for Australian Nautical Charts have been published and are contained in Annexes or as separate documents. These specifications must be read in conjunction with those documents, which provide specifications such as:

- Text font, style, colour, size, spacing and justification;
- Line colour, line weight, tint strength, dash length, gap length, tick length and symbol spacing;
- Symbol colour, size and format.

B-110.1 Standardisation of certain fundamentals

B-110.2 Standardisation of Chart scales and limits of International Charts

B-110.3 Standardisation of chart sizes and formats

B-110.4 Standardisation of symbols and abbreviations

The guidance document to be used for symbols and abbreviations on Australian Nautical Charts is the official International Hydrographic Organization's (IHO's) English version of INT1 – Symbols, Abbreviations and Terms Used on Charts. The latest Edition of this document was published by the Bundesamt fur Seechiffahrt und Hydrographie (BSH – German Hydrographic Office) in 2015. This document is used as the basis for the Specifications listed in B-110 above.

Where a symbol, term or abbreviation to be used on Australian Nautical Charts does not appear in INT1, it must be defined within the Mariners Handbook for Australian Waters (AHP20) and referred to the IHO/NCWG for endorsement as an approved national symbol.

Punctuation, symbols and embedded blanks must not be used in abbreviations (e.g. Pty Ltd) or acronyms (e.g. NSW) shown on Australian Nautical Charts. Full stops are used with abbreviations and acronyms only when showing the initials of a person's name or when the abbreviation or acronym occurs at the end of a sentence.

B-110.5 Standardisation of geographic names

All geographic names shown on Australian Nautical Charts must be sourced from the Maritime Gazetteer of Australia (MGA), which is administered by the MIS Section. Any new names derived from other sources must be referred to the MIS Section for approval and possible addition to the MGA.

B-120 Terms and Conventions Used in the Specifications

B-120.1 Conventions

B-120.2 Punctuation

B-120.3 Terminology

Within the Australian Paper Chart Specifications, the following additional terms apply:

- The first issue of a Chart is referred to as a New Chart or the First Edition.
- Subsequent issues of a Chart are referred to as New Editions. Alternatively, the “first” New Edition may be termed the Second Edition, the “second” New Edition the Third Edition, etc.

B-120.4 Strength of wording

B-120.5 Cross references

B-120.6 Obsolete or obsolescent symbols

B-121 Translation Terms

B-122 International Abbreviations

B-122.1 International Abbreviations (table)

For Australian nautical Charts, the abbreviation “bldg” (for building), as listed in UK Publication NP5011, is to be considered an approved abbreviation.

B-123 Terms for Colours

B-123.1 Tint

On Australian nautical charts, the concept of ‘Tint’ referring to a ‘stippled’ colour is no longer applicable as all the Australian charts are now printed from a digital file using plotters (POD) and therefore ‘Solid’ colours are used in all instances.

‘Transparency’ is now associated to the Grey colour used for the depiction of Fairways.

B-124 Specifications for International Charts

B-125 Depiction of Symbols

B-125.1 Symbol sizes

Symbol sizes on Australian Nautical Charts must not be changed from those specified, except in exceptional circumstances. Any variation from specified symbol sizes must be approved by DDCPM and DDCQS.

B-125.2 Displacement of symbols

For beacons and buoys clashing with critical soundings, wrecks, underwater rocks or obstructions of type point refer to B-450.5.

B-125.3 Position of symbols

B-126 Terms for Chart Scales

B-127 Line Weights and Dashed Lines

Refer to AHO Line Feature Specification for line weights and pattern dimensions used on Australian paper Charts.

B-128 Terms Used when Issuing Charts

The following terms must be used when referring to the issue of Australian paper Charts:

a) New Chart (NC)

The first publication of a national paper Chart, which will either:

- Embrace an area not previously charted to the scale shown; and/or
- Embrace an area different from any existing published Chart*; and/or
- Consist of the adoption of an international or national Chart, first published by another nation.

* A different area is defined as any change to the limit of Chart coverage by more than approximately 25%. This does not include the addition or amendment of Plans within a main Chart or a set of Plans but does include the amendment of the extent of Chart Inset(s).

Note: New Charts must always be published using a new Chart number.

b) New Edition and/or Large Correction (NE, LC)

A new issue of an existing paper Chart, containing amendments essential to navigation. It may include changes additional to those previously promulgated in Notices to Mariners, making existing editions obsolete.

Changes to one or more of the following chart construction parameters must be issued as a New Edition:

- Change in Chart Vertical Datum reference; and/or
- Change in Chart Horizontal Datum reference; and/or
- Change in Chart Scaling Latitude; and/or
- Change in Chart Units of Measure.

The decision as to whether a new issue of a Chart is a New Chart or New Edition must be made at the Chart Review.

Note: For New Editions, the Chart number must remain unchanged.

c) Reprint

A new print of the current edition of a paper Chart incorporating no amendments of navigational significance other than those previously promulgated in Notices to Mariners (if any). It may also contain amendments from other sources provided they are not significant to navigation. Previous printings of the current edition of the Chart always remain in force.

d) Block Correction

A small auxiliary paper Chart giving new details of a particular area within a published paper Chart, to be pasted on the Chart by the user. Block Corrections are included in Notices to Mariners and are restricted in paper size to A4.

e) Inset

A continuation (at scale) of a paper Chart, shown on the same Chart (e.g Aus 181).

f) Plan

A larger scale section(s) of a paper Chart, shown on the same Chart or in a sheet of Plans.

g) Sheet of Plans

A set of Plans, corresponding to a diverse range of geographic areas, represented on a single paper sheet (sheet of Plans). A sheet of Plans is characterised as a paper Chart having no "main" chart corresponding to the quoted dimensions of the Chart (see B-212.2). The exception to this rule is when one of the Plans completely covers the geographic extents of all other Plans (e.g. Aus 4).

B-130 Units

The length of a Nautical Mile varies with latitude. If it is required to convert a distance expressed in Nautical Miles to metres, the following table must be used:

LENGTH OF NAUTICAL MILES IN METRES (WGS84 SPHEROID)	
Latitude	**Length (metres)**
0°	**1842.9**
10°	**1843.5**
20°	**1845.1**
30°	**1847.5**
40°	**1850.6**
50°	**1853.8**
60°	**1856.9**
70°	**1859.4**
80°	**1861.0**
90°	**1861.6**

Table 100.1: Length of a Nautical Mile in metres at varying latitudes on the WGS84 spheroid

For nautical charting purposes, it is considered sufficient to interpolate the table values above to the nearest 5º of latitude where required. Although the length values will change slightly for different spheroids, the difference is not considered significant for charting purposes.

The standard units for **depths** and **heights** for all New Charts must be metres (m) and decimetres (dm). Where **height** units are quoted as floating point numeric values the decimal part of the value must be separated from the integer part by a decimal point rather than a full stop or comma. Trailing zeros (i.e. ·0) must not be shown. N.B.: This does not include soundings.

The standard units for **geographical positions** should be degrees and minutes or degrees, minutes and decimals of a minute. Degrees, minutes and seconds may be used if appropriate.

The standard units for all **bearings**, with the exception of magnetic variation, must be degrees and decimals of a degree to one decimal place. For magnetic variation degrees and minutes must be used.

For any other instance of a floating point numeric value on a Chart (e.g. Chart dimensions, light periods) the decimal part of the value must be separated from the integer part by a decimal point rather than a full stop or comma.

B-131 Geographical Positions

B-131.1 The four cardinal points

B-132 Bearings: Conventions

In accordance with general navigational practice and to standardise the display of bearings between paper charts and ECDIS, the true north on Australian charts must be charted as 000°. Bearings may be quoted and charted to tenths of a degree e.g. 096·4° (note that a decimal point must be used in lieu of a full stop or comma), but must not be quoted to more than one decimal place of a degree (see B-433.2 and B-434.2 for additional guidance).

B-132.1 Bearings from seaward

B-132.2 Bearings from charted marks

B-132.3 Reciprocal Bearings

B-133 Text Styles (Fonts)

Refer to SPEC_05_55_AA230048_Paper_Chart_Text_Conventions.

B-140 Use of Colour

The AHO uses the following colours for paper charts:

- Black;
- Magenta;
- Light Magenta;
- Buff;
- Blue (also referred as 'Dark Blue");
- Light Blue;
- 'Depth contour' Blue;
- Green;
- Light Green;
- Intertidal Green;
- 'Fairway' Grey;

Additional colours may be used for specific purpose products such as military Charts.
For depiction of colour under ZOC Diagrams and associated ZOC Category Table, see B-297.

No colour

Areas of deep water (see B-411), unsurveyed areas (see B-418) and areas under ZOC diagrams (see B-297) must have no tint. On older Charts, areas that cannot be navigated into using that Chart may be shown with no data and therefore no tint. However for New Editions and New Charts, such areas must have full hydrographic detail shown where available.

B-141 Black

Where linework is depicted on the paper Chart in black, it must be masked for black, magenta or green symbols. (see diagram B-141a).

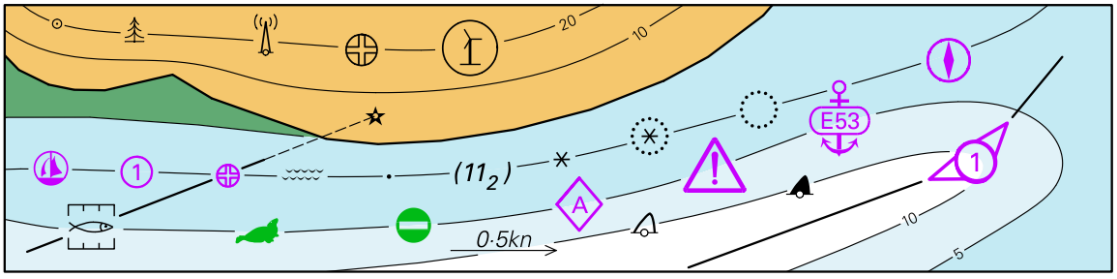


Diagram B-141a

Exceptions apply to:

- Light flares, INT1 – P1. (see diagram B-141b)
- Magenta circles surrounding Radio, Radar and Navigation System symbols, INT1 – Section S, the magenta circle is considered to be a line. (see diagram B-141c)
- Large compass rose ticks. (see diagram B-141d)
- Direction of buoyage indicators where the symbol is shown over navigable water, INT1 - Q130.3. (see diagram B-141e)
- Contours where they cross direction of traffic flow arrows, INT1 – M10, M11. (see diagram B-141f)

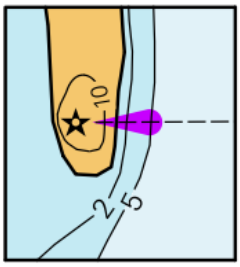


Diagram B-141b

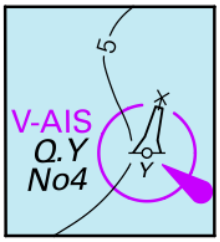


Diagram B-141c

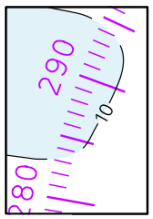


Diagram B-141d

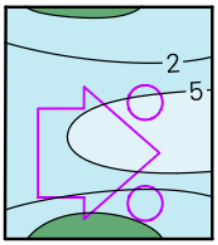


Diagram B-141e

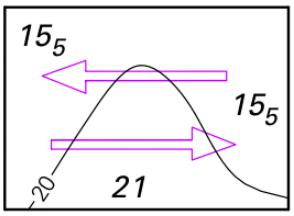


Diagram B-141f.1

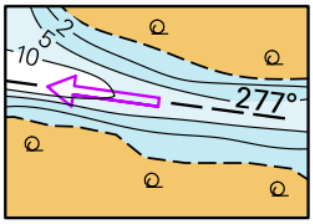


Diagram B-141f.2

B-142 Magenta

Where linework is depicted on the Chart in magenta, it must not obscure black linework (this may be a function of the colour draw order of the production system). Unless otherwise stated in the Specifications, the normal cartographic rules apply for the masking of magenta linework for charted symbols and text. Where linework is depicted on the paper Chart in magenta, it must be masked for black, magenta or green symbols, see paragraph B-141 for additional guidance including exceptions.

B-142.1 To draw attention to certain features having a significance extending beyond their immediate location

B-142.2 To distinguish information superimposed on the physical features

B-142.3 Magenta tint

On Australian nautical charts, Magenta tint refers to 'Light Magenta" solid colour. When this colour overlaps any other area colour the resulting 'Light Magenta' colour remains unchanged (no 'new colour' is generated).

B-142.4 The magenta layer on charts can become cluttered.

B-143 Buff (Yellow) or Grey

On Australian nautical Charts, land must be depicted in solid buff tint.

Note that some fleet Charts have land depicted in brown.

B-144 Blue

Blue indicates shoal water and submerged obstructions or wrecks, many of unknown depth. A solid blue tint and a light blue tint should be used for standard depth bands for series charting (see B-411.6). The ink coverage of the two blue tints is:

- Solid blue 100%
- Light blue 30% of solid blue colour.

Blue ribbon on paper Charts

On older paper Charts, a 2mm wide ribbon may exist on the solid dark blue repromat in lieu of the light blue tint.

Blue colour on Depth contours

On Australian nautical charts, a solid Blue colour (different to the one used for depth areas) can be used for depicting depth contours. This blue colour is referred to as 'Depth Contour Blue'.
Nautical charts in the INT series (=< 1500000) must show depth contours in black colour only.

New Editions

- When an existing paper Chart containing a blue ribbon is to be replaced by a New Edition, the ribbon should be replaced with the light blue tint covering the associated depth area between successive depth contour lines (see B-411.6). For example, where the ribbon exists on the shoal side of the 10m depth contour, the light blue tint, if shown, must cover the area between the 5m and 10m depth contours.
- Black depth contours are to be replaced with the "Depth contour Blue" colour in New Charts and New Editions fully derived from ENCs from 25th of August 2017. Other New Editions derived from existing raster bases will still be published with black contours until its bathymetry is fully recompiled from source adopting the 'ENC first' approach.

Maintenance

When a paper Chart containing a blue ribbon or black depth contours is to be reprinted, the ribbon/black contour must be retained.

When a paper Chart containing a blue ribbon or black depth contours is to be corrected for NtM action (including a Block correction), the ribbon/black contour must be retained and updated to be consistent with the depiction on the rest of the Chart.

B-145 Green

Green symbology is used to represent environmentally sensitive area symbology such as Marine Reserves, Environmentally Sensitive Sea Areas (ESSAs) and Particularly Sensitive Sea Areas (PSSAs) (see B-437.3, B-437.4 and B-437.6).
Where linework is depicted on the paper Chart in green, it must be masked for black, magenta or green symbols, see paragraph B-141 for additional guidance including exceptions.

Light Green

On Australian nautical charts, the 'Light Green' solid colour is used to depict the green band associated with environmentally sensitive areas (e.g: ESSA, PSSA).
When this colour overlaps any other area colour the resulting 'Light Green' colour remains unchanged (no 'new colour' is generated).

Intertidal Green

On Australian nautical charts, the colour of intertidal areas is not derived by combining the solid blue and buff tints.
A specific solid green colour ("Intertidal Green') is used to represent intertidal areas.

Fairway Grey

On Australian nautical charts, a specific solid grey colour ('Fairway Grey') is used to represent Fairway area features (see B-434.5).

This colour has the highest priority against other area colours and it is assigned a transparency level so it is blended with the colours that are drawn underneath. As a consequence when 'Fairway Grey' overlaps other area colours the resulting colour on the chart is a combination of the overlapping colours.

B-146 Cautionary Notes – Colour

B-147 Colour Printing

B-150 Associated Publications

B-151 INT1 – Symbols, Abbreviations, Terms Used on Charts

B-151.1 Chart INT1

The guidance document to be used for symbols and abbreviations on Australian Nautical Charts is the official International Hydrographic Organization's (IHO's) English version of INT1 – Symbols, Abbreviations and Terms Used on Charts published by the Bundesamt fur Seechiffahrt und Hydrographie (BSH – German Hydrographic Office). This document has been used as the basis for the Specifications listed in B-110.

Where a symbol, term or abbreviation to be used on Australian Nautical Charts does not appear in INT1, it must be defined within the Australian publication AHP20 – Mariners Handbook for Australian Waters, and referred to the IHO for endorsement as an approved national symbol.

B-151.2 "Retired" INT1 Numbers

B-152 INT 2 – Borders, Graduation, Grids and Linear Scales

See B-212, B-213, B-214, B-215, B-220.

B-153 INT 3 – Use of Symbols and Abbreviations

B-160 Updating System for the Specifications

The AHO Charting Specifications must be amended from time to time in response to the developing requirements on nautical charting, including changing navigational procedures and developments in cartographic techniques. These changes may result from amendments to S-4 as developed by the IHO Nautical Cartography Working Group (NCWG) or amendments as approved by the AHO Charting Technical Working Group (CTWG). Corrections to the Specifications must be made in accordance with AHO Quality Management System (QMS) policy. See also the 'Maintenance and Responsibilities' section at the beginning of this document.

B-170 Not currently used

B-180 Catalogues; Index Charts

B-180.1 Catalogue

B-180.2 Index charts

B-180.3 Mariners Routeing Guides

AHO Chart Specifications

referenced to S-4 Part B, Section

200

Chart Framework

(Formats, Positions, Compass Roses, Source Diagrams)

Table of Contents

B-201 Ellipsoid (Spheroid) of Reference and Horizontal Datum

B-201.1

B-201.2 World Geodetic system (1984) (WGS84)

All New Charts must be referenced to WGS84. New Editions may be produced on their existing published datum or on WGS84.

B-201.3 Regional datums or local datums

B-201.4 IHO Publication S-60 'User's Handbook of Datum Transformations Involving WGS84'

B-202 Indication on Charts of relationship of horizontal datum to world-wide and other datums

B-202.1 All Charts at scales larger than 1:500 000

B-202.2 Appropriate transformation notes

B-202.3 The following standardised wording

Charts on WGS Datum

For **Charts at scales 1:1 500 000 and larger**, constructed on WGS Datum, the positions construction note in the Chart title panel must read:

> **Positions** are related to the World Geodetic System 1984 Datum; (see SATELLITE DERIVED POSITIONS Note).

The Satellite Derived Positions Chart note must read:

> **SATELLITE DERIVED POSITIONS**
>
> Positions obtained from the Global Positioning System (GPS) in the WGS 1984 Datum can be plotted directly onto this chart.

Refer to B-255.3 for associated marginalia note details.

Charts not on WGS Datum – shift values known

For **Charts at scales 1:1 500 000 and larger**, that are not constructed on the WGS Datum, but the shift values between WGS84 and the Chart datum are known and can be plotted, the positions construction note in the Chart title panel must read:

> **Positions** are related to the xxxx Datum; (see SATELLITE DERIVED POSITIONS Note).

The Satellite Derived Positions Chart note must read:

> **SATELLITE DERIVED POSITIONS**
>
> Positions obtained from the Global Positioning System (GPS) in the WGS 1984 Datum must be moved 0·XX minutes NORTHWARD/SOUTHWARD and 0·XX minutes EASTWARD/WESTWARD to agree with this chart.

Refer to B-255.3 for associated marginalia note details.

Charts not on WGS Datum – shift values not known

For **Charts at scales 1:1 500 000 and larger**, that are not constructed on the WGS Datum, and where the shift values between WGS84 and the Chart datum are not known, the positions construction note located in the Chart title panel must read:

> **Positions** are related to the xxxx Datum; (see SATELLITE DERIVED POSITIONS Note).

The Satellite Derived Positions chart note must read:

SATELLITE DERIVED POSITIONS

Positions obtained from the Global Positioning System (GPS) in the WGS 1984 Datum cannot be plotted directly onto this chart. The difference between GPS positions and positions on this chart cannot be determined; mariners are warned that these differences MAY BE SIGNIFICANT TO NAVIGATION and are therefore advised to use alternative sources of positional information, particularly when closing the shore or navigating in the vicinity of dangers.

Refer to B-255.3 for associated marginalia note details.

Charts compiled at scales **smaller than 1:1 500 000** must not have these notes applied.

B-202.4 Chart Accuracy

B-203 Projections

For the statement of the name of the projection that appears on the paper Chart, see B-241.9.

The following projections must be used for all standard paper Nautical Charts:

B-203.1 Charts, Insets and Plans of scale 1:50 000 and larger

Paper Charts at a scale 1:50 000 and larger must use the Universal Transverse Mercator (UTM) projection. The central meridian should be referenced from the Map Grid of Australia 1994 (MGA94) and must be determined as the Zone that covers the majority of the Chart extent.

B-203.2 Charts, Insets and Plans of scale smaller than 1:50 000

Paper Charts at a scale smaller than 1:50 000 that do not extend beyond latitude 80° S must use the Mercator projection (mid-latitude specified). The mid-latitude should comply with the standard for the relevant Chart series or should be determined according to geographic coverage for non-series charting. Standard reference latitudes for Charts published by the AHO are shown in the following table:

Charting Scheme Numbers	Scale	Geographic Location	Latitude of Reference
1 - 299	75000 - 100000	Large scale charts (and plans) for Australia.	Referenced to the nearest graduated middle latitude of the area covered by the chart(s) (or plan).
300 - 377	300000	Australian series	27º 15'S
378 - 399	300000	Papua New Guinea series	8º 30'S
400 - 409	1000000	Australian Antarctic Territory	68ºS
410 - 429	1000000	Australian Continent	27º 15'S
430 - 434	1000000	Papua New Guinea	8º 30'S
441 - 459	500000 -1000000		68ºS
460 - 499	500000	Supplementary Charts to the Australian series	Referenced to the nearest graduated middle latitude of the area covered by the chart(s).
500 - 558	150000	Papua New Guinea	8º 30'S
600 - 619		Large scale charts, off-lying territories, reefs in the Coral Sea	Referenced to the nearest graduated middle latitude of the area covered by the chart (or plan).

Charting Scheme Numbers	Scale	Geographic Location	Latitude of Reference
620 - 699		Large scale charts of Papua New Guinea	Referenced to the nearest graduated middle latitude of the area covered by the chart (or plan).
700 - 842	150000	Australian Series	27º 15'S
	3500000	International Series	22º 30' S
	1500000	International Series	23º 00' S
	10000000	International Series	At the Equator
SLB 100 - 299	75000 - 100000	Large scale charts (and plans) of the Solomon Islands	Referenced to the nearest graduated middle latitude of the area covered by the chart(s).
SLB 300 - 400	300000	Solomon Islands series	8º 30' S

B-210 Chart construction

INT specifications must be used except where defined in the following sections.

B-211 Scale

On paper Charts constructed on the **Mercator** projection, the latitude of reference must be specified (refer to Table 200.1 in B-203.2).

B-212 Graduation

B-212.1 The pattern of graduation

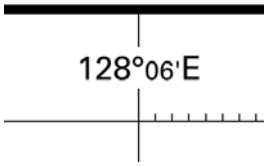
Patterns of graduation that must be used for paper Charts are defined in the following table:

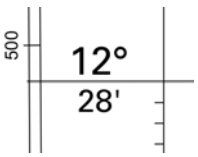
INT2 Style	Limiting Scale		Border ticks' styles and placement			
	Largest	Smallest	Picture frame	Extended	Full	Half (smallest sub-division)
E	-	25000	1'	0.5'	0.1'	0.01'
E	25001	50000	1'	0.5'	0.1'	0.02'
F	50001	100000	1°	5'	0.5'	0.1'
G	100001	200000	1°	5'	1'	0.2'
H	200001	499999	1°	5'	1'	0.5'
J	500000	1499999	1°	10'	5'	1'
K	1500000	2250000	1°	30'	10'	2'
L	2250001	4750000	1°	-	30'	5'
M	10000000 (0º)		5°	-	1°	10'

Border ticks:

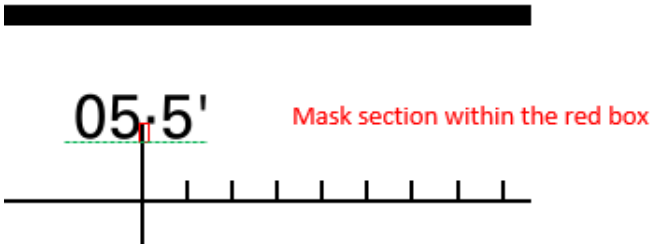
Picture frame tick
Full tick
Extended tick
Half tick (smallest sub-division)

Longitude 'Picture frame' ticks must be gapped for graduation labels (see image below). Latitude 'Picture frame' ticks are not to be masked by graduation labels (labels sit above and below the line).





When a half-minute graduation label is required in a Plan, it will usually clash against the border tick. In this scenario, the corresponding 'Extended' tick must be masked (its top end must stop at the base of the label). The label must not be moved to clear the border tick. See image below:



The guidance regarding border ticks applies, from May 2019, to all:

- New Charts
- New Editions where it is required to generate a new border:
  Note: For a sheet of plans it is expected that all plan borders are consistent in style. If the number of plans having their borders updated is equal to or greater than half the total number of Plans in the chart, all the other plans must also have their borders amended.

B-212.2 The neatlines of Charts

The neatline is the inner border that bounds the paper Chart, Plan or Inset coverage. For a main Chart or sheet of Plans, it is calculated by relating the required Chart/Plan coverage to the standard Chart neatline dimensions. AHO policy is to determine neatline dimensions using the standard dimensions, stated below, as a guide and adjusting the dimensions to locate the neatline to a value corresponding to the smallest subdivision of the Chart, Plan or Inset border type (see Table 200.2). As a result, the neatline will correspond exactly with the quoted corner co-ordinates for the Chart, Plan or Inset (see B-214). Charts having title panels outside their borders (e.g. a sheet of Plans) should have the relevant neatline dimension 25mm shorter than standard, to accommodate the Chart title panel.

Standard paper Chart Neatline Dimensions:

- Half Chart: 653.34 x 483.32mm.
- Single Fold: 1033·32 x 653·34mm.
- Double Fold: Maximum in exceptional circumstances: 1117·6 x 653·34mm.

On commencement of the compilation of a New Chart, the compiler will normally be supplied with approximate neatline values for the Chart, and any Plans or Insets that will appear on the Chart (or all Plans in a sheet of Plans) as a component of the Chart Work Order. For a New Edition, the compiler should be able to obtain the existing Chart, Plan and/or Inset neatline values from the Chart file (note that compilers must not rely solely on the quoted corner co-ordinates on the Chart, as these may be rounded values). For New Editions where the neatline values of the Chart and all Plans and Insets conforms to current AHO policy as described in this specification, there is no requirement to adjust the existing Chart neatline(s). For New Charts or New Editions where adjustment of the neatline(s) is required, there will normally be one corner (typically the south-west corner), identified in the Chart Work Order or existing Chart file, that has co-ordinate values corresponding to an exact Chart/Plan/Inset border sub-division. For the purpose of these Specifications, this corner is known as the "corner of origin". If this is not the case, the compiler should consult their supervisor to determine the corner of origin. To determine the corner co-ordinate for the diagonally opposite corner and the final neatline dimensions, the compiler must perform the following steps:

- Run the “Chart D” program, using the appropriate Chart/Plan/Inset parameters as supplied in the Chart Work Order or existing Chart; the corner of origin; and the standard neatline dimensions quoted above (or supplied dimensions for Plans/Insets). The output will provide values for all corner co-ordinates.
- Adjust the neatlines for the corner diagonally opposite the corner of origin to equal the nearest value that correlates to the smallest Chart/Plan/Inset border subdivision (outwards or inwards) - Refer to table 200.2.
- Run the “Chart D” program again, using the adjusted corner co-ordinates, in order to calculate the revised dimensions for the Chart, Plan or Inset to be quoted in the Chart margin (see B-222.3 and B-222.4), or to assist in determining border dimensions for a sheet of Plans (see B-213). The final “Chart D” result(s) must be placed in the Chart file.

The final corner co-ordinates and neatline dimensions determined by the compiler must be approved at the Final Chart Review. Occasionally, during the compilation process, it may be required to make minor adjustment to the Chart/Plan/Inset limits to include important navigational features critical to the use of the Chart, e.g. a navigational aid used for navigating in a body of water for which the Chart is being produced to cover. Where this is required, the entire Chart/Plan/Inset must be shifted (i.e. the dimensions of the Chart/Plan/Inset should not change), but all neatlines must still correspond to a smallest border sub-division. For Australian Nautical Charts, border breaks (see B-212.11) should not be used.

For additional guidance relating to fitting Plans in a sheet of Plans, see B-213.

The above specification must be applied to all New Charts and New Editions commenced from 01 July 2009.

B-212.3 Minor subdivisions of border graduations

The minor subdivision on **Universal Transverse Mercator** paper Chart borders must be in hundredths of a minute. Minor subdivisions must fall to the east of each meridian and to the south of each parallel shown on the Chart. The subdivision interval varies for Charts of scale:

Larger than and including 1:25 000

Subdivisions must be shown at intervals of 0·01’.

Smaller than 1:25 000

Subdivisions should be shown at intervals of 0·02’.

Note: In higher latitudes, e.g. Tasmania, automatically generated minor subdivisions may be at 0·01’, resulting in the subdivisions along the southern border being closer together than 0·6mm, which contradicts INT2 guidelines. Where this occurs a 0·02’ subdivision interval must be used for the whole Chart.

B-212.4 Equal intervals

B-212.5 High latitudes

Refer to B-212.3 above for guidelines relating to minor subdivisions of Universal Transverse Mercator paper Chart borders in high latitudes.

B-212.6 Graduation numbering

On Australian paper Nautical Charts, graduation values can only be in Degrees, Minutes and decimal minutes (to one decimal place). Seconds must not be shown and trailing zero’s (i.e. 00’) must not be quoted after whole degree values.

A minimum of one degree graduation label should be shown in each border of a Chart or Plan. For all paper New Charts and New Editions commenced from March 2011, a degree graduation label must appear in each half of a folded Chart. For double fold Charts, it is not

required to place a degree graduation label in the smaller folded section of the Chart, unless the value corresponds to a whole degree.

Additional degree graduation labels may be required on the skewed sides of non-rectangular paper Charts or Plans.

Minute values lower than 10' must be expressed in the form 01', 02', 03' etc. unless space is limited, in which case the leading zero may be omitted.

If it is required to show graduation numbers at one tenth-minute intervals (·1 to ·9), values must be labelled in decimals of a minute (i.e. 12·5'). Where decimals of a minute are shown, and a whole minute value exists, the trailing zero (i.e. ·0) must not be shown (i.e. 30' instead of 30·0').

B-212.7 Hemisphere labelling

A single "E" and/or "W" longitude label should be shown only in the southern border of a paper Chart, Inset or Plan. The label is not required for a Plan contained on a Chart that covers (wholly or partially) the Plan area.

B-212.8 Supplementary (subsidiary) internal graduation

Supplementary internal graduation must not be used on Australian paper Nautical Charts.

B-212.9 Skewed charts

B-212.10 Insets

Refer to B-128 for definitions of paper Chart Plan and Inset.

Where an Inset is required for a paper Chart, sufficient overlap between the main Chart and the Inset must be included so as to allow the mariner to safely transfer their position from the main Chart to the Inset. The overlap should include at least one good fixing point. Overlaps should be of such extent as to allow adequate time to transfer the course and ship's position, but not be so large as to create a need to duplicate correction unnecessarily. They need to avoid cutting off visual marks or radiobeacons near the edges that might be used in position fixing.

B-212.11 Border breaks

Border breaks must only be used in exceptional circumstances. Care should be taken in the paper Chart planning process to ensure that all significant features required are incorporated inside the Chart neatline (see B-212.2).

B-213 Graticule

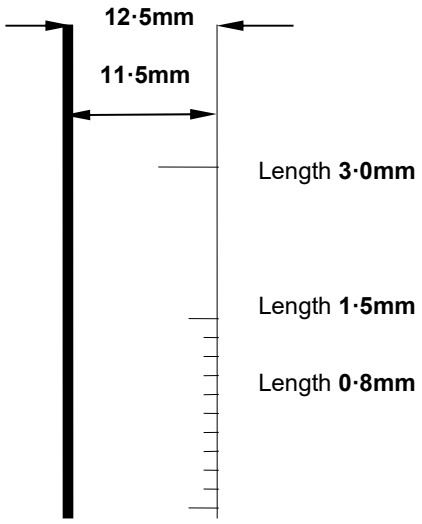
Border widths

Australia complies with IHO INT 2 'Borders, Graduation, Grids and Linear Scales' for Universal Transverse Mercator borders (INT 2 example A) and Mercator borders (INT 2 example B) where these projections are constructed for a main paper Chart. See Figure 200.1. The dimensions quoted are fixed and must not be adjusted from those shown below (i.e. the IHO INT 2 bracketed limits beyond which any deviation should not go do not apply for borders for a main Chart).

Where these projections are used for a paper Chart Plan (or Inset) on a main Chart, or for a sheet of Plans, the specific dimensions for border construction are shown at Figure 200.2 (based on INT 2 example C) and Figure 200.2 (based on INT 2 example D). In the Figures, the dimensions shown in brackets indicate the maximum and minimum dimensions that may be used for the Plan/Inset. The bold figures that are not in brackets indicate the default dimensions that apply where no adjustment is required and these dimensions must be used where possible. The following conventions apply when constructing borders for paper Chart Plans/Insets:

- For a Plan or Inset positioned within the neatline of a main Chart, the default dimensions should be used in all cases. The only exception to this rule is where there are two or more Plans within the main Chart that share an edge of an outer thick border that is intended to be the same length. A Plan or Inset positioned outside the neatline of a smaller scale Plan is considered to be a “sheet of Plans”.
- For Plans in a sheet of Plans, minor adjustments from the default, not exceeding the maximum allowable deviation indicated by the bracketed dimensions, may be applied to a Plan(s) in order to:
  - Ensure that all Plans have neatlines that correspond to exact values of the border minor sub-divisions, see B-212.2;
  - Ensure that all Plans fit correctly on the sheet, so that there are no “stepped” edges on the outermost outer thick border.
- When adjusting the neatline and border dimensions of Plans in a sheet of Plans to fit the sheet, it is recommended that adjustment of neatline dimensions be the preferred method of adjustment in accordance with B-212.2, and adjustment of border dimensions only be applied where necessary, i.e. border dimension adjustment should only be required for one or two Plans within the sheet of Plans in order for the resultant Chart to have no “stepped” edges on the outermost edge of the outer thick border.

Universal Transverse Mercator Border
INT 2 example: A



Mercator Border
INT 2 example: B

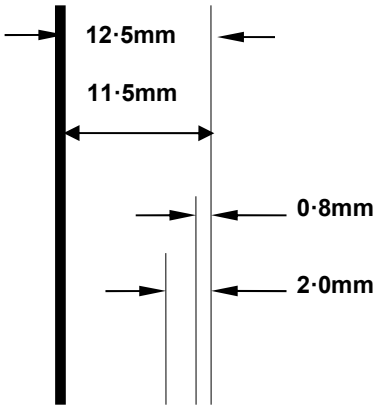


Figure 200.1: Standard Chart border widths

Sheet of Plans
INT 2 example: C

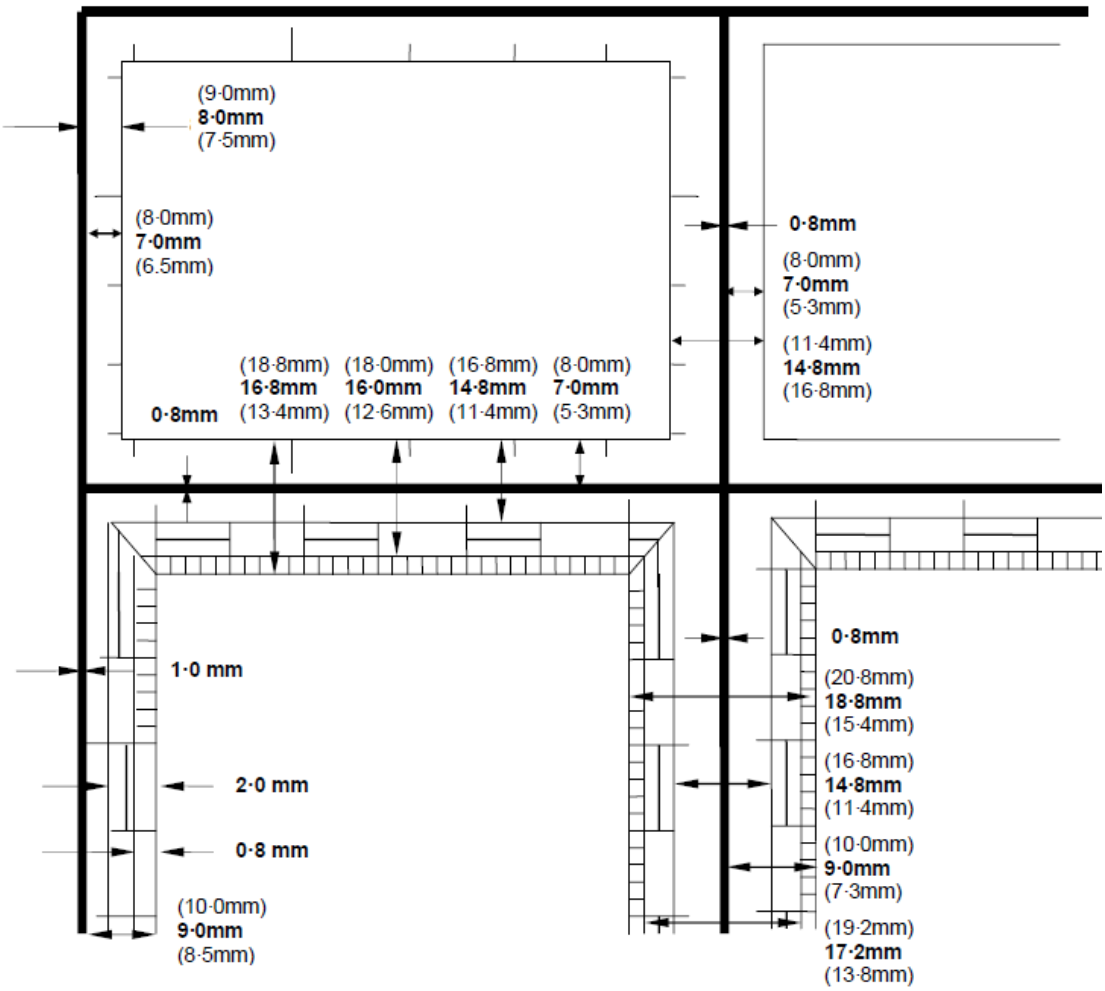


Figure 200.2: Set of Plans border widths

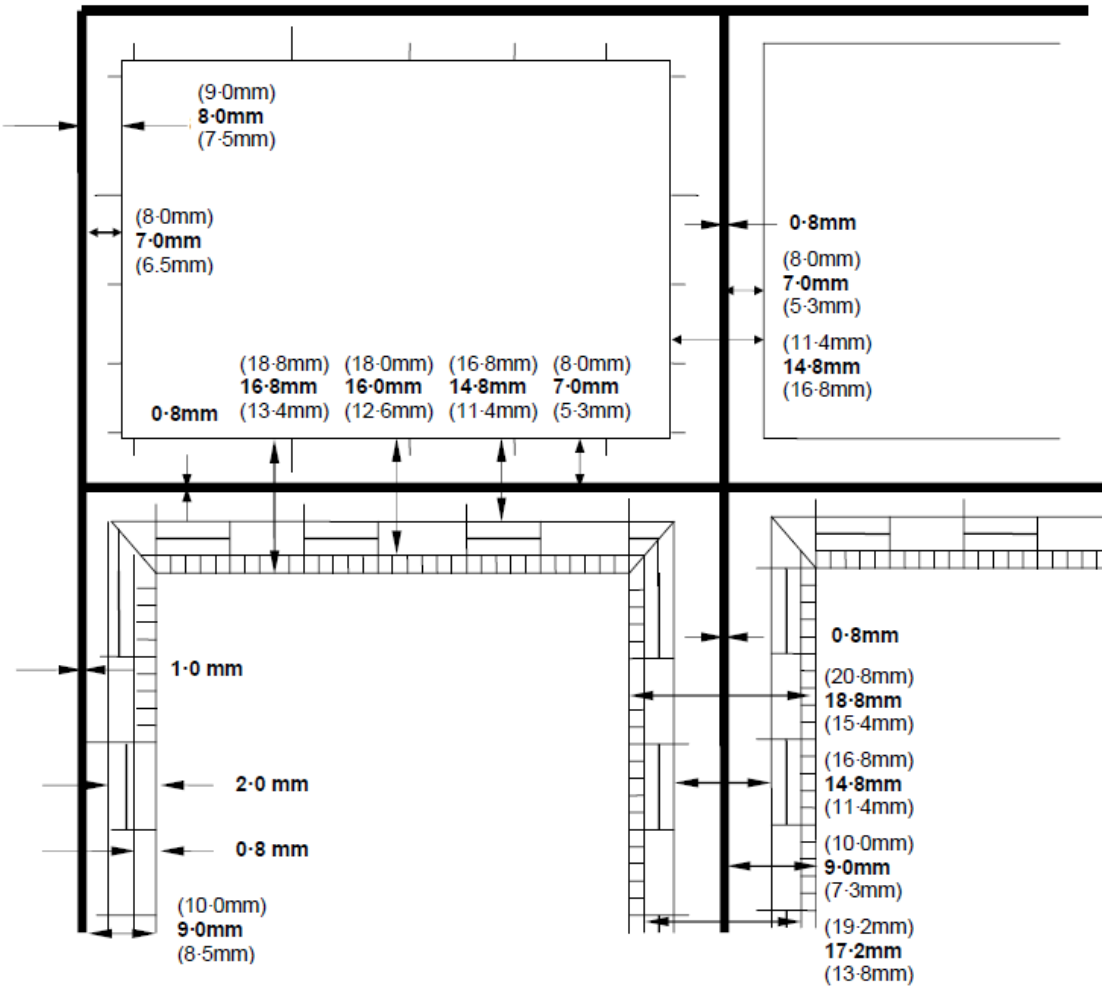
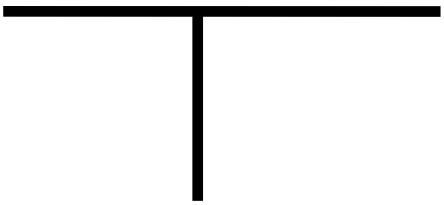

(9·0mm)
8·0mm
(7·5mm)
(8·0mm)
7·0mm
(6.5mm)
0·8mm
(18·8mm)
16·8mm
(13·4mm)
(18·0mm)
16·0mm
(12·6mm)
(16·8mm)
14·8mm
(11·4mm)
(8·0mm)
7·0mm
(5·3mm)
0·8mm
(8·0mm)
7·0mm
(5·3mm)
(11·4mm)
14·8mm
(16·8mm)
1·0 mm
2·0 mm
0·8 mm
(10·0mm)
9·0mm
(8·5mm)
0·8mm
(20·8mm)
18·8mm
(15·4mm)
(16·8mm)
14·8mm
(11·4mm)
(10·0mm)
9·0mm
(7·3mm)
(19·2mm)
17·2mm
(13·8mm)

Figure 200.2: Set of Plans border widths

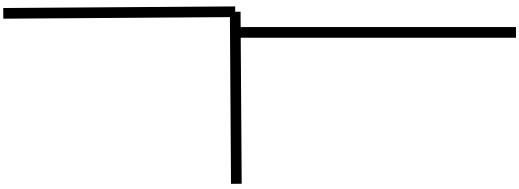
NOTE: When sheets of Plans are produced the outer thick border must be a straight line and not stepped around plans.

For example:

This:



Not this:



Inset Plan
INT 2 example: D

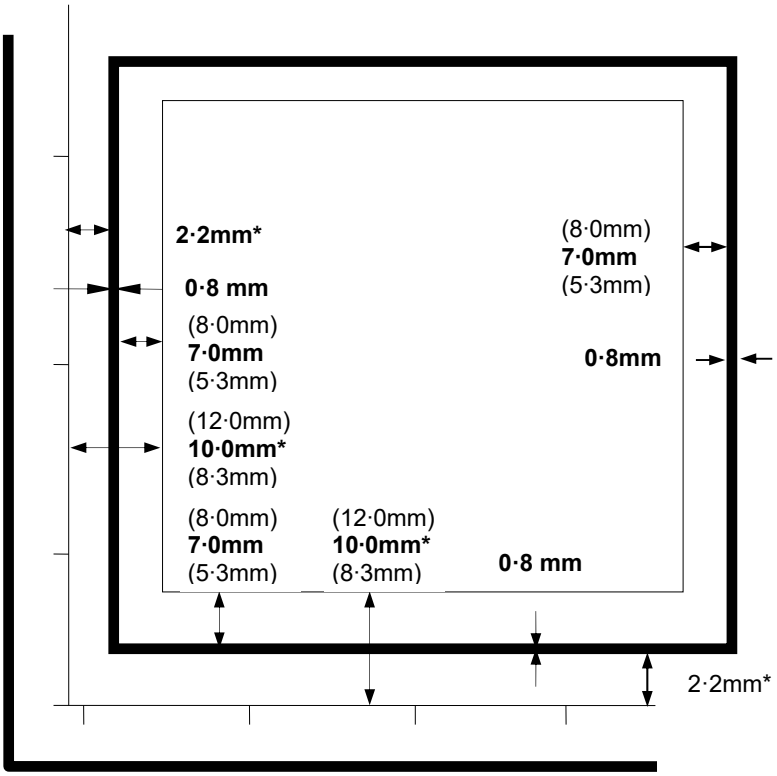


Figure 200.3: Plan within main Chart - border widths

* Where a Plan (or Inset) positioned within the neatline of a main Chart is located in a corner at which the main Chart corner co-ordinates are located (see clause B-214), the position of the Plan/Inset should be adjusted inward a further 1mm from the main Chart neatline (i.e. 3·2mm to the outer edge of the Plan/Inset outer thick border, and preferably 11·0mm from neatline to neatline).

B-213.1 Meridians and parallels

Longitude values must be centre justified to the graticule tick, and latititude values must be justified as in INT2. All graduation values must be centred between the neatline and the outer thick border.

B-213.2 Meridians and parallels

If the boundary of an administrative or restricted area (e.g. port limits, Designated Shipping Area (DSA)) is co-incident with a meridian or parallel, the symbology for the boundary must take precedence over the meridian or parallel. The boundary **must not** be offset on the paper Chart to clear the meridian or parallel.

B-213.3 On graduated Plans

B-213.4 On Charts with a non-rectangular graticule

B-214 Corner co-ordinates

Corner co-ordinates on paper Charts must be expressed in degrees, minutes and decimals of a minute (e.g. 31° 13·25'S). The quoted corner co-ordinates must agree precisely with the neatline limits of the Chart, Plan or Inset, which must be adjusted to conform to the smallest border sub-division (see B-212.2). Corner coordinates for existing Paper Charts must only be updated to minutes and decimals of a minute when the chart border is recalculated and regenerated in accordance with B-212.2 or all the existing corner coordinates correspond to

the smallest subdivision of the Chart. In all cases the corner co-ordinates must be quoted to two decimal places of a minute (e.g. 130º00·00'E; 28º38·02'S; 138º54·50'E), except for Charts at scale 1:1500000 and smaller, which must be quoted to 1 decimal place of a minute. All Chart and Plan panels must state corner co-ordinates inside the top right-hand corner and the bottom left-hand corner of the Chart neatline.

Corner co-ordinate values should be placed 2·5mm along the neatline from the corner, and positioned 1mm in from the neatline.

B-215 Rectangular grids

Universal Transverse Mercator grid ticks must not to be shown on Australian paper Nautical Charts.

Where existing paper Charts show Universal Transverse Mercator grid ticks, these must be removed through Revised Print Action when the Chart is to be reprinted, or when the Chart is being prepared as a New Edition.

Grids are still required on FLEET CHARTS and these will be covered under a separate Chart Specification/Appendix for Australian Fleet Charts.

B-215.1 If the primary grid is shown

B-215.2 If a secondary grid is shown

B-220 Linear Scales, Dimensions

B-221 Linear (Graphical) Scales

Linear scales must not be shown on Mercator paper Charts.

If a linear scale is required, it must be portrayed parallel to the southern neatline of the Chart or Plan, positioned clear of any navigationally significant detail or routes, and on land if possible.

B-221.1 Border scales

Border scales must be placed on all UTM paper Charts:

- Half Chart: One scale on both the east and west border.
- Single/double fold Charts: Scales must be positioned along both the east and west border. On portrait (north/south) Charts one scale must be positioned along the border on each side of the main fold and staggered so as to be placed diagonally opposite. Border scales must avoid any Chart "border breaks" (see B-212.11).
- Sheets of Plans (see B-128): Border scales must not be used on sheets of Plans as linear scales are required for each UTM Plan.

The graduation of border scales must comply with graduation requirements for linear scales on IHO INT 2 (Borders, Graduation, Grids and Linear Scales).

B-221.2 Additional linear scales

B-221.3 In high latitudes

B-222 Dimensions

In order to plan charted information to avoid paper Chart folds, compilers should be aware of the standard fold dimensions. Information of navigational importance i.e. compass roses, scale bars, Plans and titles (but see B-241 for titles for Charts comprising a sheet of Plans) should NOT be placed in areas where standard folds will occur.

The untrimmed paper size for Chart printing is 1220 x 760mm.

The trimmed sizes (also known as canvas sizes) for the Chart categories are:

- Half Chart: 550 x 730mm.
- Single Fold: 1100 x 730mm.
- Double Fold: 1190 x 730mm.

A **single fold** standard dimension is 550mm.

A **double fold** Chart requires the first fold to be placed at 550mm from the south limit on a portrait style Chart and 550mm from the west limit on a landscape style Chart leaving 90mm for the second fold in each case (refer to Figures 200.4 and 200.5). Note that the dimensions in the following figures are to trimmed paper (canvas) sizes and are in mm.

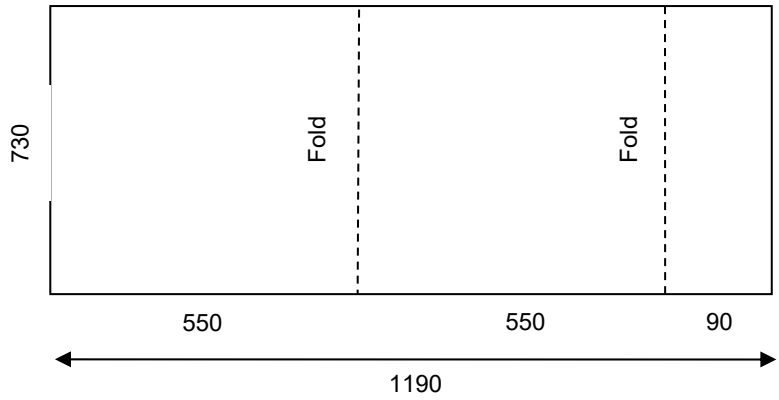


Figure 200.4: Double fold dimensions for a Landscape (E-W) chart

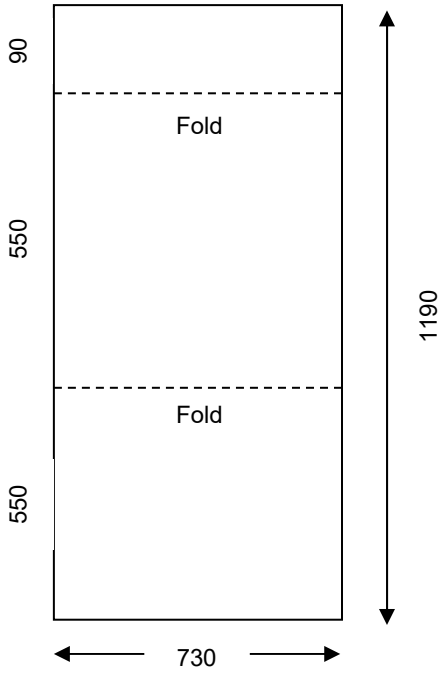


Figure 200.5: Double fold dimensions for a Portrait (N-S) chart

B-222.1 The neatline dimensions

See B-212.2.

B-222.2 Charts having titles outside their north border

B-222.3 The dimensions quoted

As Mercator paper Charts are rectangular, only one of each latitude and longitude dimension must be indicated. The east-west dimension must be quoted first (see Figure 200.6). Note that in Figures 200.6 and 200.7 below, the figures quoted are for a standard sized single fold Chart – the limits of the Chart must be adjusted to correspond to a border graduation sub-division (see B-212.2).

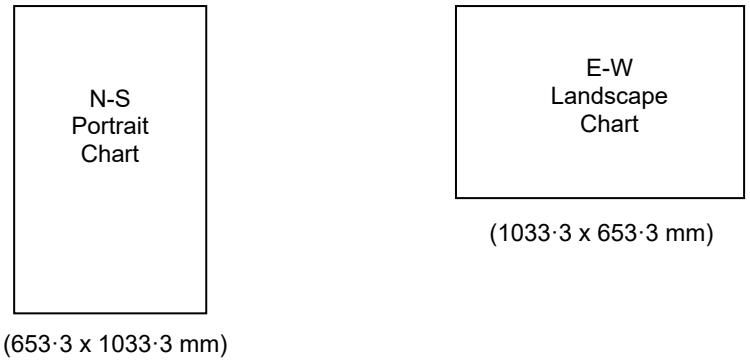


Figure 200.6: Neatline dimensions in mm for Mercator charts

Chart Presentation

On all Australian national and International (INT) paper Charts, the dimensions must be placed below the southern border. The top of the text must be 2mm from the bottom edge of the outer thick border and evenly spaced between the DEPTHS IN METRES text (or the New Edition text – see clause B-255.2) and the Chart number as follows:

DEPTHS IN METRES (653·3 x 1033·3mm) **Aus 16**

A single space must be inserted between the dimension values and the "x". There must be no space inserted between the value and the "mm" text. Where convergence is measurable, there must be no line spacing between differing latitude or longitude dimensions (see SPEC_05_55_AA230048 Australian Paper Chart Text Features Conventions – Annex B for example).

In all cases paper Chart neatline dimensions must be quoted to one decimal place and must be contained in brackets.

B-222.4 Where convergence is measurable

The inner neatline dimensions of a paper Chart on the Universal Transverse Mercator projection must be shown in the following form where there is a recordable (greater than 0·4mm) difference of convergence between each latitudinal and longitudinal measurement.

In all cases the northern most east-west dimension must be quoted first, followed by both north-south dimensions, western border displayed above the eastern border, followed thereafter by the southern border dimensions (see Figure 200.7).

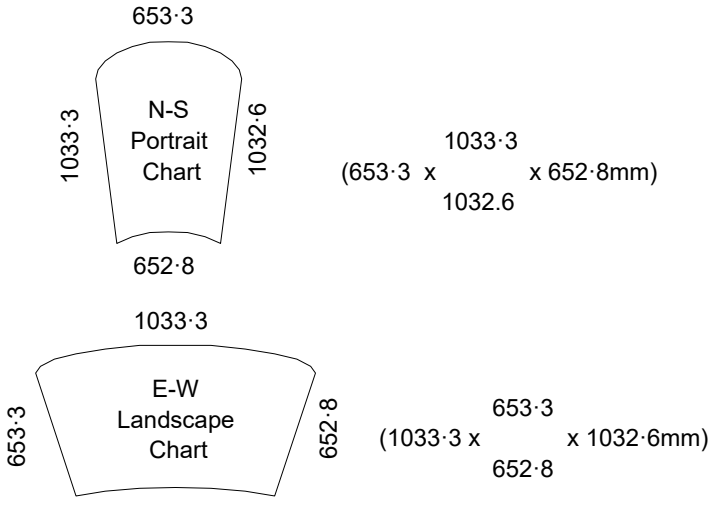


Figure 200.7: Neatline Dimensions in mm for TM paper charts with measurable convergence

Where there is a difference in measurement of 0·4mm or less between two given north-south or east-west dimensions, the designated figures should be rounded off to the average of the two measurements.

Where there are equal north-south dimensions for both east and west borders (within the rounding of 0·4mm), in all cases the east-west dimension must be quoted first, thus reflecting that the chart has a portrait (N-S) presentation or landscape (E-W) presentation (see Figure 200.8).

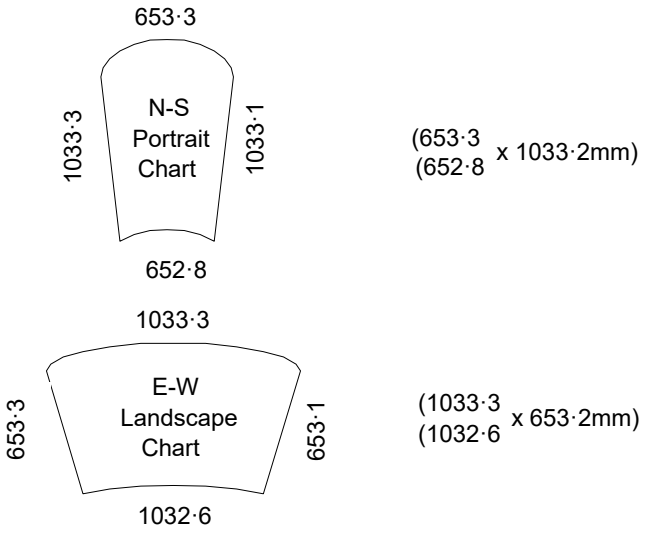


Figure 200.8: Neatline Dimensions in mm for TM paper charts with the same latitude dimensions (within rounding of 0·4mm)

B-230 Not currently used

B-240 Title, Notes

B-241 Title Blocks

Title Block – Main chart

At this time, there must be no information printed on the back of paper Charts.

Care must be taken when positioning title blocks for overlapping series paper Charts that the same charted detail within the overlap area is not obscured by the title blocks or any other tables and diagrams for both Charts.

Australian Nautical paper Chart title blocks should be set out as shown in Figure 200.13. The title block consists of separate elements, which must be centre justified within the block. The elements must be arranged as follows:

- Official Seal: (See B-241.1).
- Geographic Location: This may be separated into two lines of text. The first is indicative of continental or oceanographic location while the second locates the state or offshore location (See B-241.3). For a sheet of Plans where the state name appears in the Chart Title (e.g. Plans in Western Australia), the second line of the Geographic Location indicating the state is not required.
- Chart Title: This may be separated into more than one line of text.
- Scale Note: (See B-241.4)
- Construction Notes: The construction notes consist of:
  - Depths
  - Heights

- Positions
- Navigational marks:
- Projection:

Words must not be hyphenated (split through justification) and “Lowest Astronomical Tide” and “Mean Higher High Water” (or equivalent) must not be abbreviated. For the Navigational marks construction note, the colour designation for direction of buoyage in IALA Region A must be quoted as “(Red to Port)”.

Recommended gaps between Chart Title Block elements are as follows (See also Annex D of the ‘Australian Paper Chart Text Conventions’ - AA230048):

- 2mm between bottom of Official Seal and top of first line of Geographic Location (general geographic area);
- 3mm between bottom of first line of Geographic Location (general geographic area) and top of second line of Geographic Location (state/offshore local geographic area);
- 4mm between bottom of second line of Geographic Location (state/offshore local geographic area) and top of Chart Title;
  - 5mm between lines of text in multiple line titles (including qualifiers such as APPROACHES TO, TO, AND, INCLUDING).
- 4mm between bottom of Chart title and top of Scale Note;
- 3mm between bottom of Scale Note and top of Construction Notes
  - Continuous line spacing between each element in the Construction Notes.
- 4mm between the bottom of the Construction Notes and the top of the Explanatory/Cautionary Notes. This may be slightly less if space is a factor.

Minor variations on these gaps may be applied according to available space, but compilers must ensure that the Title Block is neat and easy to read. Note that these gaps are for Chart Title Blocks located inside the neatline of the Chart. For Title Blocks located outside the outer thick border of the Chart, see “Title Block – Chart comprising a Sheet of Plans” below. Gaps between elements in Title Blocks for Plans and Insets must be evaluated on a case by case basis, but should be consistent for all Plans/Insets on any single Chart.

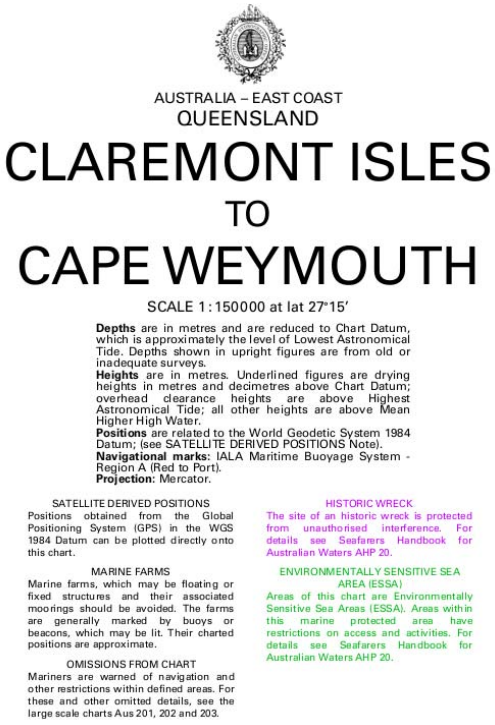


Figure 200.13: Standard Title layout for a Mercator chart

Title Block – Chart comprising a Sheet of Plans

The majority of Charts that are sheets of Plans require the title block and most if not all cautionary notes to be located outside the Chart border. The specifications for all elements of the title block are identical to those for a main Chart but arrangement will differ due to space constraints.

Some of the title block elements including some cautionary notes may be relative to a particular Plan and not the whole sheet. Accordingly these notes must appear on the subject Plan only and not in the title block panel.

- Scale note: Must be represented on each individual Plan.
- Projection: If all Plans on the sheet are of the same projection this note must appear in the Chart title block panel. Otherwise this note must appear on each Plan and not in the Chart title block panel.
- Cautionary notes: These notes must be treated subjectively for each Plan. The note(s) must appear on the relevant Plan(s) only. If the data is common to all Plans then the note(s) must be located in the Chart title block.
- Magnetic Variation: This statement must not appear within the compass rose, unless all Plans within the sheet of Plans contain a compass rose. A statement must be made for each Plan and must be located as an explanatory note in the title panel block for each Plan. An exception to this rule is when a Plan sits completely within the limits of another Plan. In this case a magnetic statement is not required (see B-272.2).

Text styles for the chart title block panel must comply with navigation series Chart Specifications and the arrangement of elements should be as follows:

- The **Crest** must be located at the top right-hand corner of the Chart, above the Product Modification date text. The base of the crest must be 6mm from the top of the outer thick border and the right hand side of the crest must be vertically aligned with the right edge of the outer thick border.
- The **coast identifier**, **state identifier** (where shown) and **Chart name** should be centred between the left and right borders. The base of the Chart name text (e.g. PLANS IN SOUTH WEST VICTORIA) must be placed 2mm above the top of the outer thick border.
- The **Depths** and **Heights** notes should be inserted to the **left** of the Chart title, justified to 75mm. The bottom of the Heights text must be placed 2mm above the top of the outer thick border. Where the height datum for heights other than clearance heights varies between Plans in a sheet of Plans (Mean Higher High Water or Mean High Water Springs – see B-302.2), the following convention should be followed:
    - The Heights note must be worded similar to the following:

      Heights are in metres. Underlined figures are drying heights in metres and decimetres above Chart Datum; overhead clearance heights are above Highest Astronomical Tide. Refer to individual plans for plane of reference for all other heights.

    - An abbreviated **Heights** note must be incorporated in each Plan (see Plans having different Height Datums below).
- The **Positions**, **Navigational Marks** and **Projections** notes should be inserted to the **right** of the Chart title, justified to 75mm. The bottom of the lowest placed note must be placed 2mm above the top of the outer thick border. (NOTE: The Projection note must only be shown where all Plans have the same projection.)
- The distance between the right hand edge of the **Depths** and **Heights** notes and the start of the Chart name should be the same as the distance between the end of the Chart name and the left hand edge of the **Positions**, **Navigational Marks** and **Projection** notes. This distance must be determined in accordance with the dimensions of the Chart and the need to include other notes.

- The **Satellite-Derived Positions** note should be placed to the right of the **Positions**, **Navigational Marks** and **Projection** notes. The bottom of the note text must be placed 2mm above the top of the outer thick border.
- Other notes may be placed either to the left of the Chart title text or to the right of the **Satellite-Derived Positions** note. The layout of the notes will depend upon the dimensions of the Chart. The bottom of any note text that is adjacent to the Chart border must be placed 2mm above the top of the outer thick border.
- The **Related Publications** boxed note may be positioned along the top of the Chart with other notes, or shown elsewhere within the body of the Chart. See B-243.

Title Block – Plan

Title blocks for Plans within a sheet of plans should comprise the following elements:

- Plan Title: centre justified within the title block.
- Scale Note: centre justified within the title block.
- Projection: This construction note is not required when all plans on the sheet have the same projection. See below for text justification.
- Magnetic Variation: This construction note must be shown except where all plans contain a compass rose or the entire limits of the plan fall within the limits of another Plan. See below for text justification.
- Heights: This construction note is required only when the height datum's (Mean Higher High Water or Mean High Water Springs) varies between plans on the Chart. Heights construction note for 'Title Block – Chart comprising a Sheet of Plans' must also reflect the differing datum's. See below for text justification.

Text justification for construction notes Projection, Magnetic Variation and Heights:

- For one element only, the element must be centre justified within the title block except for Heights where the text is to be blocked to 75mm.
- For more than one element, the elements must be left justified. The block of elements must be centre justified within the title block.

Recommended gaps between Plan Title Block elements are as follows:

- 3mm between bottom of Plan title and top of Scale Note;
- 2mm between bottom of Scale Note and top of Construction Notes

Variations on these gaps may be applied according to available space, but compilers must ensure that the Title Block is neat and easy to read.

Existing charts will be updated by Revised Print correction or through a New Edition of the Chart at the first available opportunity.

Examples of plan titles

Plans having the same projection

SHUTE HARBOUR

SCALE 1:15000

Magnetic Variation: 9°50′E 2009 (1′W).

Figure 200.14: Standard Title layout for a Plan in a set of Plans (all same projection)

Plans having different Projections

CADELL STRAIT
SCALE 1:75 000 at lat 12° 00′
Projection: Mercator.
Magnetic Variation: 4°35′E 2009 (0′).

Figure 200.15: Standard Title layout for a Plan in a sheet of Plans (different projections)

Plans having different Height Datums

EVANS HEAD
SCALE 1:5000
Projection: Universal Transverse Mercator (UTM-56).
Magnetic Variation: 11°35'E 2009 (1'W).
Heights other than overhead clearance heights are above Mean High Water.

Figure 200.16: Standard Title layout for a Plan in a sheet of Plans (different Height Datums)

Plan title where space is limited

The chart construction notes may be justified to 50mm in exceptional circumstances where space is limited. The construction notes shown may vary, see above for variations.
When it is required to show the Magnetic Variation note the heading must be abbreviated to **Mag Var:**.

EVANS HEAD
SCALE 1:5000
Projection: Universal Transverse Mercator (UTM-56).
Mag Var: 11°35'E 2009 (1'W).
Heights other than overhead clearance heights are above Mean High Water.

Figure 200.17: Standard Title layout for a Plan Title block justified to 50mm.

B-241.1 Seal (or Crest)

On Australian paper charts all crests must be black.

New charts and New Editions published from 1st January 2018 must include the latest version of the AHO, PNG and SI crests.

National Hydrographic Offices crests: Australia (AHO); PNG (NMSA); Solomon Is (SIMSA)

Existing charts containing previous versions of the crests will be updated progressively by Revised Print Correction at the first available opportunity.

Refer to 'Australian paper Chart Text Conventions' Annex D for more details on the size and layout of the AHO, PNG and SI crest.

B-241.2(I) International Charts

At the 2nd meeting of the IHO Council held in London, October 2018, the overhaul of the IHO communication methods, including GIS-services, was approved. This initiative included the use of a new IHO emblem (crest). The new IHO logo was modified slightly and the reference to Monaco and the year 1921 was removed with the agreement of HSH Prince Albert II of Monaco. The official change over to the new branding was scheduled by the IHO for World Hydrography Day, 21 June 2019.

International Hydrographic Organisation (IHO) crest

From 19th August 2019, existing INT charts published by the AHO will be updated progressively by Revised Print Correction. New Charts and New Editions must include the latest version of the IHO crest.

Refer to 'Australian paper Chart Text Conventions' Annex D for more details on the size and layout of the IHO crest.

B-241.3 General geographical area and Chart title

The use of the term 'PORT OF' on product titles must be omitted unless strictly necessary. The term 'PORT OF' can only be used when the there is no built up area or toponym already charted with the same name (e.g. 'Port of Ashburton'. Ashburton is the name of the shire but no reference to this name exists in the product). The paper chart has to be consistent with the corresponding ENC title as per *SPEC_05_55_AA758980 Navigation Purpose 5 & 6 ENC cell identifiers and location text*.

Australian Coast Title Identification

Note that in all examples of Australian coast title identification shown below, there is a full space on either side of the dash (–) where used.

Australian Mainland

The Australian coastline must be identified in the Chart title by divisions of its continuous boundary relative to areas north, south, east or west of the nation's position on the earth's surface. The following divisions, including point to point identification guide, must be used when assessing each Chart's area appointment, as indicated in the first line of the chart title and placed below the national AHO crest:

- EAST COAST – Cape York to Cape Howe
- SOUTH COAST – Cape Howe to Cape Leeuwin
- WEST COAST – Cape Leeuwin to North West Cape
- NORTH WEST COAST – North West Cape to Cape Londonderry
- NORTH COAST – Cape Londonderry to Cape York

E.g.: AUSTRALIA – NORTH COAST

Tasmania

Charts covering the State of Tasmania exclude the coast area identification and must be identified as:

AUSTRALIA – TASMANIA

Antarctica

Australian Antarctic Charts must be identified as:

AUSTRALIAN ANTARCTIC TERRITORY

Australian Territories

Charts of these areas must be identified by the Ocean name. Examples include:

Heard Island	SOUTHERN OCEAN
Cocos-Keeling Islands	INDIAN OCEAN

Offshore Reefs

Offshore reefs such as Scott Reef and Marion Reef must retain the Australian Mainland coastline division and be supported by the appropriate Ocean name. Examples include:

Scott Reef	AUSTRALIA – NORTH WEST COAST INDIAN OCEAN
Marion Reef	AUSTRALIA – EAST COAST CORAL SEA

Portions of Different National Area

Where medium and small scale Charts include portions of national areas on the same Chart, such as Australia and PNG, the title reference must omit the coast identification.

E.g. AUSTRALIA – PAPUA NEW GUINEA

Papua New Guinea Mainland

The PNG coastline must be identified in the Chart title by divisions of its mainland continuous boundary relative to areas north, north east and south of the nation's position on the earth's surface. The following divisions, including point to point identification guide, must be used when assessing each Chart's area appointment, as indicated in the first line of the chart title and placed below the AHO and PNG crests:

- NORTH COAST – Vanimo Point (2°40'S 141°17'E) to Teliata Point (5°55'S 147°21'E) including the islands Karkar, Long and Umboi.
- NORTH EAST COAST – Teliata Point to Isulailai Point (10°33.7'S 150°41.7'E) including the islands Normanby, Ferguson, Goodenough, Kiriwina, Woodlark and Louisiade Archipelago.
- SOUTH COAST - Isulailai Point to Daru Island.

E.g. PAPUA NEW GUINEA – NORTH COAST

Papua New Guinea subdivisions

1) New Britain Coast Identification

The following divisions, including point to point identification guide, must be used when assessing each chart's area appointment:

- NORTH COAST – Dorf Point to Cape Gazelle
- SOUTH COAST – Cape Gazelle to Dorf Point.

E.g. NEW BRITAIN – NORTH COAST

2) New Ireland Coast Identification

The following divisions, including point to point identification guide, must be used when assessing each chart's area appointment:

- NORTH COAST – Binnigem to Cape St. George
- SOUTH COAST – Cape St. George to North Cape

E.g. NEW IRELAND – NORTH COAST

Note: New Britain and New Ireland must be treated like the Australian states and their coast identification added in a second line of text under 'Papua New Guinea".

E.g. PAPUA NEW GUINEA
NEW IRELAND – NORTH COAST

Solomon Islands

As Bougainville and Queen Carola are the only islands within Australia's area of interest, identification must be:

SOUTH PACIFIC OCEAN – SOLOMON ISLANDS

Admiralty Islands

Identification must be:

SOUTH PACIFIC OCEAN
ADMIRALTY ISLANDS

Timor-Leste

For approach Charts, identification must be:

TIMOR-LESTE
TIMOR SEA

For large scale port/harbour Charts (including sheets of Plans), identification must be:

TIMOR-LESTE

Portions of Different Island Areas

Where medium and small scale Charts include portions of island areas on the same Chart, such as New Britain and New Ireland, the following text must be shown:

E.g. SOUTH PACIFIC OCEAN
PAPUA NEW GUINEA – NEW BRITAIN

SOUTH PACIFIC OCEAN
NEW BRITAIN – NEW IRELAND

Australian State Title Identification

Where there are two Australian States of equal or similar area shown on a Chart, the title notation under the coast identification must read:

E.g. QUEENSLAND and NEW SOUTH WALES

Where one State is prominent or occupying the greater portion of a Chart, only that State must be identified.

E.g. WESTERN AUSTRALIA

State names must not be abbreviated but shown in full as follows:

- QUEENSLAND
- NEW SOUTH WALES
- VICTORIA
- TASMANIA
- SOUTH AUSTRALIA
- WESTERN AUSTRALIA

- NORTHERN TERRITORY

Charts portraying Australia's offshore reefs or areas of water should be identified within oceans or seas instead of a State. Examples include:

Aus 789: AUSTRALIA – SOUTH COAST
BASS STRAIT

Aus 314: TIMOR SEA

Aus 377: AUSTRALIA – PAPUA NEW GUINEA
TORRES STRAIT

B-241.4 Scale note

Scale notes used on Australian series Charts are specific to projection type.

The Mercator projection attracts the following statement (the reference latitude value is subjective – see Table 200.1 in B-203.2):

SCALE 1 : 1 500 000 at lat 23°00'

Half letter spacing must be used between components 1 and :, : and 1, 1 and 500, 500 and 000 (or their equivalents). This spacing rule must be applied to all scale statements.

The Universal Transverse Mercator projection attracts the following statement:

SCALE 1 : 50 000

Half letter spacing must be applied as above.

Plan(s) within a main Chart may have the scale note abridged by omitting the word 'SCALE'. This is permitted only where the scale components of the Plan, other than the scale ratio, are identical to the main Chart.

Inset(s) within a main Chart must have the scale note abridged by omitting the word 'SCALE'.

B-241.5 Unit of measure for depths

The unit of measure for depths must be metres and decimetres.

Depths should be referenced to Lowest Astronomical Tide (LAT).

B-241.6 Unit of measure for heights

The unit of measure for heights must be metres.

Drying heights must be referenced to Chart Datum (see B-241.5). Vertical and safe clearances of any overhead structure should be referenced to Highest Astronomical Tide (HAT). All other heights must be referenced to either Mean Higher High Water (MHHW) or Mean High Water Springs (MHWS) – depending on the area concerned, as determined by the Tides and Geodetic Section.

B-241.7 The name (and date) of the horizontal datum

B-241.8 IALA Maritime Buoyage

Australian waters lie within IALA Maritime Buoyage System Region A (Red to Port).

B-241.9 The name of the projection

For Charts or Plans that are compiled on the Universal Transverse Mercator projection (see B-203.1), the name of the projection quoted in the title block must be "Universal Transverse Mercator (UTM)".

The UTM projection attracts the following statement (where xx is the number of the zone in use).

Projection: Universal Transverse Mercator (UTM–xx).

For Charts or Plans compiled on the Mercator projection (see B-203.2), the name of the projection quoted in the title block must be “Mercator”.

B-241.10 A note citing the sources

Acknowledgements construction note

New paper charts published from 10 February 2017, must not show the ‘Acknowledgements’ construction note.

Where shown on existing paper charts the ‘Acknowledgements’ construction note must be removed by Revised Print correction or through a New Edition of the Chart at the first available opportunity.

B-241.11 Title blocks of insets

B-242 Cautionary and Explanatory Notes

The notes should be located in the paper Chart title panel area immediately below the lowest construction note (see B-241 above). They must be block justified to 50mm. There should be a 3.00mm line space between the note title and the note body (i.e. between the bottom of the note title text and the bottom of the first line of the note body text), and a 2.47mm line space for the note body. If there are multiple paragraphs within a single note, paragraph spacing should be 3.00mm.

The layout of the notes depends upon how many notes are to be inserted, as well as the space available. Where Black, Magenta and/or Green notes are to be inserted, two or more columns should be used separating the colours. The Black notes should be positioned in the left column(s) and the Magenta and Green notes in the right column(s). Where only Black notes are to be inserted, they should be positioned vertically in one column, or in two or more columns. All notes in a column must be vertically aligned, and where there is more than one column, the minimum distance between columns must be 8mm, and where there are more than two columns the distance between columns must be consistent on the Chart.

Where notes are placed in two or more columns, the titles of the top notes must be horizontally aligned. Vertical spacing of other notes within a column will depend on the length of the notes themselves, but must be consistent between notes in the column(s), and as a guide should be equivalent to a single blank line space.

An Omissions note must be inserted if any information has been omitted through generalisation from larger scale Charts.

Approval and administration of all cautionary and explanatory notes shown on Australian Nautical Charts lies with the MIS Section. Compilers must confirm the wording of all cautionary and explanatory notes when compiling New Charts and New Editions with the MIS Section to ensure that existing charted notes have not been superseded.

Chart note references (legends) on the face of the chart
If a chart note applies to the whole chart and there’s no specific charted feature (symbol or limit) on the chart, the use of legends randomly distributed across the chart is discouraged as it could be misleading and make mariners think the note only applies to the surroundings where the legend is on the chart (e.g. Tidal Streams and Currents).
Common sense must prevail and we should limit clutter when possible. If any clarification is required, refer to DDCQS.

B-242.1 Headings

The note heading must be centre justified over the note body on the paper Chart.

The headings of all cautionary and explanatory notes must be easily identified with any associated note reference on the paper Chart. Therefore, where possible, the note name must be the same as the charted note reference, or contain an acronym (abbreviation) as used in the note reference, e.g.:

Note Reference on Chart	Note Heading
Omissions (see Note)	OMISSIONS
Harbour Entrance (see Note)	HARBOUR ENTRANCE
TWO-WAY ROUTE (see Note)	TWO-WAY ROUTE
DSA (see Note)	DESIGNATED SHIPPING AREA (DSA)
GBRMP (see Note)	GREAT BARRIER REEF MARINE PARK (GBRMP)

In some cases the note may be a generic note applicable to several types of charted features. In such cases the note name must include an acronym (abbreviation) of the full note name text for inclusion in the note reference on the Chart (see B-242). Examples include GREAT BARRIER REEF MARINE PARK (GBRMP), a generic note which applies to the Great Barrier Reef ESSA and the IMO declared PSSA (see B-437.1, B-437.2 and B-437.6); and AUSTRALIAN MARITIME JURISDICTION (AMJ), a generic note which applies to the Territorial Sea Baseline and all associated limits (see B-440 and B-440.9). E.g.:

Note Reference on Chart	Note Heading
PSSA (see GBRMP Note)	GREAT BARRIER REEF MARINE PARK (GBRMP)
AUSTRALIA EEZ (see AMJ Note)	AUSTRALIAN MARITIME JURISDICTION (AMJ)
AUSTRALIA / INDONESIA Seabed Treaty (see AMJ Note)	AUSTRALIAN MARITIME JURISDICTION (AMJ)

If any clarification of note names and note references is required, refer to DDCPM.

B-242.2 Specimens

B-242.3 Cautionary notes

Cautionary notes should be printed on paper Charts in the same colour as their subject.

B-242.4 Translation

B-242.5 Explanatory Notes

B-243 Reference to Other Publications

Related publications must be referenced on paper Charts in a boxed note, which should be placed outside the upper left-hand corner of the Chart. The preferred version of the note, as shown in Figure 200.18 below, should be positioned so that the left-hand edge of the box is 160mm from the left-hand edge of the outer thick border. The bottom of the box must be 2mm above the top of the outer thick border in this case.

The preferred version of the note must comprise 3 lines of text contained in a box 147mm in length and 10mm wide. The text must be block justified to 145mm and be similar in appearance to the example in Figure 200.18.

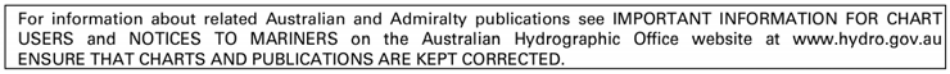


Figure 200.18: References to Related Publications (preferred version)

An alternative version of the note may be used where space in the Chart margin prohibits use of the preferred version, such as a portrait half Chart or a Chart comprising a sheet of Plans (see B-241). The alternative version must carry the same wording and should be contained in a box 52mm in length and 27mm high and be similar in appearance to the example in Figure 200.18. The location of the note will vary depending upon available space. However, it should be located towards the top and within the body of the Chart. The note should not be

placed within a Plan or Inset within a main Chart, or within a Plan on a Chart comprising a sheet of Plans.

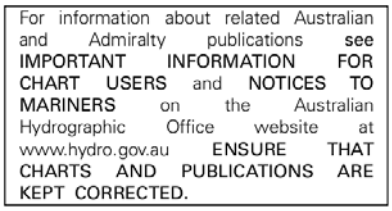


Figure 200.19: References to Related Publications (alternative version)

B-243.1 QR (Quick Response) codes

B-250 Chart Numbering, Marginal Information

The dimensional proportions of information falling outside the paper Chart's outer border will vary depending on Chart size and shape.

All text or text blocks that are located outside the outer thick border of a paper Chart should be placed so that the nearest point of the text (excluding tails where the measurement is to the bottom of a line of text) or text box is 2mm from the outside edge of the outer thick border.

B-251 Chart Numbering

The paper Chart number must be placed in the lower right-hand corner of the Chart and, inverted, in the upper left-hand corner. The Chart number must be placed so that the right/left hand side of the type is vertically aligned with the right/left hand outer edge of the outer thick border.

Australian paper charts must be preceded by the three letter code '**Aus'** (upper and lower case).

Paper charts produced by the AHO on behalf of Papua New Guinea must be preceded by the three letter country code '**PNG'** (all in capitals).

Paper charts produced by the AHO on behalf of the Solomon Islands must be preceded by the three letter country code '**SLB'** (all in capitals).

Examples of the format of Chart numbers is as follows:

Aus 314 PNG 645 SLB 101

Note that there must be a full letter space after the three letter country codes

The numbering system used by the AHO is based on the location, purpose and scale of the product. Any New Chart must be allocated a number based on the table below.

AUSTRALIA (Aus)		
Purpose	***Scale***	***Charting Scheme Numbers***
Large scale charts (and plans)	4000 - 100000	1 - 299
Large and Medium scale charts, off-lying territories, reefs in the Coral Sea	4000 - 150000	600 - 619
Medium scale chart series	150000	700 - 842
Small scale chart series	300000	300 - 377
Supplementary Charts to the Australian series	500000	460 - 499
Australian Antarctic Territory	1000000	400 - 409
	500000 -1000000	441 - 459
Index and miscellaneous charts	Variable	5000 - 5100
International series	1500000	Discuss with regional INT Chart coordinator (DDCPM)
	3500000	
	10000000	

PAPUA NEW GUINEA (PNG)		
Purpose	***Scale***	***Charting Scheme Numbers***
Large scale charts and Sheet of plans	4000 - 100000	620 - 699
Medium scale chart series	150000	500 - 558
Small scale chart series	300000	378 - 399
Supplementary Charts to the PNG series	1000000	430 - 434
Index and miscellaneous charts	Variable	1000 - 1999
International series	1500000	Discuss with regional INT Chart coordinator (DDCPM)
	3500000	
	10000000	

SOLOMON ISLANDS (SLB)		
Purpose	***Scale***	***Charting Scheme Numbers***
Large scale charts and Sheet of plans	4000 – 99999	100 – 199
Medium scale chart series	100000 – 299999	200 – 299
Small scale chart series	300000 – 149999	300 – 399
Index and miscellaneous charts	Variable	1000 – 1999
International series	1500000	Discuss with regional INT Chart coordinator (DDCPM)
	3500000	
	10000000	

For all paper New Charts and New Editions commenced from March 2011, and all Charts updated by Notices to Mariners or Revised Print action from March 2011, an additional chart number must be placed in the upper right-hand corner of the Chart. This chart number must be placed along the right edge of the Chart, reading from outside, and right justified (horizontally aligned) to the top edge of the outer thick border.

B-251.1(I) International Charts

On Australian produced INT paper Charts, the international Chart number must be positioned as for the position of the Aus Chart number specified in the first and second paragraphs of B-251 above. The Aus Chart number must then be positioned above/below and right justified to the INT Chart number, with a 1·5mm line space between. There must be no INT Chart number included with the Aus Chart number placed in the top right-hand corner of the Chart.

B-251.2(I) International numbering

B-252 Dates of Publication and Updates

B-252.1 The publication note

The publication note for all Australian paper Nautical Charts must be centred along the bottom of the Chart with the top of the note text positioned 2mm below the bottom edge of the outer thick border.

In the following examples of publication notes:

- [Date] indicates the publication date of the first Edition of the Chart (note that there is no leading “0” in the day, and the month and year are shown in full), e.g. :

  26 January 2006

  4 July 2008

- [Hydrographer’s rank and name] (including recognition of any national award or honour conferred*) is the Hydrographer at the time of publication of the first Edition of the Chart e.g.:

  Commodore F.T. Freeman

* NOTE: For charts published under the direction of Cdre Rod Nairn from 13 June 2011, recognition of his being honoured as a Member of the Order of Australia (AM) must be included in the publication note. Charts published prior to 13 June 2011 must not include this recognition.

The publication note must read, on a single line, as follows:

New Charts published from 14th June 2011 and New Editions of Charts having 1st Edition published from 1st January 2005

Published by the Australian Hydrographic Office, [Date], under the direction of [Hydrographer’s rank and name], RAN, Hydrographer of Australia.

New Editions of Charts having 1st Edition published between 18th November 1990 and 1st January 2005

Published by the Australian Hydrographic Office, [Date].

New Editions of Charts having 1st Edition published between 1944 and 18th November 1990

Published by the Australian Hydrographic Office, [Date], under the Superintendence of (Hydrographer's rank and name), Hydrographer, RAN.

Australian Hydrographic Office Addresses

The street address of the Australian Hydrographic Office and the web site address must be shown directly beneath and centre-justified to the publication date text and shown as follows:

8 Station Street, Wollongong, NSW 2500, Telephone (02) 4223 6500, Fax (02) 4223 6599.
www.hydro.gov.au

Note that from 01 July 2008 new Australian Hydrographic Office telephone and fax contact numbers have been implemented. These changed numbers must be incorporated on all New Charts, New Editions and Reprints from Reprint Serial 13-2008.

B-252.2 Edition date and numbers

The Edition date for the first Edition of a paper Chart (New Chart) must be shown as described in B-252.1 above.

The Edition number must be shown on Australian paper Nautical Charts, with New Charts being Edition number 1, the first New Edition being Edition number 2, etc. It must be in the format "Edition Number X". The edition number must be placed, centred between the publication note and "Depths in Metres", at the bottom of the Chart for single and double fold paper Charts, or right justified 20mm to the left of the publication note for paper half Charts (see B-253 for location of the Copyright boxed note for half Charts). The top of the text must be positioned 2mm below the bottom edge of the outer thick border.

New Edition

When a New Edition of a paper Chart is published, the New Edition date must be placed on the Chart. The New Edition date must be placed left justified with and below the Edition number text. It must be in the format "Edition Date D Mmm YYYY" (note no leading "0" in day and month is abbreviated to the first 3 letters). Note that once the New Edition date is added below the Edition number, the overall length of the combined text block increases and, for single and double fold paper Charts, it will have to be re-centred between the publication note and "Depths in Metres".

Examples include:

- New Chart: Edition Number 1
- First New Edition: Edition Number 2
Edition Date 5 Nov 2000
- Sixth New Edition: Edition Number 7
Edition Date 15 Feb 2008

Note that for New paper Charts (first example above) Edition date is not included – this is because the Edition date is included in the publication note for the Chart (see B-252.1).

Edition dates are determined as the Friday corresponding to the fortnightly Notices to Mariners edition that occurs on or immediately after the sign-off of the Chart compilation.

A New Edition of a paper Chart must not attract a Notices to Mariners correction that appears in the Notices to Mariners edition corresponding to the Edition date of the chart. If this occurs, the release of the New Edition must be delayed to the next Reprint Serial (see Notices to Mariners, Revised Reprinting below), to allow the correction to be applied to the Chart prior to publication.

B-252.3 Notices to Mariners

The reference to Notices to Mariners provides details of Notices to Mariners applied to the print of the paper Chart. The location of the legend must be in the lower left-hand corner of the Chart. The left edge of the text must be aligned to the left edge of the outer thick border. The top of the legend must be 2mm below the bottom of the outer thick border. For all New Charts and New Editions, the text must read “Notices to Mariners”.

Notices to Mariners – Print On Demand (POD) files

When a new POD file is generated due to NtM changes, the legend must be updated to “Notices to Mariners inclusive to” along with the year and the latest (highest NtM number) Notice to Mariners correction as follows:

Notices to Mariners inclusive to YYYY-*xxx* -

E.g. Notices to Mariners inclusive to 2017-*123* -

Print on Demand (POD) printing of charts is scheduled to coincide with the fortnightly publication of Notices to Mariners editions, of which there are 25 Serials in a calendar year corresponding with Notices to Mariners editions 1 to 25.

POD files that currently do not align with the guidance above must be amended by ‘Revised Print Corrections’ or during NtM activities at the next available opportunity.

B-252.4(l) On reproduced (adopted) Charts

Modified Reproduction of Great Britain Charts

Where agreement has been reached with the UKHO for Australia to adopt a Great Britain paper Chart into its series as a modified reproduction, the publication note must be replaced with the Australian standard notation for a New Chart including a new published date.

Directly beneath and centre-justified to the publication date note, the street address, and the web site address, the Modified reproduction note must be shown (see B-252.1 for [Date] format):

Modified reproduction of former British Admiralty chart xxxx, originally published [Date].

An example of the full layout of the publication data of a modified reproduction chart follows:

Published by the Australian Hydrographic Office, 19 July 1991.
8 Station Street, Wollongong, N.S.W. 2500, Telephone (02) 4223 6500, Fax (02) 4223 6599.
www.hydro.gov.au
Modified reproduction of former British Admiralty chart 348, originally published 8 June 1956.

B-253 Copyright Legend

On all single and double fold Australian paper Nautical Charts, the Copyright boxed note must be positioned at the bottom of the Chart. The top right corner of the surrounding box must be 2mm from the bottom of the outer thick border and 20mm from the publication/address text for a N-S (portrait) Chart or 100mm from the publication/address text for an E-W (landscape) Chart. For half Charts, the Copyright boxed note must be positioned at the top of the Chart, centred between the related publications boxed note (see B-243) and the Product Modification date (see B-255). The bottom of the surrounding box must be 2mm from the top of the outer thick border.

The 3-line note must fit in a box with dimensions of 130mm x 9·5mm.

Figure 200.20: Copyright Note

The date reflected in the note must be the published year date for a New Chart (NC). For a New Edition (NE), the date must be the NE date.

For NtM Raster Updates or Revised Print Corrections the copyright year is not to be altered except when marginalia for the chart is to be updated to reflect the change of name from the 'Australian Hydrographic Service' to the 'Australian Hydrographic Office' when the copyright date must align with the image creation date.

B-254 References to Other Charts

The decision as to whether the existence of an overlapping paper Chart of "similar" but larger scale is to be depicted using a border reference or larger scale Chart limit should be made at the Chart Review stage of production.

B-254.1 Border references

The following is an example of the format for an adjoining paper Chart border reference:

Adjoining Chart Aus 410

Where the adjoining Chart is an International (INT) Chart, the reference must be shown for the INT Chart number as well as the issuing national Chart number in parentheses, e.g.:

Adjoining Chart INT 602 (Aus 4602)

Adjoining Chart INT 508 (BA 4508)

The reference must be centre aligned between the outer thick border and neatline and centre justified for the extent of the Chart overlap along the border. It should be arranged clear of any graticule linework or labels, and individual words, groups of words or the entire legend should be centre justified between graticule subdivisions as space permits. The reference must read from the bottom of the Chart where it is located along the top or bottom margin, or read inwards if located along the left or right margin.

For Insets and Plans that continue outside the limit of the main Chart, a reference to the continuation must be included, e.g.:

For an Inset, the main Chart border must include the reference Continued on Inset. The Inset border must include the reference Continued on main Chart.

For a Plan that continues off the main Chart, the main Chart border must include the reference Continued on Plan. The Plan border must include the reference Continued on main Chart.

Note: Chart borders must not show references to smaller scale charts.

B-254.2 The limits of larger scale Charts or Plans

The limits of the next largest scale paper Chart(s), or Plan(s), which are wholly or partly within the extents of a Chart must be shown in magenta. Where the larger scale Chart has a Plan or Inset, the area covered by the Plan or Inset on the larger scale Chart must be excluded from the area indicated by the larger scale Chart limit. For Insets, the extent of the continuation from the main Chart limit must be included in the area indicated by the larger scale Chart limit. In general, areas of larger scale Charts covered by Chart title, notes and diagrams should not be excluded from the larger scale Chart limit, but may be excluded in exceptional circumstances if the area covered by the Chart title, notes or diagrams on the larger scale Chart is considered to be navigationally significant.

Where an edge of the limit of the next largest scale Chart or Plan falls coincident with a graticule line on the main Chart, the graticule must be broken (no gap between black and magenta linework) for the larger scale limit.

Limits of larger scale paper Charts must carry the legend "Aus XXX" e.g. Aus 6. Plan limits, where the Plan is on the same sheet, must carry the legend see Plan. The legend must be inserted in one corner of the limits. Where possible, this should be a seaward corner.

Limits of larger scale ENC coverage

From May 2019, New Paper Charts and New Editions must indicate the existence of larger scale ENC data where there is no paper chart coverage of similar scale. When the ENC limits

are shown, they are to be depicted a by solid magenta line and supported by a legend. In some circumstances both ENC and Paper chart limits will be required to be shown. The larger scale ENC data limits to be shown on the paper chart will be sourced from either:

- an **M_COVR** - CATCOV = 1(coverage available) object or
- an **M_CSCL** object

Note that the use of a solid magenta line to depict the exact limits of an area covered by larger scale ENC data is optional. It is acceptable to only display one or more chart note references (see 'Labels' below) strategically positioned across the area of interest. All options must be discussed with DDCQS in advance and the final decision documented in the Paper Chart History (PCH) document.

The limits of areas containing larger scale ENC data must be omitted from ZOC Diagrams and the limits of the underpinning ZOC areas must be shown.

Labels

The chart limits, where shown, must be supported by a legend, positioned along the inside of the boundary and reading from the bottom of the chart as shown below. Chart notes are to be supplied by MIS section.

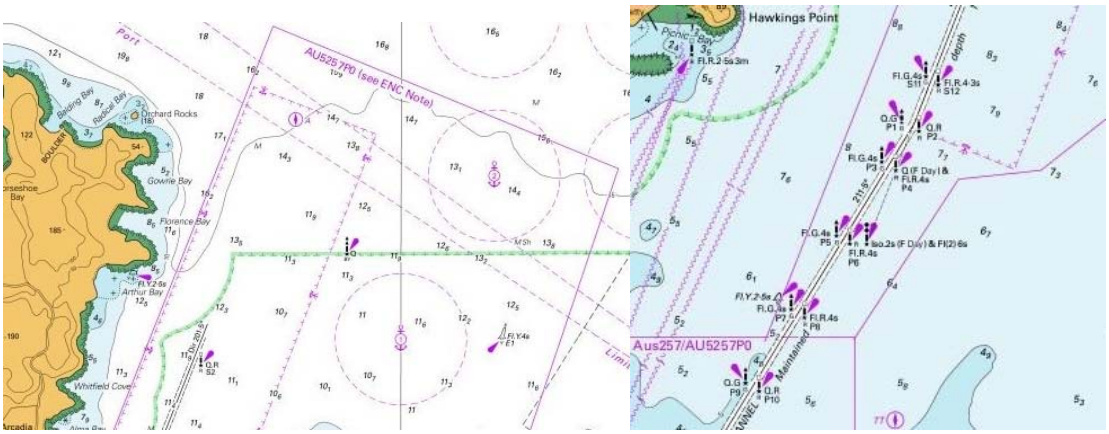
Larger scale ENC data limits based on **M_COVR** object (ENC product extents):

[ENC number] (see ENC Note) e.g. AU5257P0 (see ENC Note)

Larger scale ENC data limits based on **M_CSCL** object (an area within a product):

ENC (see Note)

Where the limit of the ENC partially coincides with the limit of a paper chart, the following legend (referring to both products) must be added along the shared limit: [Paper Chart number]/[ENC number] e.g. Aus257/AU5257P0. For this scenario a chart note reference is not required.



300B-254.3(I) References to INT Chart numbers

B-254.4 References to foreign Charts

B-254.5 If there is a plottable horizontal datum difference

B-255 Other Marginal Information

Print on Demand (POD) creation date

The POD creation date records the date that a new or modified paper Chart image was produced and forwarded to the Product Distribution section for POD printing. The terms "Reprint Date" and "Product Modification Date" are no longer used. The date must be placed in the top right hand corner with the bottom of the text being 2mm from the top edge of the outer thick border. It must be right justified with the charts eastern neatline, and be in the format:

dd.mm.yyyy

E.g. 02.04.2000

The POD creation date must correspond to the day before the date for the fortnightly Notices to Mariners edition (see B-252.3) on which the Chart is included for printing (i.e. the Thursday before the date of the corresponding Notices to Mariners edition, which for New Charts and New Editions corresponds to day before the Edition date for the Chart (see B-252.2)), termed the POD archive supply date. For information regarding Notices to Mariners edition dates, refer to MNAM.

If an error is found on the Chart, subsequent to the fortnightly delivery of the POD archive, that does not result in Notices to Mariners action, the corrected POD file must have the POD creation date modified to the date that the revised file is delivered to the Product Distribution section for POD printing.

Type and year of base repromat

To indicate the origin of the base repromat of paper Charts and year that this base was produced, the text "Dig Ed YYYY" or "Pos Original YYYY" was formerly shown below the Chart dimensions (see B-222.3). This must not be shown on all New Charts and New Editions published from January 2006.

Third party data disclaimer note

On all Australian paper Nautical Charts, the following text block must be shown (N.B. This is not to scale – see below for specification):

Important Notice. This chart includes all significant hydrographic information obtained by the Australian Hydrographic Office (AHO) at date of compilation. Significant information is updated by Australian Notices to Mariners. All reasonable efforts have been made to ensure the accuracy and completeness of the information, including third party information, incorporated in this chart. The AHO regards third parties from which it receives information as reliable, however the AHO cannot verify all such information and errors may therefore exist. Where possible, indications regarding the reliability of information are noted or symbolised on the chart. Users should familiarise themselves with the meaning of any notes or symbols. The AHO does not accept liability for errors in third party information or the inappropriate use of this chart.

For Mercator Charts, the note must be positioned along the left edge of the chart, with the bottom edge of the surrounding box being 1mm from the outer edge of the thick border, and the left edge of the surrounding box being in line with the inner edge of the bottom outer thick border. For UTM Charts, the note must be positioned as above, except where it interferes with the border scalebar, in which case it must be offset 1mm from the scalebar interval values. The surrounding box must be 235mm wide by 12mm high, with line-weight 0·125mm. Text must be blocked to 233mm on 4 lines.

B-255.1 The term marginal information

B-255.2 Units

New Charts must have depths shown in metres. New Editions should have depths shown in metres.

Irrespective of what units are used, the units must be stated clearly in notes positioned near the upper left (NW) and lower right (SE) corner of the outer thick border of paper Charts. The text must be positioned 2mm clear of the upper and lower edges of the outer thick border.

For half-Charts, the placement of the text may be discretionary based on the fit of other information shown along the top and bottom of the Chart. If the Chart is a sheet of Plans, it may not be possible to place the text along the top of the Chart border.

For a landscape Chart: In the NW corner, the text must be centred between the Chart Number and the Related Publications boxed note (see B-243). In the SE corner, the right edge of the text must be 110mm from the right outer thick border.

For a portrait chart: In the NW corner, the text must be centred between the Chart Number and the Related Publications boxed note (see B-243). In the SE corner, the right edge of the text must be 90mm from the right outer thick border.

The note must be as follows:

DEPTHS IN METRES

For International (INT) paper Charts, the note must also be shown centred on the left and right borders in addition to the top and bottom border as described above. For the left and right border cases, the bottom of the text must be closest to the border, and positioned 2mm from the outer thick border edge.

B-255.3 Horizontal datum

The following standard was formerly applied in respect to the application of additional marginalia information referring to the Satellite Derived Positions Chart note for paper Charts at scales 1:1 500 000 and larger.

From 10 April 2015, this standard must no longer be applied. As such, for all paper new Charts and New Editions published on or after 10 April 2015, the additional WGS 1984 marginalia must not be included. For all charts published prior to 10 April 2015, the marginalia must be removed by Revised Print correction.

New Charts and New Editions on the WGS84 datum:

The following marginalia text was formerly inserted:

WGS 1984 positions CAN be plotted directly onto this chart

The text was positioned:

- In the top left corner, along the left edge and right justified to the top edge of the outer thick border.
- In the bottom right corner, along the right edge, and right justified to the bottom edge of the outer thick border.

The text was blocked as above, with 0·8mm line spacing, and offset 2mm from the outer edge of the left and right outer thick borders, and must read inwards.

For UTM Charts, the border scalebars were adjusted so as not to interfere with this text, where necessary.

Chart Reprints:

For Charts compiled on the WGS84 datum, the marginalia text was inserted as above, with the exception of UTM Charts where the border scalebars interfered with the text. In this case the text was offset 1mm from the scalebar interval values.

For Charts compiled on other horizontal datums, the following text was inserted, in Magenta:

WGS 1984 positions CANNOT be plotted directly onto this chart

New Editions not on the WGS84 Datum:

New Editions compiled on other horizontal datums had marginalia text inserted in magenta as above.

B-260 Compass Roses

On Australian paper Nautical Charts, all compass roses must be shown in magenta.

B-261 Compass Roses : Patterns, True and Magnetic

B-261.1 The true circle

An outer true north rose should be shown on all paper Charts.

The “North Star” must not be inserted. Dashed magenta lines joining the centre indication to the 0°, 090°, 180° and 270° graduation ticks must be inserted where they do not coincide with meridians or parallels.

B-261.2 The magnetic circle

The inner magnetic variation rose (see INT1 – B70) must not be shown on Australian paper Charts.

B-262 Compass Roses: Size and Position

B-262.1 The diameter

True north roses must be shown on paper Charts at diameters of 135mm for the large (standard) rose or 104mm for the smaller rose. The 135mm rose is preferred; the smaller rose should only be used where space is critical. The diameter of the rose is measured from the outer ends of the rose degree ticks.

The style of the rose must not change with the reduced size.

B-262.2 Position

General guidance governing the placement of compass roses on paper Charts is:

- Within sea areas preferably, then within land areas. As a last resort, partly on land and partly on the sea;
- No part of the compass rose is to be within 50mm of the chart inner borders;
- Clear of all folds.

In terms of Chart detail compass roses should be:

- Clear of harbour entrances; important navigation channels; traffic separation schemes; major navigational aids; dangers; critical soundings and conspicuous objects (on land);
- Centred to coincide with the intersection of a parallel and a meridian. Where this is not possible, either a parallel or a meridian should be preferred, with the least option being offset from both parallels and meridians;
- Ideally the rose centre should be at least 150 mm from the Chart neatlines. Where more than one rose is required, they should be placed such that all parts of the Chart can be covered by an 18” (460mm) parallel ruler i.e. there should be no navigable areas where a parallel ruler cannot reach;
- Meridians and parallels, which cut a rose, must be carried through and broken only for rose detail. Other black and magenta line work must also be broken for the rose. Line features must also be broken where they cross the rose centre circle and dot, and where they cross the magnetic variation arrow head.

For UTM Charts, where convergence is plottable, the true rose must align with the meridians.

For Charts comprising a sheet of Plans, compass roses must be positioned in accordance with S-4 – B-262.2 and the guidance above. For guidance regarding the depiction of magnetic data information for Charts comprising a sheet of Plans, see B-272.2.

B-270 Magnetic Data

Statement

The statement of magnetic variation and its annual rate of change on paper Charts should be given for the 30 June of the year of publication of all New Charts and New Editions.

All published Australian Nautical Charts of scale 1:750000 and larger must be updated by Revised Print correction when the value for the magnetic variation calculated exceeds the charted value by more than 45' or the quoted annual change is in error by more than 3'; or after 10 years (whichever occurs first). Similarly, all published Australian Nautical Charts of scale smaller than 1:750000 must be updated by New Edition action when the value for the magnetic variation calculated exceeds the charted value by more than 1º or the quoted annual change is in error by more than 3'; or after 10 years (whichever occurs first).

B-271 Magnetic data: Source material

The calculation of magnetic variation and its annual rate of change for Charts of scale 1:750000 and larger must be undertaken using the interactive software provided by Geoscience Australia on their web page at:

http://www.ga.gov.au/oracle/geomag/agrfform.jsp

The calculation of magnetic variation and its annual rate of change for isogonals must be undertaken using software provided to the AHO by Geoscience Australia, revised for each new epoch, and placed on the AHO DRN.

The Geoscience Australia model is updated at 5 yearly epochs (e.g. information for the 2010 epoch is available late in 2010). The following data input is required:

- Latitude and longitude of the compass rose position (centre of the rose) or centre of the Plan (for a Chart comprising a sheet of plans);
- The date for the year corresponding to the New Chart/New Edition publication date (or Revised Print date where the charted magnetic variation is more than 1º in error) (e.g. 30 June 2011 if the publication/reprint date is in 2011);
- Select D and dD options.

The output will be the Magnetic Variation in decimal degrees and the annual rate of change in +/-decimal degrees (+ indicates an easterly change, - indicates a westerly change).

Some examples of the calculation (based on the date being 30 June 2011) are shown in the following table. Note the rounding of values in Chart Depiction (see B-272.3):

Latitude	Longitude	Magnetic Variation	Annual Rate of Change	Chart Depiction
-11°47'	134°12' E	3°56'53"	0°00'36"	3°55'E 2011 (1'E)
-19°46'	148°06' E	8°01'44"	-0°00'47"	8°00'E 2011 (1'W)
-38°44'	146°41' E	12°32'38"	0°00'29"	12°35'E 2011 (0')

Table 200.4: Examples of Magnetic Variation calculation

B-272 Magnetic data: Symbols

B-272.1 On Charts of scale smaller than 1:750 000

In addition to isogonals, the following information must be shown:

- A note indicating the date the magnetic variation and annual change was calculated for (i.e. the year of publication – e.g. 2011 if the publication date is in 2011) of the curves

must be indicated in or near the title block. Note wording must be provided by the MIS Section.

- When isogonal lines are shown, the compass roses on the paper Chart must consist of the true north rose only, i.e. standard compass rose, including cardinal pecked lines and centre circle and dot, but without the magnetic north arrow, magnetic variation value and annual change to magnetic variation value.

B-272.2 On Charts of scale larger than or equal to 1:750 000

Magnetic data must be shown inside compass roses or as legends. When used as a legend, the paper Chart depiction should be as follows:

Magnetic Variation: 13°50'E 2011 (1'E)

Note that there must be no letter spacing inserted after the degree or minute symbols.

In some circumstances it is necessary to show the magnetic variation within the title block of a paper Chart Plan. This will generally occur on a sheet of Plans where a compass rose is not included in each Plan. In this circumstance the magnetic variation should be shown as depicted above. Where space is insufficient for the full text, the magnetic variation text may be abbreviated to **Mag. Var.** See also B-241.

Within a sheet of Plans where the magnetic variation is stated as legends, a compass rose(s) should also be shown on the Chart. The rose, centre circle and dot and NS and EW pecked lines only must be shown in this case – the magnetic variation arrow must not be shown. These roses should be shown in accordance with the guidelines in B-262.2.

Where each Plan in a sheet of Plans contains a compass rose, the magnetic data should be shown inside the compass roses. Where a Plan is included on a Chart or sheet of Plans and the entire limit of the Plan is contained on the main Chart or another Plan, there is no requirement to show magnetic data information for the Plan.

B-272.3 Magnetic legends

The magnetic variation value, date and annual rate of change (in parentheses) should be placed, centre justified and centre aligned, within the magnetic variation arrow of the paper Chart compass rose, which points to the quoted magnetic variation value on the rose. Justification may be varied to avoid fouling critical data. Variation must be quoted to the nearest 5' and the rate of change to the nearest 1'. To both values, the E or W label must be added as appropriate. Where the increase or decrease in the rate of annual change is 30" or less, it must be shown as (0'). An example of the legend is as follows:

8°20'E 2011 (1'E)

Note that there must be no letter spacing inserted after the degree or minute symbols.

B-273 Magnetic data: Corrections

B-274 Abnormal Magnetic Variation

B-274.1 Where the magnitude and extent

The following legends may be used on paper Charts:

- Abnormal Magnetic Variation (see Note) - to indicate a varying anomalous value.
- Local Magnetic Anomaly (see Note) - to indicate a local effect of constant magnitude.

A note must be inserted in or near the title block when precise limits of areas are not available or scale does not allow the use of the symbol. Note wording must be provided by the MIS Section.

B-274.2 Where local magnetic anomalies have not been investigated

When the information is not sufficiently precise the following legend may be used on paper Charts:

- Magnetic Anomaly (see Note) - to indicate a local effect.

A note must be inserted in or near the title block when precise limits of areas are not available or scale does not allow the use of the symbol. Note wording must be provided by the MIS Section.

B-274.3 Magnetic poles

B-280 Depth Unit Conversion Table

New paper Charts and New Editions must not show a depth conversion scale. All existing paper Chart products with an edition date prior to 11 March 2004 must retain the depth conversion scale.

B-281 Other Tables

B-290 Source Diagrams

For Australian Nautical paper Charts only ZOC diagrams must be shown. See B-290.6 and B-297. Source diagrams as explained in this section must not be shown on standard series nautical Charts. In unusual cases they may be used on fleet Charts (see B-298).

B-290.1 The term 'Source Diagram'

B-290.2 Two main types of diagrams

B-290.3 The Explanatory notes

There must be no explanatory (Chart construction) note drawing attention to the ZOC Diagram placed on Australian paper Nautical Charts. See B-241.10.

B-290.4 Sources of topography

There must be no reference to topographic sources shown in paper Chart ZOC diagrams.

B-290.5 National navigation manuals

B-290.6 Updating

All published paper Charts of scales 1:500 000 and larger having no ZOC Diagram or having a Reliability Diagram (see B-298.1) must be updated to include a ZOC Diagram when a New Edition of the Chart is produced.

B-291 Purpose of Source Diagrams

B-291.1 The purpose

B-291.2 As a useful by-product

B-292 Scales of Charts Which Should Have Source Diagrams

B-292.1 Regional differences

B-292.2 Charts of scale 1:500 000 and larger

All paper New Charts and New Editions of scale 1:500 000 and larger must contain a ZOC Diagram.

B-292.3 A large scale Chart compiled from a single survey

See B-292.2.

B-293 Graphical Representation of Limits of Surveys

B-293.1 The linear dimensions

B-293.2 Continuous black lines

B-293.3 Land tint

Land tint must cover land areas on paper Chart ZOC Diagrams. Sea areas, including intertidal areas, must be left white.

B-293.4 Graduation

Paper Chart ZOC Diagrams must show latitude and longitude graduation at the same interval as the main Chart to enable clear position recognition between the Diagram and the Chart. For

some small Plan and Inset areas, some internal graduations may need to be excluded. Graduation should be labelled with at least one degree value along each side, related to main Chart graduation labelling. The other graduations should be labelled with minute values sufficient to indicate the graduation interval.

Where a Chart has no Plans or Insets, the border of the ZOC Diagram must be a single line.

B-293.5 Inset Plans

Plans should be positioned proportionally to each other in terms of location and size, within the paper Chart ZOC Diagram.

Where a Chart includes Plans or an Inset, the border of the ZOC Diagram must include all borders and neatlines of the Chart panels.

Plans and Insets within the ZOC Diagram must also be graduated with at least one label showing a degree and, if appropriate, a minute value.

B-293.6 Larger-scale Charts and Plans

When there is a Plan or Inset within the paper Chart boundary, the ZOC information should be shown on the section of the Diagram corresponding to the position of the Plan or Inset on the Chart, with a note being added to the main Chart area on the Diagram stating "see Plan". Similarly, when there is a larger scale Chart within the area, ZOC information may be omitted and a reference to the larger scale Chart inserted instead i.e. Aus X (where X is the Chart number). This should only be done if the larger scale Chart also contains a ZOC Diagram.

Note that the limits of areas containing larger scale ENC data (B-254.2) must not be shown in ZOC Diagrams. The limits of the ZOC areas must be displayed instead.

B-293.7 Charts

B-293.8 Special measures

The extents of major coral reefs and obstruction areas should be shown within the paper Chart ZOC Diagram to assist in identifying where channels lie in relation to the limits of the ZOC data. Where this is the case, the extents must be shown as a danger line (see INT1 – K1), without green or blue colour tint infill.

B-294 Details of Sources: Date and Scale

B-294.1 The date of a survey

B-294.2 Guidance

B-294.3 The scale

B-294.4 When a new survey is received

B-295 Details of Sources: Origin and Type

B-295.1 The country of origin

B-295.2 The type of "survey"

B-295.3 Guidance

B-295.4 Surveys made by non-government agencies

B-296 Source Lists

B-296.1 Sources of similar type, date and scale

B-296.2 The sources

B-296.3 The source list

B-297 Zones of Confidence (ZOC) Diagrams

Position

The paper Chart ZOC Diagram and its associated Category Table must be placed on land where possible and clear of important navigational information. The Category Table should be positioned underneath and centred to the ZOC Diagram (preferred) or to the right hand side of the ZOC Diagram. Where the ZOC Diagram and Category Table is placed on land, the land tint must be "masked" under the Diagram (except for land areas in the diagram itself – see B-293.3) but retained under the Category Table. Where the ZOC Diagram and Category Table is placed in the water, blue water tint must be "masked" under the Diagram but should be retained under the Category Table.

If the Table is located to the side of the Diagram, the bottom of the Table should be aligned with the Diagram's bottom graduation text or the Diagram's bottom neatline.

B-297.1 Zones of Confidence (ZOC) Diagrams

Place names should only be shown to distinguish major named features on the paper Chart such as a city name or island name. If geographic features appear in the Chart title they should also be shown in the ZOC Diagram.

B-297.2 Continuous black lines

Line characteristics for paper Chart ZOC diagram components are given in the following table:

Component	Colour	Line Characteristics (mm)
Coastline	Black	0·15mm line weight
Reef	Black	0·20mm diameter dot 0·5mm apart (centreline).
Borders and Graduation	Black	0·125mm line weight
ZOC limits	Magenta	0·15mm line weight, dash length 1·5mm, dash gap 0·5mm
Larger scale paper chart limits	Magenta	0·15 line weight

Table 200.5: Line characteristics for ZOC Diagrams

B-297.3 The linear dimensions

The linear dimensions of the graphic for all paper Chart ZOC Diagrams must be one-tenth those of the Chart's neatline dimensions.

B-297.4 The quality

The Diagram must properly represent all hydrographic source information. This includes the boundaries of larger scale paper Charts where they carry a ZOC Diagram to current

specifications (limits of areas containing larger scale ENC data must not be shown). In this case the paper Chart limit and reference must be shown and all ZOC data within the limits of the larger scale chart must be omitted. If the larger scale Chart does not carry a ZOC diagram the ZOC data within the limits of the larger scale Chart must be included and the Chart limit and reference must not be shown.

ZOC values for source data must be approved by DDBDA.

Where a charted survey is supplemented on the Chart by occasional soundings from a lower ZOC survey, only the main survey should be categorised. The less accurate depths should be indicated on the Chart as hairline/upright soundings. Where a single survey comprises areas assessed at different ZOC categories, a decision should be made as to whether to indicate the different areas on the ZOC Diagram. This will depend on the extent of the area covered at scale, and hairline soundings may be used on the Chart in lieu of the lower ZOC boundary in the Diagram (see B-412.4). Decisions must be made in consultation with DDCPM.

Where an area has been surveyed on numerous occasions and these surveys have been allocated a lower ZOC value (i.e. B, C or D), the final charted ZOC value for the area may be upgraded as the criteria for a higher ZOC value may have been achieved through total coverage from all surveys conducted. Compilers should identify such circumstances at the Final Chart Review. All decisions regarding the final ZOC value to be shown on the Chart must be confirmed by DDHPS.

As a result of some disasters, e.g. earthquakes, tsunamis, hurricanes, it is possible that large areas of seafloor have moved and/or become cluttered with dangerous obstructions. Emergency surveys may subsequently be conducted over essential shipping routes and inside harbours (see clause B-417.8). Outside these surveys, all existing detail is now suspect, whatever the quality of the previous surveys. In such cases, the CATZOC value should be reclassified to value *5* (zone of confidence D) in the affected areas outside the area covered by emergency surveys. In the Australian context, such “disasters” are mostly associated with severe flooding, affecting depths in rivers and in the vicinity of river mouths. For these “less severe” natural disasters, the CATZOC value should be reclassified to value *4* (zone of confidence C) in the affected areas.

Where surveys of the same ZOC category adjoin or overlap, the area covered by the surveys must be merged into a single area.

B-297.5 Guidance

B-297.6 The higher ZOC categories

For all new Charts and New Editions where a Maintained Depth area is shown, this must be categorised as ZOC A1 for ENC and in the paper Chart ZOC Diagram.

B-297.7 Additional categories

For all new Charts and New Editions the abbreviation for Maintained Depth (MDSC) must not be used in the ZOC Diagram on Australian paper Nautical Charts (see B-297.6), and the row referring to MDSC in the ZOC Categories Table must be removed.

For all new Charts and New Editions unsurveyed areas must be categorised as ZOC D within the ZOC diagram on Australian Nautical Charts.

B-297.8 The date of a survey may be important

On Australian paper Nautical Charts dates should not be included on ZOC Diagrams. In exceptional circumstances, particularly in areas of mobile or unstable sea floor, the date may be inserted with DDHPS approval.

B-297.9 Category of Zones of Confidence in data – ZOC Table

For all paper new Charts and New Editions commenced from March 2019, the Seafloor Coverage qualification for ZOC values A1 and A2 must read “Significant seafloor features

detected" and 'Position Accuracy' for ZOC A1 must read '+/- 5m + 5% depth, to be consistent with changed qualifications introduced in S-57 Supplements No. 2 (June 2009) and No. 3 (June 2014).

B-298 Dual-Purpose Diagrams

B-298.1 Dual-purpose diagrams

On many Australian paper Charts published prior to the adoption of ZOC Diagrams, a Source Diagram, termed in Australia a Reliability Diagram, was used to give an assessment of accuracy of depth information for navigation.

Where a Chart contains a Reliability Diagram, it must be replaced by a ZOC Diagram at the next New Edition of the Chart.

Updating a Reliability Diagram

For minor corrections a Notice to Mariner may be used to update a Reliability Diagram. If the change is substantial preference is for a Notice to Mariner Block to update the Reliability Diagram to a ZOC Diagram.

Where a Reliability Diagram is being updated, the text and line characteristics should be as near consistent as the existing Reliability Diagram features as possible.

Blue Tint within a Reliability Diagram

For charts to be reprinted that contain a Reliability Diagram, any blue tint on the Diagram must be removed.

B-298.2 The linear dimensions

AHO Chart Specifications

referenced to S-4 Part B, Section

300

Topography

Table of Contents

B-300 Topography (Land Representation): General

B-300.1 The requirements for the representation of land

B-300.2 User needs

Land topographic features are shown to assist the mariner in determining position, orientation and direction of movement. The following principles must be observed:

- Only topographical features visible and identifiable for coastal or river navigation, or capable of being detected by radar, must be included on Australian Nautical Charts.
- On Charts covering pilotage and constrained waters land topographical features beyond the coastline and foreshore must be limited to conspicuous objects, landmarks and features (both natural and man-made) that provide readily identifiable head-marks, stern-marks, beam-marks and transits to aid visual navigation. Other land topographic detail should be kept to a minimum to provide navigators with a general picture of the geography and the nature of the foreshore. The number and positioning of fixed or floating navigation aids in a Chart area should have little influence on the level of topographical detail depicted.
- On Charts intended for coastal navigation, the level of detail of the topography shown must vary with distance inland from the coast. The detail of topography shown in the coastal belt should allow the mariner to determine position visually and by radar, and provide a general picture of the geography and the nature of the foreshore. The navigators' interest in land detail is greatest at the coastline and falls off rapidly inland, and is non-existent where a feature is not in visual or radar line of sight. The position and prominence of fixed navigation aids should be considered in determining the appropriate level of depiction.
- On Charts intended for route planning and ocean passage, land topography should only include the coastline and significant navigation aids.
- Consistent depiction of land topographic detail must be maintained between ENC cells and equivalent paper Charts. Where a revised level of detail has been determined appropriate, the ENC and paper Chart may differ only until such time as the next New Edition is published.

Information should be derived from analogue or digital surveys, topographic maps, port plans, remote-sensed images, aerial photography or the next largest scale Chart as appropriate. The priority order for capturing the HW line (coastline) on charts is:

i. On the field surveys
ii. Satellite imagery; orthorectified aerial photos
iii. Topographic maps

Topographic source data should be at scales preferably larger than the Chart scale. For raster datasets this means that its spatial resolution (grid size) should be =< than (0.2 x product scale) (eg. 1.6m for a 1:8000 scale). If coastline is captured using an 'inadequate' (smaller scale) source it must be represented as approximate (QUAPOS=4 in ENCs). This is to recognise that it may have been not possible to identify all relevant features for the scale of the product. Where imagery is used, it must be noted that information (such as coastline) is an interpretation only – discussion should be held during the Chart Review as to how such information is to be interpreted, with decisions (such as interpretation of the seaward edge of mangroves as the "apparent" high water line) recorded in the chart file.

Important topographic detail mentioned in Sailing Directions must be included on the largest scale Chart covering a geographic area and on other scales where appropriate.

B-300.3 The scale and purpose of the chart

Series Charts must provide a uniform depiction of topographic detail across the series. This does not negate the requirement to include more recent/accurate information on a New Chart or New Edition.

The types of landmarks charted and the distance inland to which they are shown will vary with the Chart purpose, scale, the type of terrain, availability of source data and adequacy of navigation aids as detailed above. Therefore Table 300.1 below provides **guidance** on the land topographic features appropriate for the various Chart scales (ENC and paper Chart). Where a scale range is specified, the larger and smaller scales shown are inclusive.

S-4 Topographic Content : Chart Scale

Topographic Theme	*AUOC Ref*	*S-4 Part B Sect 300 Paragraph*	*Chart Scale(s)*
Survey Control Points	4.3	B-304	Nil
Feature Control Points	4.3	B-305	500000 and larger
Land Jurisdictional Boundaries	11.2.1	B-306	150000 - 3500000
Distance Marks	4.4	B-307	25000 and larger
Coastline- General	4.5	B-310-311	All
Coast, Natural Features	4.5.1	B-312	500000 and larger
Coast, Artificial Features	4.5.2	B-313	500000 and larger
Ports and Harbours	4.5.2, 4.6	B-320	150000 and larger
Quays, Piers, Wharves, Jetties and Moles	4.6	B-321	500000 and larger
Structures not intended for Berthing Alongside	4.5.2	B-322	500000 and larger
Berths (names and numbers)	4.6.2	B-323	25000 and larger
Landing and Launching Places	4.6.5	B-324	150000 and larger
Harbour Offices	4.6.3	B-325	25000 and larger
Docks	4.6.6	B-326	25000 and larger
Dolphins, Posts and Piles	4.6.7.1	B-327	75000 and larger
Bollards	4.6.7.1	B-327.4	5000 and larger
Dockside Buildings and Structures	4.6.9	B-328	25000 and larger
Works under construction and projected	4.6.10	B-329	500000 and larger
Landmarks and Conspicuous Objects	4.8.15	B-340	500000 and larger
Natural Features	4.7	B-350	500000 and larger
Relief: Contours, Form Lines, Shading	4.7.2	B-351	500000 and larger
Relief: Spot Heights	4.7.2	B-352	500000 and larger
Rivers, Lakes, Glaciers	4.7.6, 4.7.8, 4.7.10	B-353	500000 and larger
Vegetation	4.7.11	B-354	150000 and larger
Artificial Features in general	4.8	B-360	500000 and larger
Canals	4.8.1	B-361	25000 and larger
Railways – across waterways	4.8.2	B-362	75000 and larger
Tunnels, Cuttings - conspicuous	4.8.3, 4.8.4	B-363	75000 and larger
Roads and Tracks - conspicuous	4.8.8	B-365	150000 and larger
Airfields	4.8.12	B-366.1	500000 and larger

S-4 Topographic Content : Chart Scale			
Topographic Theme	***AUOC Ref***	***S-4 Part B Sect 300 Paragraph***	***Chart Scale(s)***
Landing areas	4.8.12	B-366.2	500000 and larger
Helicopter landing areas	4.8.12	B-366.1	500000 and larger
Quarries - conspicuous	4.8.4	B-367.2	500000 and larger
Buildings	4.8.15	B-370	150000 and larger
Urban Areas	4.8.4	B-370	500000 and larger
Street and Road Names	4.8.8	B-371	75000 and larger
Public Buildings	4.8.15	B-372	25000 and larger
Places of Worship	4.8.15	B-373	75000 and larger
Chimneys, Towers, Windmills, Flagstaffs	4.8.15	B-374	500000 and larger
Radio Masts and Towers	4.8.15	B-375	500000 and larger
Cylindrical Tanks	4.8.15	B-376	500000 and larger
Pipelines on land	11.6.1	B-377	Nil
Ruins	4.8.15	B-378	150000 and larger
Fortified Structures	4.8.15	B-379	150000 and larger
Bridges and Obstructions - Clearances	2.1.2	B-380	75000 and larger
Bridges	4.8.10, 4.8.18	B-381	500000 and larger
Overhead Cables	11.5.2	B-382	75000 and larger
Overhead Pipes	11.6.3	B-383	75000 and larger
Views and Sketch Points		B-390	Nil
DGPS station		B-481.5	500000 and larger

Table 300.1: Theoretical relationship between Navigational Purpose and level of depiction

Duplicated areas

Areas covered by larger scale Charts

When producing a Chart in areas that are covered by a larger scale Chart, the following rules must be applied:

A selection of detail from the larger scale Chart must be shown, with the exception of updating for information that is more recent or accurate than the larger scale Chart. Where this is the case, the larger scale Chart should also be updated as soon as possible to reflect the more recent and/or accurate information.

All detail that is important for navigation must be selected, taking into account the scale and purpose of the Chart.

Detail must be generalised to ensure clarity, without omitting important detail.

Areas covered by overlapping paper Charts at the same or similar scale

Overlapping areas of paper Charts of the same or similar scale must be identical where possible. An exception is when a New Chart or New Edition is produced which carries more recent and/or accurate information than an overlapping Chart. Where this is the case, the overlapping Chart should also be updated as soon as possible to reflect the more recent and/or accurate information. Also, overlap areas may contain Chart Title, Construction and Cautionary Notes, ZOC diagram, etc. on one or both of the Charts, which may result in the depiction of topographic detail not being identical.

Where an overlapping Chart is of “similar” scale, and the determination at the Chart Review stage of production is that this is to be indicated as a border reference to the adjoining Chart (see B-254), the topographic detail in the overlap area must be identical where possible, in accordance with the above paragraph.

Information from existing Charts

When producing either a New Chart or New Edition that supersedes an existing Chart, topographic information from the existing Chart should be reassessed, and altered only where necessary. Reasons for alteration include:

- New or more accurate information is available.
- Correction of an error on the existing chart.
- Alteration to accommodate new information e.g. reselection of contour labels around new features.
- Alteration to accommodate movement of existing data e.g. reselection of spot heights around a relocated title block.
- Alteration to include changes to Specifications.

All New Charts must comply with these Specifications, using any previous Chart only as a guide.

Cautionary and Explanatory Notes

Within the body of the Chart, references are often made to cautionary and/or explanatory notes that are included in the Chart title block. An example is:

Indigenous Australian Estate
(see Note)

B-300.4 Source data

B-301 Land Tint

All Australian paper Nautical Charts must use a buff colour for land tint. Exceptionally, some fleet Charts may use a brown colour.

B-301.1 Land tint should normally be shown continuously

B-302 Plane of Reference for Heights

Spot height values taken from topographic maps (usually based on MSL) must be adjusted to the stated Height Datum (plane of reference for heights – see B-302.2) for the Chart.

If no precise position for the spot is known, it may be useful to include a height figure, without a spot. In wooded areas, the general height of the treetops may be shown (see INT1 - C14).

Spot heights must be shown to the nearest whole metre value.

For heights of rocks which do not cover (islets) see B-421.1.

Rounding Rules for Heights

Where required to be rounded to whole metres, land heights quoted in metres and decimetres on the source must be rounded as follows:

- 0·1 to 0·5 – down
- 0·6 to 0·9 – up

To convert land heights given in feet to metres

Table HD 610 must be used for heights 0 to 102 feet and Table HD 612 must be used for heights 102 feet and above, rounded to whole metres (0·50 down and 0·51 up). *These tables must not be used in reverse.*

To convert metric land heights to feet:

1 to 399 metres – Table NP 720 must be used (rounding 0·5 down and 0·6 up).

400 metres and above – must be converted by dividing the metric value by 0·3048 and rounding the result to the nearest foot (0·50 down and 0·51 up).

B-302.1 The explanatory notes

B-302.2 The plane of reference

The plane of reference for all heights, except drying heights, bridges and overhead obstructions involving clearances, must be either Mean High Water Springs (MHWS) or Mean Higher High Water (MHHW), depending on whether the tidal level is based on diurnal ports (MHHW) or semi-diurnal ports (MHWS). All tidal information must be supplied by the Tides and Geodetic Section. See B-380.1 for bridge and overhead obstruction clearance heights and B-413 for drying heights.

B-302.3 All height figures

B-303 Heights Above Physical Ground Level

B-304 Survey Control Points

Survey control points that are of interest to the hydrographic surveyor only rather than the navigator must be omitted from Charts. Survey control points that are of some navigational significance should be shown. Other survey control points used to reference a source document on a local grid or unusual projections or geodetic datum may be retained during Chart

compilation to aid in the editing and acceptance process, but these points must be removed prior to publication of the Chart.

B-304.1 A triangulation point

B-304.2 An observation spot

B-304.3 A benchmark

B-305 Not currently used

B-306 Boundary Marks

Boundary marks must not be shown on Australian Nautical Charts. Fence lines and bounding walls must not be charted unless conspicuous and then only if there are insufficient other conspicuous features in the vicinity.

B-307 Distance Marks

B-310 Coastline, General

The coastline should be referenced to Mean High Water Springs (MHWS) or Mean Higher High Water (MHHW) – depending upon the plane of reference for heights (see B-302). On many sources (e.g. topographic or ice maps) the plane of reference for heights is referenced to Mean Sea Level (MSL). In the absence of any other source for the coastline, this should be adopted for the Chart as the MHWS or MHHW level. Where imagery is used as source for the coastline, decisions regarding the interpretation of the imagery (e.g. interpretation of the seaward edge of mangroves as the "apparent" high water line) must be discussed during the chart review and recorded in the chart file. Refer to section 300.2 for the preferred sources (and their priority order) to be used when capturing coastline.

Whenever the coastline is updated and major anomalies exist with existing charted coastline, the anomaly must be raised with Geosciences Australia through the MIS Section. This is important due to the connection between the charted HW line and GA's 'Australian Maritime Boundary Information System (AMBIS)' data set (for coastline). This dataset supports Australia's claims to its maritime boundaries.

'Dry' soundings (depth is =< -H) from LADS (RAN) surveys are not to be used to identify land areas. Intertidal soundings must only be used to delineate intertidal areas and soundings which depth is =< than –H must not be charted. The use of other (third party) datasets based on laser technology may be used to define the HWL but they have to be specifically approved by DDBDA.

Where possible, text shown on paper Charts must be positioned so as not to interfere with the coastline (see B-230 in this document – S-4 B-230 is currently not used). The coastline may only be broken (gapped) for point symbols such as navigation aids and landmarks.

B-310.1 A surveyed coastline

B-310.2 The coastline must be generalised

B-310.3 The line weight used for the coastline

B-311 Unsurveyed Coastline

Coastline that is derived from a source compiled at a scale that is considerably smaller than the Chart must be represented as approximate.

B-312 Coast, Natural Features

B-312.1 A steep and high coast

Cliffs and steep coast must be symbolised on paper Charts using the appropriate symbology as defined in the AHO Line and Symbol Specifications, which is subject to small and large scale variants in width (INT1 symbology is not suitable). The width of the symbol should be selected based on the following:

- To match the physical size of the cliff.
- To prevent the symbol from being displaced inshore significantly (a factor of Chart scale). This is particularly true when the displacement of the symbol gives mariners a wrong impression of the coast.
- To prevent the vertical lines of the symbol from overlapping each other when the symbol is curved around an angular piece of cliff crest or from extending seaward beyond the charted coastline.

Coastal hillocks

Coastal hillocks must only be shown when they are navigationally significant. Where it is required to show coastal hillocks, topographic contour(s) and/or spot elevations should be used to represent elevation detail. The paper Chart symbol INT1 – C4 must not be used.

B-312.2 A flat coast

A sandy shore

A stony shore

The paper Chart symbol INT1 – C7 must not be used on Australian Nautical Charts. Such coastline may be indicated by legend if required.

A marshy shore

The seaward extent of marsh areas, visible at high water, must be delineated by inadequately surveyed coastline (see B-311). This should be supported by the independent application of the marsh symbol inland from the coastline on paper Charts.

B-312.3 Prominent sandhills or dunes

A single line of dots must be used to delineate the extent of these features on paper Charts, where considered useful to the mariner. Extensive areas may be supported by a legend.

B-312.4 Mangroves (and Nipa Palms)

While mangrove areas must be encoded in larger scale ENC as they are represented on the source (i.e. in the intertidal area if indicated as such on the source), for paper charts at scales 1:500000 and larger a decision as to the method of depiction of mangroves (i.e. in the intertidal area or on land) must be made at the chart review. The decision as to which method to use should be based on the possible importance of the seaward edge of the mangrove in terrestrial (radar) navigation.

NOTE: It is important to recognise that any information taken from aerial photography or satellite imagery is an interpretation only. When aerial photography or satellite imagery is used as source, decisions as to how to represent areas considered to be mangrove, including whether to interpret both the landward (high water) and seaward (low water) lines; or depict only the seaward edge as the “apparent” high water line, must be made during the chart review. All decisions must be recorded on the chart file.

B-313 Coastal Protection Structures

The AHO adheres to S-4 for the features represented in this Section but has identified Line and Symbol Specifications for presentation standardisation on paper Charts. See sections F1, F2, F3 and F6.3 of those Specifications for details.

B-313.1 A dyke, levee

Where it is required to show a dyke or levee, it must be done using the INT1 – F1(a) option.

B-313.2 A seawall

Where it is required to show a sea wall, it must be done using INT1 – F2.1, and showing only a single line of “bricks” on the inshore side of the coastline. The symbol INT1 – F2.2 must not be used.

B-313.3 A causeway

B-313.4 A groyne

B-320 Ports and Harbours in General

Features which are part of port infrastructure that are required to be identified by the mariner in the course of pilotage, navigation or berthing must be shown on the largest scale Chart covering the port, along with any associated feature place names.

B-320.1 Fishing harbours or ports

B-320.2 Boat harbours and marinas

B-321 Berthing Structures

Where practical, depths associated with quays, jetties and berths should be indicated on the largest scale charts (see B-410(a)).

B-321.1 Quays and Wharves

Where it is required to show a quay or wharf, it must be done on paper Charts using the symbology as depicted at INT1 – F13(b). The application of the thicker line (0·3mm) indicates the section of the quay or wharf where ships may come alongside, known as the **berth** (see B-323). These berths are sometimes named or numbered. Note that some wharves have a solid face while others have an open face. This information may be important for ships manoeuvring towards a berth.

B-321.2 A pier

Where it is required to show a pier or jetty, it must be done on paper Charts using the symbology as depicted in INT1 – F14 and F15, with the single thicker line (0·3mm) being used when scale prevents showing both sides independently.

If the single thicker line option is used, the annotation “Pier” or “Jetty” should be shown where space allows. The plural “Piers” or “Jetties” may be used in congested areas with multiple facilities.

B-321.3 A mole

Where it is required to show a mole, it must be done on paper Charts as follows:

- The breakwater part of the mole must be shown as depicted in INT1 – F4.1(a);
- The berthing facility along the mole must be shown as depicted in INT1 – F13(b) (see B-321.1).

The single thicker line (0·3mm) must be used when scale prevents showing both sides of the mole independently.

B-321.4 A jetty

See B-321.2.

B-321.5 A roll on, roll off ferry

B-321.6 Names of berthing structures

B-321.7 Berth designations

The circle surrounding the berth number or letter must be 3·5mm in diameter on paper Charts. In all cases, the berth number must read from the bottom of the chart (i.e. must not be oriented to the angle of the berth face).

B-321.8 A visitors’ berth

B-321.9 A covered berth

B-322 Structures Not Intended for Berthing Alongside

B-322.1 A breakwater

Where it is required to show a breakwater, it must be done on paper Charts using the symbology as depicted in INT1 – F4.1(a), with the single thicker line (0·3mm) being used when scale prevents showing both sides independently.

B-322.2 A training wall

B-323 Not currently used

B-324 Landing and Launching Places

B-324.1 A slipway

The legend “Ramp” should be added alongside a launching ramp on paper Charts to differentiate it from a slipway, and the legend “Slip” should be added alongside a slipway to differentiate it from a ramp. The plural “Ramps” or “Slips” may be used in congested areas with multiple facilities.

B-324.2 Landings

B-324.3 A pontoon

The legend “*Pontoon*” should be shown on paper Charts where space permits, as the symbol is not distinctive.

B-324.4 Steps and landing stairs

B-325 Harbour Offices

B-325.1 A harbour masters office

B-325.2 A custom office

B-325.3 A health office, or quarantine building

B-326 Docks

B-326.1 A dry dock (or graving dock)

The seaward edge of the gate on a dry dock must be shown on paper Charts in the same line weight as the coastline.

B-326.2 A floating dock

B-326.3 A wet dock or non-tidal basin

B-325.4 A tidal basin or tidal harbour

B-326.5 A caisson

The seaward edge of the gate on a caisson must be shown on paper Charts in the same line weight as the coastline.

B-326.6 A lock

B-326.7 A flood barrage

B-326.8 A gridiron

B-327 Dolphins, Posts and Piles, Bollards

B-327.1 A dolphin

On Australian paper Nautical Charts, where the small square symbol is used (see INT1 – F20(b)), land tint must be superimposed within the square.

Where space is limited, the legend is not required.

B-327.2 A deviation dolphin

B-327.3 Minor posts or piles

B-327.4 A bollard

B-328 Dockside Buildings and Structures

B-328.1 Transit sheds and warehouses

B-328.2 A timber yard

B-328.3 A crane

Note: Lifting and container cranes may also be visually conspicuous. Where this occurs, the crane symbol must also be annotated on paper Charts with the legend "CRANE". Also, charted sheerlegs may not be visually conspicuous. Where this occurs, the text accompanying the position circle must be standard upper and lower case text.

The position of a sheerleg or a travelling crane is defined as its resting position, if known.

Cranes must be oriented such that the "arm" of the crane symbol points to seaward.

B-328.4 Dock railways

B-329 Works Under Construction and Projected

B-329.1 Works on land

B-329.2 Works at sea which will extend the coastline seaward

B-329.3 Works at sea which will be wholly or partly submerged

B-329.4 Where information is lacking

B-329.5 Limits of works marked by buoys or lights

B-329.6 Work projected

B-330 Moored and Fixed Vessels, Hulks

B-340 Landmarks, Conspicuous Objects: General

Features which are visually or radar conspicuous to the mariner and which assist the mariner in the course of pilotage or navigation must be shown. Features that are prominent from seaward (landmarks) should also be shown where space permits. However, consideration should also be given as to what navigational aids are available in the vicinity, before selecting which landmarks (if any) are to be shown (see also B-340.1).

B-340.1 Prominence

B-340.2 Charting landmarks

The actual position of pictorial symbols on paper Charts is the centre of the small circle at the base of the symbol.

B-340.3 Conspicuous objects

B-340.4 Aids to navigation which are daymarks

B-340.5 Pictorial sketches of landmarks

B-350 Natural Features: General

On the smaller scale ENCs and INT paper Charts (1:10 000 000 and 1:3 500 000 (Navigation Purpose 1) series), there must be no relief (contours, spot heights) shown. On the 1:1 500 000 (Navigation Purpose 2) Chart series, only the main landfall relief features should be shown, by spot height only.

B-350.1 Harbour Plans

B-350.2 Coastal and approach Charts

B-350.3 Landfall and passage Charts

B-350.4 Navigable rivers, lakes and canals

B-351 Relief: Contours

Topographic contours that support natural features that are visually or radar conspicuous, or used for navigation, must be shown on Charts from scale 1:150 000 to 1:500 000 inclusive.

Depiction of topographic contours on Charts at scales larger than 1:150 000 must be considered on a case by case basis, taking into account the navigational requirements of the Chart.

B-351.1(I) On international charts

Topographic contours must not be shown on Australian Navigational and INT Charts at scales 1:1 500 000 and smaller.

B-351.2 Omission of contours from smaller scales

B-351.3 Contour lines

All topographic contours on Australian paper Nautical Charts must be shown in black.

Index contours must not be shown on Australian Nautical Charts.

The full range of contours shown on the Chart must support spot heights. Isolated contours must only be shown if they have a shape measuring more than 4mm in any direction, unless they are required to support a spot height or represent a prominent or conspicuous isolated hill. As part of generalisation, small contours may be incorporated into larger adjacent contours of the same value. Where required, contours must be shown for areas visible from seaward and should not be shown elsewhere.

Contours should reflect the general nature of the topography in the area of interest to the mariner i.e. contours should not be depicted in inland areas not visible from seaward or on the inland side of hills and ranges. They must be broken on paper Charts for text, buildings, roads, pictorial symbols and similar detail. Contours should not be shown in charted urban areas (INT1 – D1) unless the topography of the area is such that it forms a prominent natural feature that may be used for navigation.

B-351.4 Approximate contours

B-351.5 The contour interval

The area(s) of coverage for topographic contours and contour interval should be confirmed during the Chart Review, however series charting should use the same contour interval. For example, the standard contour interval used for Charts in the 1:90 000 – 1:500 000 scale range should be 100m. However, in areas where the height from the coast increases to very high elevations within the area of interest, such as in parts of Papua New Guinea, a decision may be made during the Chart Review to show the topographic contours at a 200m contour interval.

Supplementary contours may be used on Australian Nautical Charts, but only where the relief is too flat to be adequately represented at lower elevations, and it is considered to be necessary for navigation to include them.

B-351.6 Height labels

Topographic contour values on paper Charts must be oriented to read up the slope and must be placed at regular intervals evenly over the Chart. They should be laddered in a line or curve. When possible, the values should be positioned so that they are easily legible from the southern border of the Chart, or if viewed from seaward.

B-352 Relief: Spot Heights

The spot must be symbolised on paper Charts by a solid circle of size 0·3mm diameter.

Spot elevation values should be left or right justified to and centre aligned with the spot symbol. In congested areas it may be necessary to place the value above or below the symbol. In both cases the value should be centre justified to the symbol.

Where the geographic name of the feature is known, it should be placed above the elevation value with left or right justification subject to placement in relation to the symbol. These are preferable even though topographic contours may need to be broken. The two lines of text should be centre aligned to the spot elevation symbol. See examples below.

The following example shows the first two preferences. The last preference is for any other placement. *Please note that the size of the spots and text in the example is not correct.*

Mount Williams . . **Mount Williams**
34 **34**

When the elevation of an island will not fit within its coastline at paper Chart scale, or the island has been represented as a dot (see B-310.2), the elevation must be placed within brackets and should be positioned beside the island or its name (see INT1 – K10(b) and (c)). If the name and elevation are to be shown on a single line, the island name must be closest to the island, as follows:

O Investigator Island **(126)** **(126)** Investigator Island **O**

For heights of 5 meters or less the trailing zero (i.e. ·0) must not be shown.

All spot elevation values, regardless of the size of any associated feature name, must be shown on paper Charts in accordance with AHO Text Specifications.

B-352.1 Location of spot heights

B-352.2 A point or summit, the height of which has been determined

B-352.3 Approximate heights

B-352.4 The height of top of trees

The height of top of trees, shown in brackets on paper Charts, may also be used to give the mariner an indication of the overall height of a heavily vegetated low island.

B-353 Land Drainage: Rivers, Lakes, Glaciers

B-353.1 The Symbol

Rivers, or reaches of rivers that are navigable at Chart scale, must be depicted in accordance with the specifications for any navigable body of water. The balance of this section applies to rivers regardless of their navigability.

Where both banks of a perennial river can be shown at Chart scale, the banks should be depicted as continuous coastline. Where the bank(s) of the river is mangrove, it should be depicted as mangrove coast (see B-312.4). Colour fill on paper Charts for rivers with no depth

information should be governed by the known depth(s) for navigable water at the mouth of the river (see B-353.3 for intermittent rivers).

Where scale prohibits the banks being depicted independently, a perennial river, where required, must be captured as a single line (see B-353.3 for intermittent rivers).

B-353.2 Names

Text style and size on paper Charts is subject to the size and importance of the river. See AHO Text Specifications for details.

B-353.3 Intermittent rivers

Where intermittent rivers or reaches are required, they must be represented on paper Charts by a dashed line and the mouth of the river must be closed by coastline. Land (buff) tint must be used for intermittent rivers where both banks are depicted.

B-353.4 Not currently used

B-353.5 Rapids and waterfalls

B-353.6 Lakes

Lakes must only be shown on Australian Nautical Charts where they have some significance to navigation. Where lakes are shown on paper Charts, they must have a solid blue tint infill.

B-353.7 Salt Pans

Where the limits of salt pans are required, they must be represented on paper Charts by a firm line, at 0·1mm lineweight. This should be supported by the legend “Salt pans”. Where paper Chart scale prohibits the use of the limit the legend alone may be used. The pattern symbology (INT1 – C24(a)) must not be used.

B-353.8 Glaciers

Where required, the seaward limits of glaciers must be depicted on paper Charts by the ice front symbol (INT1 - N60.1) for that part of the glacier projecting into the water. The remaining perimeters (on land) must be depicted using a black pecked line (INT1 - C25). Colour infill must not be shown over the area covered by the glacier. The irregular line pattern must not be used within the area.

B-354 Vegetation

B-354.1 Woods in general

On Australian Nautical Charts, the symbol for a wooded area (INT1 – C30(a)) must not be used. Where required, wooded areas should be depicted as in INT1 – C30(b). Where it is considered pertinent to the mariner, additional information may be included e.g. “Densely wooded” or “Heavily wooded”.

B-354.2 Prominent Trees

For visually conspicuous trees or groups of trees, see B-340.

B-355 Volcanic Activity

B-355.1 An active volcano

B-355.2 A lava flow

On Australian paper Nautical Charts, the small circle and dash symbology must not be shown inside the boundary of the lava flow.

B-360 Cultural (Artificial, Man-Made) Features: General

B-360.1 Harbour plans

B-360.2 Coastal and approach Charts

B-361 Canals

Currently there are no known navigable canals within the Australian charting area. Non-navigable canals should be depicted as for non-navigable rivers (see B-353.1).

B-361.1 Minimum depths or maximum authorised draught

B-361.2 Overhead clearances

B-361.3 Distances

B-361.4 Locations

B-361.5 Lock and lock gate symbols

B-361.6 Canals on smaller scale charts

B-362 Railways

Railways must only be shown on Australian Nautical Charts where they can assist the mariner in determining position, orientation and direction of movement of their vessel. This includes railways on approaches to and across features crossing a navigable waterway (bridges, weirs).

B-362.1 A railway line or tramway

Where required, railways must be depicted on paper Charts using a continuous line with ties (INT1 – D13(c)).

Where required, crane tracks and tramways must also be depicted using the railway symbol.

B-362.2 Railway station buildings

B-363 Tunnels and Cuttings

B-363.1 A tunnel entrance

B-363.2 A cutting

B-364 Embankments and Dams

B-364.1 Embankments

B-364.2 A dam

B-365 Roads and Tracks

Roads must not be shown on Australian Nautical Charts except in the following cases:

- Roads required by port authorities. Feedback should be sought from port authorities during the compilation of the larger scale Charts.
- Roads on approaches to and across features crossing a navigable waterway (bridges, weirs).
- Roads in port infrastructure, to be assessed on a case by case basis.

- Roads that assist the mariner in determining position, orientation and direction of movement of their vessel.

B-365.1 Motorways

There must be no distinction made between motorways and roads on Australian Nautical Charts.

B-365.2 Roads

Where roads are required, and are not shown true to scale, they must be represented on paper Charts by two parallel lines, 0·5 mm apart. Major roads must not be distinguished.

For large scale paper Charts, the width of the road may be variable as the actual road width taken from large scale surveys may be represented.

Topographic contours must be broken on paper Charts (gapped) where they cross roads. Railway lines, roads and rivers may cross roads.

B-365.3 Tracks and paths

Where unsurfaced or loose-surfaced vehicular tracks are required, they must be shown on paper Charts using a dashed road symbol (two parallel lines) using the same width rules as those for roads (INT1 – D12(a)).

Where walking tracks are required, they must be shown using a single dashed line (INT1 – D12(b)).

Topographic contours must not cross through double-sided tracks. Railway lines, roads and rivers may cross double-sided tracks.

B-365.4 On smaller scale Charts

Roads must not be shown on Charts at scale 1:500 000 and smaller.

B-366 Airports

Aerodrome, landing fields and helicopter landing sites listed in Australian aviation authority handbooks should be shown on Australian Nautical Charts, along with their place name.

B-366.1 Airports and airfields on large-scale Charts

B-366.2 Airports on smaller scale charts

Where required, airfields on Charts between 1:150 000 and 1:500 000 (inclusive) must be depicted on paper Charts using the point symbol (INT1 – D17(c)). For helicopter landing sites, the national symbol represented at D(b) of the UKHO version of INT1 (NP5011) must be used.

B-366.3 Heliports

Helicopter landing sites, where considered to be of maritime importance, must be shown on Charts at scale larger than 1:150 000; on paper Charts by the airfield boundary (INT1 – D17(b)) and the legend “Helicopter Landing Site”. Helipads, where required, must be depicted using the national symbol represented at D(b) of the UKHO version of INT1 (NP5011).

B-366.4 Navigational restrictions in airport approaches

B-367 Quarries, Mines

Currently not depicted on Australian Nautical Charts. If conspicuous, they should be considered.

B-367.1 On larger scale Charts

B-367.2 On smaller scale Charts

B-368 Caravan and Camping Sites

B-370 Buildings and Urban Areas

Note that the specifications covered in S-4 - B-370 to B-379 are related primarily to the larger scale Charts. Additional guidance for large scale Charts, and guidance as to depiction of buildings and urban areas on medium scale Charts, is given below.

B-370.1 Waterfront buildings

Waterfront buildings should only be shown on the largest scale Chart covering an area, unless they are landmarks or visually conspicuous.

B-370.2 Landmark buildings

B-370.3 Within urban areas

On Australian Nautical Charts, urban areas must not be broken into blocks defined by street pattern.

Contour lines should generally not be shown in urban areas (see B-351.4).

B-370.4 The extent of urban areas

The limits of urban areas must no longer be shown on Australian Nautical Charts. Where a current Chart shows the extent of urban areas, these extents must be removed on publication of the next Edition of the Chart. Place names of populated places or inhabited places (including suburb names in major cities where required) should be shown in place of urban areas.

B-370.5 Scattered inland buildings

Where scale prohibits the use of the semi-pictorial method (i.e. the building is encoded using point geometry on the corresponding ENC), individual buildings, where required, must be represented on paper Charts by a filled black square (INT1 – D5(a)).

B-370.6 Inland villages

Inland towns and villages should not be shown on Australian Nautical Charts, unless there is some significance to navigation. Where it is required to show an inland town or village on medium and small scale Charts, it should be done on paper Charts using the open circle symbol (INT1 – D3(a)), unless the village has been established as a mission, in which case it should be represented as the cross symbol (INT1 – D4(a)).

B-370.7 On medium-scale charts

When it is required to show an urban area on Charts at scales 1:90 000 to 1:500 000 (inclusive), it must be done on paper Charts using the open circle symbol (INT1 – D3(a)). Urban areas must not be depicted as areas at these scales.

B-370.8 Refuges

B-370.9 Buildings in or over the water

For Australian paper charts the seaward boundary of the urban area should be charted as a fine dashed line (C33). The urban area should be shown using Buff tint, the high water line (coastline) is not to be shown. The legend ‘(houses above water)’ may also be shown if space permits.

B-371 Street and Road Names

Street and road names should be shown on large scale Charts to support the infrastructure within a port area or a town. Names should only be used for identifying streets that will assist the mariner to locate buildings of interest i.e. hospitals, port authority offices, etc. The latest edition of the local street directory should be referenced for the compilation of street names.

On medium scale Charts up to and including 1:500 000, major highways, where shown on the Chart, should be named.

B-372 Public Buildings

B-372.1 Post offices

B-373 Places of Worship and Associated Features

Places of worship should not be shown on Australian Nautical Charts unless they (or their spires) are visually conspicuous or used as a landmark for navigation.

B-373.1 A church

The AHO complies with S-4 with the exception that pictorial sketches on paper Charts are not utilised.

B-373.2 Churches: Related abbreviations

B-373.3 A temple

B-373.4 A mosque

B-373.5 Not currently used

B-373.6 Cemeteries

B-374 Chimneys, Towers, Windmills, Wind Turbines, Flagstaffs

B-374.1 A chimney (stack)

B-374.2 A water tower

B-374.3 A tower in general

B-374.4 A monument

B-374.5 A windmill

B-374.6 Wind turbines

B-374.7 A flagstaff

B-375 Telecommunication Masts and Towers

B-375.1 A telecommunication mast

Other types of mast

Where it is required to show a mast other than a radio or television mast, it must be done on paper Charts using the Supplementary National Symbol INT1 – E(a).

B-375.2 A telecommunication tower

B-375.3 Not currently used

B-375.4 A dish aerial

B-375.5 Any structure

B-376 Cylindrical Tanks

Groups of tanks, as at a refinery, should not have the individual tanks depicted, but the facility should be depicted on the largest scale Charts as a legend (see B-376.2). However an individual tank within a refinery that is conspicuous may be shown in isolation.

B-376.1 Individual tanks

B-376.2 Large groups of tanks

B-376.3 Silos

B-377 Pipelines on Land

B-378 Ruined Buildings and Structures

B-378.1 The high water outline

B-378.2 A ruined landmark

B-379 Fortified Structures

B-379.1 On large-scale Charts, fortified structures

B-379.2 On smaller scale Charts

Major fortified structures

Minor fortified structures

B-380 Overhead Obstructions and Clearances: Bridges, Cables, Pipes

B-380.1 Vertical clearance

For New Charts and New Editions, vertical clearance heights for all bridges and overhead obstructions must be referenced to Highest Astronomical Tide (HAT).

For all vertical clearances 10m or less, when the decimal value is zero it must be omitted (e.g. 3.04 must be shown as 3 and not 3·0).

B-380.2 The figure

B-380.3 Horizontal clearance

B-381 Bridges

B-381.1 Fixed bridges

B-381.2 Transporter bridges

B-381.3 Opening bridges

B-381.4 Submersible bridges

B-381.5 Bridge Supports

B-381.6 Depth (including obstructions) under bridges

On Australian nautical charts, depth contours in black must be broken for bridges regardless of the scale of the chart.
When using blue contours on very large-scale charts, where the bridge is shown true to scale and it clarifies the picture, the blue contours may be continued through the bridge. This decision must involve DDCQS, MCQA and the production manager.

B-382 Overhead Cables

B-382.1 Power transmission lines

If the relevant authority has not provided the AHO with a value defining the safe vertical clearance, there must be no clearance for power transmission lines charted. This includes the circumstance where a vertical clearance has been supplied, but there is no indication as to whether this is the safe vertical clearance. This is to ensure that the mariner does not get an unsafe indication as to the safe clearance under a power line through misinterpretation of vertical clearance (INT1 – D20).

B-382.2 Telephone lines

B-382.3 An overhead transporter

B-383 Overhead Pipes

B-390 Pictorial Representations

B-390.1 Pictorial sketches or photographs of landmarks

Sketches of landmarks may be used where they will assist the mariner with identifying navigational aids.

Sketches of complex bridges are often included to show varying vertical clearances under curved spans and/or to clearly identify navigational lights.

B-390.2 Panoramic views

For New Charts and New Editions, views of sections of the coastline from seaward must not be shown. Accordingly, the viewpoint together with any associated text should also be omitted.

AHO Chart Specifications

referenced to S-4 Part B, Section

400

Hydrography and Navigational Aids

Table of Contents

B-400 HYDROGRAPHY AND NAVIGATIONAL AIDS

B-401 Levels of Detail Charted

Uniform depiction

Series Charts (in ENC terms cells of the same Navigational Purpose) must provide a uniform depiction of hydrographic detail across the series. This does not negate the requirement to include more recent/accurate information on a New Chart or New Edition.

Areas covered by adjoining paper Charts at the same or similar scale

Overlap areas on paper Charts at the same scale should be identical. An exception is when a New Chart or New Edition is produced which carries more recent/accurate information than a published adjoining Chart. Also, overlap areas may contain Chart title, construction and cautionary notes, ZOC diagram etc. on one or both of the Charts, which may result in the depiction of hydrographic detail not being identical. Where a New Chart or New Edition is published that overlaps a Chart at the same scale, the overlapping Chart must be updated to agree with the newly published Chart at the first available opportunity. Additionally, other scale Charts affected are to be updated as soon as possible thereafter.

Where an overlapping Chart is of “similar” scale, and the determination at the Chart Review stage of production is that this is to be indicated as a border reference to the adjoining Chart (see B-254), the charted detail in the overlap area should be identical, in accordance with the above paragraph.

Information from existing Charts

When producing either a New Chart or a New Edition that supersedes an existing Chart, hydrographic information from the existing Chart should be reproduced, and altered only where necessary. Reasons for alteration include:

- New or more accurate information is available;
- Correction of an error on the existing Chart;
- Alteration to accommodate new information e.g. reselection of soundings around a new name;
- Alteration to accommodate movement of existing data e.g. reselection of soundings around a repositioned compass rose;
- Updating of the Chart detail for changes to Chart specifications e.g. replacement of a blue ribbon with blue tint area on paper Charts; publishing and copyright data; replacing a Reliability Diagram with a ZOC Diagram, etc.;
- Change of sounding datum (soundings and depth contours will change).

Compilers and editors must ensure that when a New Chart or New Edition is compiled to replace an existing Chart(s), a check against all critical depth information on the existing published Chart(s) (including shoal soundings, rocks, wrecks and obstructions) must be conducted. This includes change of sounding datum. Only those depths and other critical information that have been disproved by subsequent source data are to be removed, and a copy of the documentation disproving this information must be placed on the Chart’s production file. All other critical depth information must be retained. A check must also be conducted for newly charted shoals to ensure that they are not previously disproved depths on the Chart(s) being replaced. In some cases, it may be required to conduct these checks against existing larger or smaller scale Charts covering the area of the New Chart or New Edition. If compilers and editors are unsure as to whether critical depth information is to be retained or removed, they must consult their supervisor or DDHPS.

B-401.1 Full depiction

B-401.2 Generalisation

B-401.3 Minimal depiction

All isolated areas of navigable waters that are open to the sea must be compiled at the same level of depiction as the remainder of the Chart, regardless of whether a mariner can navigate into the area or not using that particular Chart (i.e. no “white” areas on paper Charts). An adjoining Chart reference must also to be placed in the centre of the isolated area as per INT1 - A19.

B-402 Partial Depiction of Details: Principles

B-402.1 The purpose of generalisation

B-402.2 The purpose of minimal depiction

B-402.3 The possible risks of omitting detail

B-402.4(I) On international Charts

B-402.5(I) Conversely

B-402.6(I) An alternative to partial depiction on international Charts

B-403 Generalisation

When producing a chart that has an area covered by a larger scale chart the following rules must be applied:

- A selection of detail from the larger scale Chart must be shown, with the exception of updating for information that is more recent/accurate than the larger scale Chart. (Note: Preference should be given to updating the larger scale Chart first in this case – see B-100.5);
- All detail that is important for navigation must be selected, taking into account the Chart’s scale and purpose;
- Detail from the larger scale Chart must be generalised to ensure clarity, without losing navigational integrity. When considering information to be generalised, particular attention should be given to submarine topography.

B-403.1 Generalisation of depth portrayal

In terms of these Specifications, the term “generalisation” implies rationalisation of information in order to provide the mariner with the appropriate information with regard to scale for navigation anywhere within the charted area. This will assist in aiding the mariner in an emergency or unforeseen situation which may require navigation in areas not originally included in the intended voyage plan.

Where a Chart contains a Plan covering an area of the Chart at larger scale, the area of the Plan on the smaller scale main Chart may be heavily generalised, especially where the Plan is at a much larger scale than the main Chart. For congested areas, the main Chart may only indicate generalised depth contours (without supporting soundings), dredged channels or leading lines and major navigation marks within the area of the Plan.

In areas of Charts where the bathymetry is extremely complex due to the vicinity of intertidal rock or coral reefs, the following procedure should be adopted:

A “representative” depth contour should be determined from the standard contour interval for the Chart (see clause B-411). The representative depth contour should be interpreted as the shallowest depth contour that totally surrounds the reef. The value of this contour will vary, and must be evaluated on a “case by case” basis, with consultation with Production Supervisor or

Regional Manager if compilers are uncertain. This contour should then be shown on the Chart, in addition to any shoaler contour required to support any critical soundings depicted close to the reef. If there is no single depth contour that totally surrounds the reef, or it is difficult to determine, then a depth contour that best approximates this circumstance must be chosen, with consultation with Production Supervisor or Regional Manager if compilers are uncertain.

B-404 Minimal Depiction of Detail

B-404.1 The limit of minimal depiction

A selection of hydrographic information should be done for the entire range of depths on Charts at scales 1:500 000 and larger.

B-404.2 Detail retained in an area of minimal depiction

Long range navigational aids of use to the mariner navigating the outer parts of the Chart and which appear on smaller scale Charts must be retained.

B-404.3 Details omitted from areas of minimal depiction

B-405 Chart Datum

Chart Datum (CD) may alternatively be referred to as Sounding Datum. Within S-4 and the AHO Charting Specifications, the term Chart Datum is used for consistency.

B-405.1 Uniformity

B-405.2 Where the tidal range is not appreciable

On Australian Nautical Charts at scales 1:500 000 and larger, Mean Sea Level (MSL) must not be used as Chart Datum (see B-405.3).

B-405.3 Where the tidal range is appreciable

All New Charts and full New Editions at scales 1:500 000 and larger must use Lowest Astronomical Tide (LAT) as Chart Datum.

New Editions of Charts at scales 1:500 000 and larger may have their existing Chart Datum maintained, but should be updated to LAT at the first available opportunity.

See B-128 with regards to Chart Datum in relation to New Charts and New Editions.

B-405.4 In some offshore areas

B-405.5 Tide tables and Chart Datum

B-405.6 The connection between Chart Datum and land survey datums

B-405.7 Rivers and estuaries

B-406 Tidal Levels

Tidal level information must be supplied by the Tides and Geodetic Section and placed in the Chart's production file. Refer to Figure 400.1 for an example of a Tidal Levels table.

Charts at scales 1:500 000 and larger must contain tidal information. On paper Charts, this is in the form of a Tidal Levels table.

Tidal Levels referred to Datum of Soundings

Place	Lat S	Long E	Heights in metres above datum					
			HAT	MHHW	MLHW	MSL	MHLW	MLLW
Restoration Island	12° 38'	143° 27'	2·9	2·4	1·4	1·4	1·3	0·4
Jubilee Reef	13 10	143 46	3·1	2·5	1·6	1·5	1·5	0·6
Creech Reef	13 38	144 05	3·1	2·5	1·6	1·5	1·5	0·5
			HAT	MHWS	MHWN	MSL	MLWN	MLWS
Fife Island	13 39	143 43	3·3	2·7	1·9	1·7	1·5	0·8
Portland Roads	12 36	143 25	3·4	2·6	1·9	1·6	1·4	0·7
Night Island	13 10	143 34	3·0	2·4	1·6	1·5	1·3	0·6

Figure 400.1: Tidal Levels table - example

Datums to be shown

Tidal datums to be shown on the Chart must be defined in the Chart's production file.

Mean Sea Level (MSL) must be placed in the Tidal Levels table on all paper New Charts and New Editions where tidal predictions are based on LAT. The column must be located between the high water and low water datums and headed MSL. The Tides and Geodetic Section must provide MSL figures for all Charts in lieu of predictions indicated in the Australian National Tide Tables.

Highest Astronomical Tide (HAT) must be placed in the Tidal Levels table on all paper New Charts and New Editions. The column must be located to the left of the high water datums and headed HAT.

Tidal level values must be above Chart Datum, quoted in metres to one decimal place.

A statement of the type of tide must not be included.

B-406.1 Places for which tidal levels are given

On the basis of charted information, the mariner should be able to assess the significance of the tide and tidal streams in any area and should be able to decide whether it is feasible to take their vessel into a particular place. When they actually do so, they will supplement the charted information with other information from Australian National Tide Tables (ANTT) and may obtain details of tidal streams from Tide Stream Atlases.

Tidal stations listed in the Tidal Levels table must, where possible, fall within the limits of the Chart. Exceptionally, a tidal station that falls outside the limits of the Chart may be listed, but this should only occur where there are no tidal stations within the limits of the Chart. Where the selected tidal station falls outside the limit of the Chart, Tides and Geodetic Control staff may be of the opinion that the tidal levels for the station are not indicative of the tidal levels for the Chart, e.g. a Chart that is entirely within enclosed waters but the only tide station observations are in open water. Where this occurs, a note may be placed under the Tidal Levels table as follows:

Tidal level values shown are approximate and may differ for the area of this chart.

Tides and Geodetic Control staff must provide such guidance at the Chart Review stage of production, which should only be given in exceptional circumstances.

Where there are more than 10 tidal stations within the limits of the paper Chart, Tides and Geodetic Control staff are responsible for providing an abbreviated listing based the relative importance of the tidal stations.

Place names shown in the Tidal Levels table must contain the toponym of the nearest location as shown on the relevant Chart. Alternative place names may follow in brackets e.g. Alotau (Milne Bay). If additional text, to match the name of the tidal station in the ANTT, is necessary it must be included at the end of the place name separated by a dash (e.g. Bat Island – Northwest).
The order of the Place names within the table should be defined by Tides and Geodetic Control staff – in latitude order (North to South) for portrait Charts or longitude order (East to West) for landscape Charts.

Latitude and longitude positions of the tidal reference (Place) must be shown to the nearest minute for all Places. The degree and minute symbols must only be shown on the top-most Place name's position.

A Remarks column must not be included in Tidal Levels tables.

B-406.2 Semi-diurnal tides

B-406.3 Semi-diurnal tides with large diurnal inequalities (Mixed Tide)

B-406.4 Diurnal tides

B-406.5 Offshore areas where depth is critical

B-406.6 Areas where tidal range is barely appreciable

In Australian waters, tidal ranges in all areas are considered to be appreciable.

B-407 Tidal Streams

Where information is available, tidal stream data must be indicated on all Charts at scales 1:500 000 and larger, unless already covered by larger scale Charts. Tidal stream information must be supplied by the Tides and Geodetic Section and placed in the Chart's production file.

B-407.1 Rates

B-407.2 Stations

Tidal streams must be a letter referenced from A to V, starting with A on all paper Charts, omitting I and O. Note that the referencing letter may be different for the same diamond (i.e. at the same location with the same values) on different (overlapping or larger/smaller scale) paper Charts.

The magenta diamond and reference letter must be placed on the Chart in the position of the tidal stream, or as close as possible to this position. The tidal diamond must not obstruct important information.

Labelling of the stations must be based on latitude order (North to South) for portrait Charts or longitude order (East to West) for landscape Charts.

B-407.3 Tidal stream tables

The position of the station should be accurate to one decimal place of a minute. Refer to Figure 400.2 below for an example of a paper Chart Tidal Stream table.

For table entries indicating slack water (rates 0·0, 0·0), the direction of stream must be left blank.

Tidal Streams referred to HW at WELLINGTON

Hours		Geographical Position		A 7°24.3'S 157 55.5 E		B 7°14.5'S 157 50.4 E		C 7°31.1'S 157 45.0 E	
		Directions of streams (degrees)	Rates at spring tides (knots)	Rates at neap tides (knots)					
Before High Water	6	- 6	331	0·9	0·8	010	1·7	1·6	058	0·2	0·2
	5	- 5	338	1·3	1·2	000	2·3	2·1	018	0·3	0·3
	4	- 4	336	1·1	1·0	354	2·0	1·9	009	0·6	0·5
	3	- 3	311	0·9	0·8	342	0·9	0·8	018	0·6	0·5
	2	- 2	276	0·6	0·5	335	0·3	0·2	011	0·3	0·2
	1	- 1	198	0·5	0·4	155	0·4	0·3	244	0·2	0·2
High Water		0	148	0·9	0·8	172	1·7	1·6	232	0·4	0·4
After High Water	1	+ 1	141	1·2	1·1	180	2·2	2·0	229	0·6	0·5
	2	+ 2	140	1·2	1·1	186	2·2	2·0	222	0·4	0·3
	3	+ 3	135	0·9	0·8	183	1·6	1·5	163	0·2	0·2
	4	+ 4	118	0·3	0·3	180	0·7	0·6	144	0·3	0·3
	5	+ 5	337	0·3	0·2	028	0·4	0·4	137	0·4	0·3
	6	+ 6	327	0·6	0·5	010	1·6	1·4	114	0·2	0·2

Figure 400.2: Tidal Stream table – Landscape example

Where either the spring or neap rates for the location have not been provided, the corresponding column in the table must be left blank.

Where tide stream information is referenced to the Australian National Tide Tables (ANTT - AHP 11) only (i.e. no tabular information), the positional reference on the paper chart must be as for a table reference. The reference to ANTT must be in the form of a note, similar to:

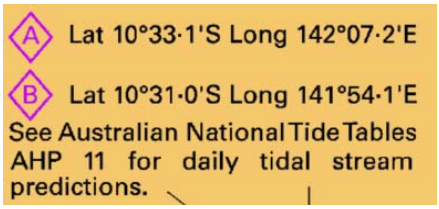


Figure 400.2A: Tidal Stream referenced to ANTT - example

Where a combination of ANTT reference and tide stream panel information exists for a single chart, this information must be positioned in close proximity. Where the chart contains the ANTT reference note only, this should be placed in close proximity to other charted explanatory/cautionary notes.

B-407.4 Tidal stream arrows

Tidal stream arrows should be positioned as indicated on the source, however where the arrows interfere with more significant charted detail at compilation scale, the preference is to move the arrow(s) to clear this detail. Where the source indicates both a flood and an ebb stream arrow at a location, one of the arrows should be positioned in the recorded location, and the other offset slightly for clarity. For paper Charts, this offset should be sufficient to allow the rate(s) to be shown between the arrows.

Where known, the maximum speed, in knots, must be shown, parallel with the arrow and reading from the bottom of the paper Chart. The value must be accurate to the nearest 0·5 knots (rounded 0·5 down, 0·6 up) and stated as e.g. *0·5kn* or *1kn* for whole knots. Note that there must be no letter space between the value and "*kn*".

Where the source indicates a range of rates at the flood or ebb (after the rounding rules above have been applied), the range should be shown, parallel with the arrow and reading from the bottom of the paper Chart e.g. *0·5 – 1kn*. Note that there must be a half space on either side of the "–".

Where the source indicates both a flood and an ebb stream arrow at a location, the arrows should be positioned on paper Charts such that the tail "feathers" on the flood stream arrow fall inside the gap between the arrows.

B-407.5 Tidal stream diagrams

B-408 Currents (Non-Tidal)

The MDS Section must be consulted regarding the information to be shown on the face of the Chart with regard to all non-tidal currents, including any associated Chart notes, given that notes may be reviewed between editions of Charts.

B-408.1 The strength of currents

B-408.2 Currents in restricted waters

B-408.3 Ocean currents

Where available, ocean current information must be shown on small and medium scale Charts (=> 1: 90 000). Current information is not required to be shown on larger scale Charts, unless the current is considered to be of significant importance.

On ENCs, **CURENT** point objects should be placed at approximately 30 centimetre intervals (at compilation scale) centrally along the axis of the current. The MDS Section must be consulted regarding the information to be shown on the face of the Chart with regard to all ocean currents.

On paper Charts, currents must be portrayed by a legend and arrows (INT1 – H43) in each side of the folded chart. The legend should include the actual name of the current (e.g. *East Australia Current)*, its rate and season (if known). Refer to example below:

The legend must be oriented to indicate the general direction of flow, reading from the bottom of the chart.

From December 2018, it is no longer required to include the generic 'Tidal Streams and Currents' or 'Currents' Chart Notes to charts.

B-408.4 Temporary wind-induced currents

B-408.5 Other publications

B-410 Representation of Depth: General

Soundings on smaller scale Charts having the same Chart Datum must be selected from those shown on the larger scales. This is to ensure consistency in Notices to Mariners updates, and provide the mariner with a consistent representation of depths across scale ranges. Where the Chart Datum differs across the scale range, the soundings on the smaller scale Chart should be selected from the larger scale Chart, taking into account differences in sounding values and the position of contours.

The full range of contours must be maintained across the Chart (see B-411) i.e. contours must not be omitted in areas where surveys are inadequate and the contours can be interpolated.

The bathymetric data used in the compilation of depth contours and soundings must exclude the areas defined as wrecks by the MIS section. They are considered artificial objects and their depths must not be used to delineate the topography of the sea bottom. Only areas of siltation around or close to the WRECKS object defined by the MIS section should be used when drawing depth contours or performing sounding selection (refer to B-422 and AUOC 6.2.1).

Sounding selection

Sounding selection is one of the most important tasks performed by the nautical cartographer during the compilation and maintenance of a Nautical Chart. When a danger to navigation exists, soundings must be selected to represent the situation to the mariner. Soundings must also be selected to show as many routes as possible which may be followed in safety, based on the specific intended usage of the Chart. Emphasis must always be placed on clarity of presentation, if the Chart is to be of any use.

Modern Chart production platforms contain tools which aid the compiler performing sounding selection in ways that were previously unavailable to cartographers that operated in a purely manual production environment. Such tools include database systems that allow for the deconfliction of all survey data in the area of interest into a single, homogeneous dataset on common datums; automated contouring; depth colour banding; and sounding suppression algorithms to perform an analysis of a sounding dataset and mathematically select a subset of the dataset that is representative of the sounding selection pattern required. Such automated processes, while considered to be a very good tool, must not be considered to replace the human element in the sounding selection process, which must include assessment of all the variables (not just mathematical) inherent in the area to be charted. It has been recognised world-wide that there are currently no automated systems capable of producing an ideal sounding selection for navigation purposes.

For nautical charting purposes, the main principle considered in sounding selection is the selection of soundings based on a “shoal biased” selection pattern. For well surveyed areas, this is achieved through the “triangular method of selection”, where a triangular pattern is established whereby no sounding will exist within a triangle of selected soundings which is less than any of the three soundings defining the edges of the triangle. All three soundings must belong to the same depth band (e.g. no side of the triangle can cross over a depth contour). In areas where sea bottom coverage is poor, mariners may assume that white spaces mean ‘no data’ and navigate “from sounding to sounding” in order to ensure that they are maintaining a safe under-keel clearance (often in areas where vessel draft is restricted). In these scenarios no sounding should exist along an edge of a triangle which is less than either of the selected soundings defining this edge. For areas covered only by track soundings, shoal biased is achieved through the “linear method of selection”, where soundings are selected along the track such that no sounding will exist between two selected soundings that is less than either of the selected soundings. In order to provide an indication to the mariner of the location of the tracks, selected soundings along tracks may be much closer together than soundings selected using the triangular method of selection.

Although the shoal biased principle must be used when selecting soundings to be depicted on Charts, this does not preclude the depiction of the deepest depths in the area. The responsibility of the cartographer is, through the use of depth contours and soundings, to provide the mariner with as accurate a representation of the seafloor as possible. Mariners

often compare echo sounder readings with charted depths as an aid to position fixing, and if the full range of depth is not indicated the mariner may be misled into thinking that they are farther offshore than they actually are. Deeper soundings are also essential in named anchorages and in other areas where ships are likely to anchor

The sounding selection process outlined below is based on sounding selection for the largest scale Chart covering a particular area, noting the soundings on smaller scale Charts must be selected from the larger scale Chart(s). The principles for sounding selection from larger scale Charts, however, must still be applied.

The main factors that must be considered when determining a satisfactory sounding pattern for a particular area include:

- The scale of the Chart. This gives an indication as to the intended usage of the Chart by the mariner (general/route planning; coastal navigation; approach; harbour).
- The purpose of the Chart, e.g. navigation through a specific channel; general approach to a harbour mouth.
- On larger scale Charts, the probable destinations of vessels, e.g. wharves, berthing facilities, etc.
- Density and quality of available survey data: The sounding selection pattern is often an indication to the mariner of the density and quality of the underlying survey data used to compile the charted area, e.g. a sparsely surveyed area covered only by track plots (individual lines of sounding) should have a sounding selection pattern that clearly indicates the tracks (and areas not covered by tracks) to the mariner. This will indicate to the mariner the possibility of an undiscovered shoal existing outside the tracks. Differing density of the selection pattern may also be utilised to provide the mariner with an indication that areas have been surveyed to different levels of quality (e.g. varying distance apart of sounding lines).
  - Regular or irregular sounding spacing pattern?
    In the past, when hydrographic surveys were not capable of delivering full sea bottom coverage, the sounding selection pattern vary greatly dependant on the unevenness of the seafloor. A closer, more irregular sounding selection pattern was traditionally applied in areas of greatly undulating seafloor topography, while a more regular, consistent pattern was sufficient for a relatively flat or evenly sloping seafloor. The depth of the water was also a factor – in general, soundings were more widely spaced in deeper water, gradually becoming more closely spaced as depth decreased. Nowadays, modern hydrogarphic surveying equipment such as MBES and airborne laser deliver high density bathymetric datasets providing full or almost full sea bottom coverage. In areas covered by this type of datasets a regular selection pattern is now accepted.

  Paper charts (and the first ENCs derived from them) have shown an irregular (depth dependant) sounding spacing pattern for many years. Current compilation practices under the new AHO's 'ENC first' policy do not require a direct link between paper and electronic products and, as a consequence, the way data is represented on each product varies to better fit the way it is used by mariners

  Based on this paper charts should retain the traditional irregular (depth dependant) sounding spacing but certain ENCs (or areas within an ENC) may display a regular sounding spacing pattern (see bullet point 3 in the section below).

Assessment of suppressed sounding data for charted sounding selection

Automatic sounding suppression of full, deconflicted survey data to a density equivalent to that of the charted pattern, although considered to be a useful tool in the sounding selection process, must not be assumed to be the equivalent of the final, "fit for purpose" selection of soundings to be shown on the Chart. Their result is based only on a mathematical interpretation

of the numerical values in the dataset. The sounding suppression must be rigorously evaluated in consideration of the additional factors listed above in order to achieve a satisfactory sounding selection for the published Chart.

One method of evaluating and refining the suppression of soundings derived from the original source dataset is described below. Variations of this system, principally concerning the order in which the various sounding selection steps are carried out, are acceptable. In some circumstances all the depth contours may be inserted first on the compilation. At other times, it may be appropriate to complete the compilation area by area. However, the sounding selection principles set out below must be followed in all cases.

- Make sure a full deconflicted bathymetric dataset covering the area to be charted is available for extraction in the database (data search, capture and appraisal may be needed before this step can be performed).
- Extract this data from the database and conduct a sounding suppression on the full deconflicted bathymetric dataset. This suppression should be shoal biased and based on the scale of the Chart being compiled with no other user defined parameters required. This suppression will provide a subset of soundings which approximates the final sounding density on the final product. This will become your starting point when performing the final sounding selection for your chart.
  Note: Sounding spacing in rocky/coral intertidal areas should be looser than in 'always underwater' areas. In these areas, drying soundings should be selected at a 30mm interval (approx.). If the sea bottom is made of sand or mud and there's evidence that, due to the tidal regime in the area, it may be navigated by ships at high tide, standard sounding spacing should be maintained.
- On ENCs, an evenly distributed pattern of soundings based on predefined average distances (see table below) is accepted as a satisfactory sounding display in the following situations:
  a) The ENC or M_CSCL scale is 1:4000, 1:8000, 1:12000 or 1:22000.
  b) The area is covered by ZOC A1, A2 or some ZOC B surveys (full or almost full seafloor coverage).
  c) The area is transited by large vessels mainly due to man-made (DRGARE, Fairway, etc) or natural (deep water channel, etc) limitations.
- The recommend minimum distance between soundings is 25mm at viewing scale (see pre-defined values in AUOC table 2.1).

ENC *CSCL* or **M_CSCL** *CSCALE*	Recommended distance between soundings (in meters)
4000	100
8000	200
12000	300
22000	600

- This table can be also used to allocate SCAMIN values to a subset of soundings but if soundings already exist at that scale band the sounding spacing must blend with the existing pattern instead of using the fixed distances shown in the table.
- The compiler must also automatically generate contours (from the full density dataset - see B-411.5) to assist in the sounding selection process. Again, the contour interval is at the discretion of the compiler, but as a minimum must be according to the standard contour interval required for the Chart (see B-411).
  On Australian ENCs additional non standard contours may be added at stakeholders request (e.g. every one metre in depths between 8 and 15m). For 'intermediate contours' related to dredged areas refer to AUOC 5.5.1.
- Combine this data with any other information that has been compiled for the Chart thus far. For instance, coastline, navigation aids, wrecks and maritime boundaries may be combined

with the sounding data to assist with sounding selection. When compiling a New Edition of a Chart to incorporate new survey data, the sounding data may be combined with the existing published Chart.

- Check the least depths in critical areas (often referred to as controlling depth) and select as required. These will include such places as:
  - over shoals and banks, tongues and ridges; remember that a greatest drying height will be a least depth over a bank at high water;
  - along the line of greatest depth through channels and over bars;
  - along leading lines and other recommended tracks and in the fairway sectors of lights;
  - in the entrances to harbours and basins;
  - in traffic lane areas as indicated by navigational aids, two-way routes, traffic separation lines, etc.;
  - alongside piers and wharves; and
  - in areas where vessels are likely to anchor.

  Note: When selecting from a multibeam survey, it should be noted that the least depths may be those recorded over man-made features (wrecks, fouls, pipelines, sinkers, etc), or features such as rock or coral pinnacles. This should be checked against other source or existing published Charts for evaluation of whether alternate depiction other than soundings is required.

- Check for the deepest soundings in each area, particularly in shipping channels, and select as required. It is important not to omit these soundings, particularly in inshore areas, as a navigator, comparing echo sounder readings with charted depth as an aid to position-fixing, might thereby be misled into thinking that they are farther offshore than they are. The deeper soundings are also essential in named anchorages and in other areas where ships are likely to anchor. Whenever 'deep areas' are big enough as to enclose a sounding (deepest depth in the area) they should be considered for inclusion in the product.

- Insert the standard set of depth contours (if not already done); the same contour intervals must be used throughout a series of charts (see B-411). These should give a reasonably faithful representation of sea floor topography and should, therefore, not be over-generalised. The contours should be shown consistently throughout the area of a chart where possible, for ease of interpretation. When generalising, shoal patches may be joined up (see "Depiction of isolated shoal patches – Charts 1:75 000 and larger" below), but enclosed hollows must not be joined. Contours defining shoals must not clash against selected soundings; they should be 'pushed out' to run 'very close' but do not touch these soundings when looked at compilation scale (ENC or M_CSCL). See B-411.5.

- Evaluate the soundings in terms of the charted pattern complementing the contouring, and select as required. The soundings selected should be complementary to the depth contours and the latter must be used to eliminate any unnecessary soundings. Soundings (other than essential minimum and maximum depths) should be selected in close proximity of depth contours only if they indicate an appreciably different depth. Depth contours must play their full part in the depiction of seafloor relief and in portraying the adequacy of the source dataset. Where possible, ensure that soundings have been selected within each contour interval. On smaller scale Charts, it is sometimes better to omit soundings close inshore where, because of their size, they would distort the true picture. A range of clearly labelled contour lines, particularly if they are supported by solid or light blue colour tints (see B-411.6), give the Chart user a far better idea of the seafloor gradient. This method can also be usefully employed in small bays and river entrances. Similarly, sounding selection that would cause a contour to extend into a navigable channel or dredged area, thereby giving an impression of a restriction of movement, must be avoided where an alternate selection that does not result in distorting the contour is possible.

- Check for soundings which reveal sea floor features not brought out so far by the depth contours and the depths already selected, and select as required. Pay particular attention to shoal areas and the channels between them. The most important soundings to check for at this stage are those which mark an appreciable change of slope. These are necessary if

intermediate depths are to be correctly interpolated by the mariner. Consider whether all significant features of the seafloor are represented accurately. Pay attention to secondary features existing at depths which are between standard depth contours. See section B-421.4 in regards to the identification of underwater rocks when using high density bathymetry as source.

- Examine depths adjacent to critical parts of the chart. Soundings surrounding dangers and shoals will show a mariner whether the danger is steep-to or whether a sloping sea floor will afford warning of approach. The irregularity of the seabed (or “steepness” of shoals) must be fully depicted if the mariner is to be able to assess the danger of breaking seas, even in least depths far greater than the vessel's draught. Depths adjacent to channels, leading lines and fairways should also receive consideration; other traffic or rough weather may force a vessel off the ideal course.
- Care must be taken so that interpolation by the mariner between any pair of soundings will reveal either the exact true depths or depths that are on the safe side. In no case must interpolation between any pair of depths give the impression that there is more water there than the survey shows. Accurate depiction of depth detail to the mariner must not be sacrificed in an attempt to create an aesthetically appealing selection pattern. Soundings must not be moved from their true positions in an attempt to improve the selection pattern, or to clear a contour or dredged limit, under any circumstances.
- Check for soundings that may foul other navigational information on the Chart, and re-select as required. These include, but are not restricted to, rocks, wrecks, obstructions, navigational aids, dredged areas, shoreline constructions (ramps, slips, jetties, piers, breakwaters), piles, mooring facilities. This is likely to be an iterative process throughout the compilation of the Chart.
- Check for selected soundings that may foul supplementary information on the paper Chart, and re-select as required. Such supplementary information includes, but is not restricted to, compass roses, graticule intersections, and the Chart neatline. This is likely to be an iterative process throughout the compilation of the Chart.
- Check for soundings within features such as marine farms, spoil grounds and other obstruction areas that the least depth within the area has been selected.

Where it is possible that vessels may pass over the crest line of a bank, particular care must be taken with the selection of the soundings. The crest line should be interpreted from the source dataset and numerous depths selected along it. Deeper soundings on the sloping sides of the bank near to the crest line should not be selected if they could give the impression that there is a deeper passage across the crest between two shoaler soundings. Conversely, a gap in a bank that provides a channel through which ships may safely navigate at Chart scale should be clearly indicated (i.e. a deeper sounding in the channel selected in addition to the soundings representing the edge of the bank).

The depths shown alongside piers and wharves also need to be chosen with care when the area is not dredged. A very large-scale survey may show shoal depths close to the structure, the presence of which does not prevent vessels with a greater draught mooring alongside, especially when held off by fenders. Ideally, consideration should be given to the beam, cross-section and draught of vessels likely to moor alongside and depths should be chosen at suitable distances from the structure.

When the compiler is satisfied with their sounding selection, it must be submitted for review. Reviewers must conduct their review in line with the above principles and provide constructive feedback to the compiler.

When conducting sounding selection using the method described above, it is important to recognise that the final selection as shown on the published Chart may be the result of an iterative process of an initial selection and re-selection throughout the compilation process to allow for other charted information as it is compiled. For instance, when the initial sounding selection is completed, other chart information such as navigation aids, tracks and routes,

compass roses (for paper Charts; which may be re-located during the Chart editing process) and maritime boundaries may not have been incorporated in the compilation.

Removal of disproved shoals

Once charted, a shoal or obstruction constituting a possible danger to navigation must not be removed from Charts unless the Report of Survey for a later survey specifically deems the shoal disproved or DDHPS provides a written instruction. On smaller scale Charts, the shoal or obstruction may be generalised, but the shoalest depth must be retained.

Depiction of isolated shoal patches – Charts 1:75 000 and larger

Where there is a need to indicate isolated patches of similar depth rather than unifying these patches into a single bank formation (see Figure 400.3 below), consideration must be given to the chart user and the appropriate presentation. In every case, it must be easy for the mariner to determine whether an isolated patch is a deep or a shoal. If it is not clear, additional soundings and contour values must be added to remove any confusion.

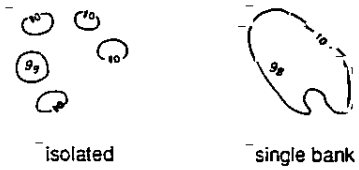


Figure 400.3: Depiction of isolated shoal patches and banks

Where isolated shoal patches are shown on paper Charts within the dark blue tint, light blue tint or blue ribbon depth areas, shallower depths tend to blend into the blue tint and are not prominent to the chart user. Contour values in this instance must be replaced by soundings (see Figure 400.4 below).

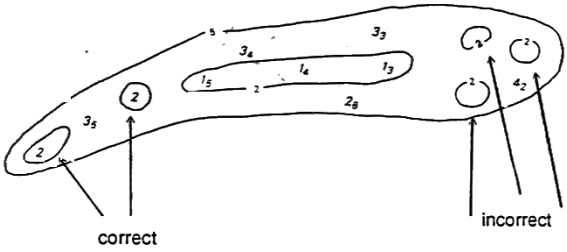


Figure 400.4: Depiction of shoal soundings in areas covered by blue tints

Where isolated shoal patches are covered on paper Charts by dark blue tint, light blue tint or blue ribbon in waters deeper than 10m, they are easily identified because of the colour. Consequently, contour values may replace actual depth soundings, except where a depth is less than the value stated on the contour line (see Figure 400.5 below).

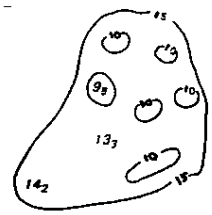


Figure 400.5: Depiction of shoal soundings less than 10m in areas outside blue tints

Where isolated shoal patches deeper than 10m are identified and there is no supportive blue colour on paper Charts, these must be shown as soundings rather than contour values. The same must be applied for isolated patches within the 20m, 30m and 50m contour isobaths (see Figure 400.6 below).

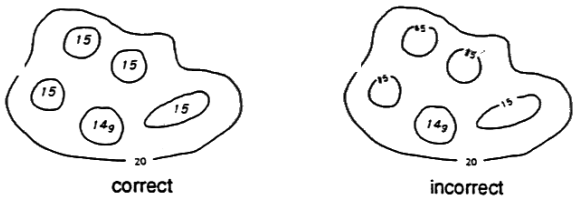


Figure 400.6: Depiction of shoal soundings greater than 10m in areas outside blue tints

B-410.1 Depths alongside berths

B-411 Depth Contours and Shallow Water Tint

In areas where the complete sequence of contours is not shown (e.g. where a "cliff" occurs), soundings, depth contour values and the blue tints (for paper Charts) must be used to enable the clear recognition of any contour.

The contour intervals specified below are the minimum series of depth contours to be included on all Australian Nautical Charts. For ENC, additional contours may be included (e.g. a 1 metre or decimetre contour interval within a specified depth range) to optimise the safety depth contour functionality in ECDIS. Additionally, an "intermediate" depth contour to cover the approaches to dredged areas on ENC's may be required (refer SPEC_05_55_AA34159 AUOC, clause 5.5.1).

Decisions regarding the contour interval to be used for an ENC cell must be finalised at the Chart Review.

Contour interval: Charts at scales larger than 1:150 000

The standard series of depth contour lines that must be charted on Australian Nautical Charts at scales larger than 1:150 000 is: Drying line, 2, 5, 10, 15, 20, 30, 50, 100, 200, 300, 400, 500, 1000, 2000, 3000, 4000, 5000, 6000m, etc.

Contour interval: Charts at scales 1:150 000 and 1:300 000

The standard series of depth contour lines that should be charted on Australian Nautical Charts at scales 1:150 000 and 1:300 000 is as for the larger scale Charts.

In exceptional circumstances, the 15m depth contour may be omitted. This must only be done where the bathymetry at Chart scale results in a contour pattern that is unsuitable for the Chart. Decisions as to the omission of the 15m contour must be made on a case by case basis and should be confirmed at the Chart Review. The bathymetry across the entire Chart must be considered, and where the decision is made not to show the contour, the representation must be consistent across the entire Chart i.e. there must be no 15m contour shown on the Chart. Consideration must also be given to other types of nautical products (e.g. ENC) when making such decisions.

Contour interval: Charts at scale 1:500 000

The standard series of depth contour lines that must be charted on Australian Nautical Charts at scale 1:500 000 is: Drying line, 5, 10, 20, 30, 50, 100, 200, 300, 400, 500, 1000, 2000, 3000, 4000, 5000, 6000, etc.

Due to generalisation issues, larger scale Chart coverage and the usage of the Chart, the 5m depth contour may be omitted along the coastline.

Contour interval: Charts at scale 1:1 500 000

The standard series of depth contour lines that must be charted on Australian Nautical Charts at scales 1:1 500 000 is: Drying line, 30, 100, 200, 500, 1000, 2000, 3000, 4000, 5000, 6000, etc.

Contour interval: Charts at scale 1:3 500 000

The standard series of depth contour lines that must be charted on Australian Nautical Charts at scale 1:3 500 000 is: Drying line, 30, 200, 1000, 2000, 2500, 3000, 4000, 5000, 6000, etc.

Contour interval: Charts at scale 1:10 000 000

The standard series of depth contour lines that must be charted on Australian Nautical Charts at scale 1:10 000 000 is: Drying line, 200, 1000, 2000, 2500, 3000, 4000, 5000, 6000, etc.

B-411.1 Line Symbol

The line weight of paper Chart depth contours (including approximate depth contours) must be 0·1mm. On Australian paper Nautical Charts, depth contours are shown in black but from August 2017 some charts will be published using blue contours (see B-144 – New Editions).

Nautical charts in the INT series (=< 1500000) must show depth contours in black colour only. In order to avoid possible interpretation of a contour as a point symbol, isolated shoal soundings surrounded by a contour must not have the contour represented as a perfect (i.e. computer generated) circle.

For charts still representing depth contours in black, where a depth contour merges into another depth contour (i.e. to form a “cliff”), intertidal reefs or the coastline at paper Chart scale, the representation of the contour must be truncated back from the merge point on the paper Chart by approximately 1mm. This is done for reasons of cartographic clarity – note that for ENCs, contours will merge. This practice must not be followed when using blue contours (exceptions to this rule must be approved by DDCQS).

For charts still representing depth contours in black, where a depth contour passes through a selected sounding of the same or shoaler depth, the depth contour must be pushed around the sounding, towards the deeper side, so that neither the sounding or depth contour is obscured (cartographic clarity). This practice must not be followed when using blue contours.

Blue contours must not be obscured (gapped) where they cross other features.

B-411.2 Approximate contours

In areas of depth 30 metres or less where the ZOC category is determined as C (i.e. without hydrographic survey interlining, or at DDBDA’s discretion); and in all areas where the ZOC category is determined as D, contours must be shown as approximate (unreliable). The symbology on paper Charts must be a dashed line as defined in AHO Line Specifications.

For encoding guidance associated with approximate (inadequately surveyed) depth contours, see SPEC_05_55_AA34159 Australian Use of the Object Catalogue AUOC, clause 5.2.

Where a single isolated sounding is to be supported by a small section of approximate depth contour (i.e. there is insufficient surrounding sounding information to accurately interpolate the contour) the sounding must not be treated as an isolated shoal. The supporting contour should follow the general alignment of surrounding bathymetric information (depth contours) or the coastline. Single isolated soundings that are significantly shoaler than the surrounding bathymetry must be investigated on a case by case basis.

B-411.3 Labelling

Depth contours on paper Charts should be labelled with a depth contour value(s) to provide additional useful information to the mariner. Position of depth contour values should be such

that they are evenly positioned over the Chart in a way that ensures quick recognition of all contours, having consideration for sounding selection i.e. contour values should not be placed close to hydrographic data (e.g. soundings). Depth contour values should be laddered, when possible, to read from the southern border of the Chart. Where possible, values should be placed within a regular gap along an approximate (indefinite) contour.

Drying lines (zero metre depth contours) must not be labelled.

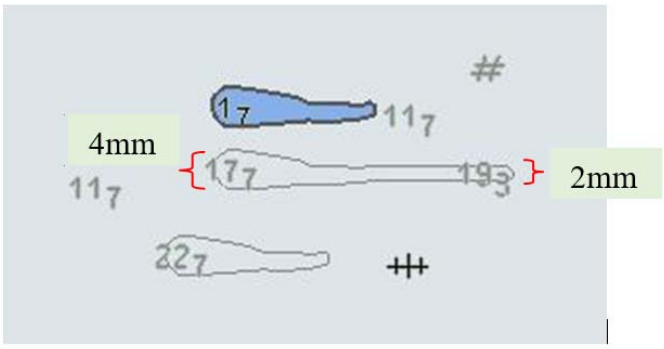
B-411.4 A danger line (dotted line)

Danger lines may be used in place of contours to represent the boundaries of areas of foul, shoal or dangerous ground that are isolated from the coast.

B-411.5 Generalisation of contours

In most modern production systems functionality exists to automatically generate depth contours based on the sounding data stored in the system/database. Where automatic contouring is performed, this must be done using the most appropriate resolution (for the scale of the product) bathymetric dataset (see Caris Base Editor WI BI178044).This contouring may be considered to be representative of the final charted contours or it may be used as a tool to aid in the selection of charted soundings (see B-410) and as a guide for the interpolation of charted contours. For all ENCs, but excluding NP6 ENCs, the minimum accepted size for an isolated shoal is 4mm in any direction (measured at compilation scale). There is no longer the requirement to push contours out to clear soundings. When possible, well accepted cartographic practices must be followed and cartographers must avoid selecting soundings unnecessarily close to depth contours.

Note: At least one section of an 'isolated shoal' must be big enough as to fit a circle of 4mm diameter (usually at the location of the shoalest sounding). The rest of the **DEPARE** must not be thinner than 2mm (measured at compilation scale). See image below:



Automatically generated contours used in NP6 'HD Bathymetric ENCs' must not be generalised; micro depth areas must be retained and they may not have a sounding to support them.

Depth contours must not be generalised in a way that will represent a deeper picture to the mariner.

For 'intermediate' depth contours associated with the approaches to dredged areas in ENCs refer to AUOC 5.5.1.

On paper charts:

- When a black contour interferes with a sounding at the paper Chart scale, it must be broken (gapped) for the sounding if the sounding is deeper than the contour or amended to clear the sounding on the deeper side if the sounding is equal to or shoaler than the contour.
- When blue contours are in use, they must not be gapped for any other feature. Attention must be paid to very small isolated shoals that may end up 'hidden' underneath a sounding figure. In these cases the blue contour must be enlarged slightly as to make it visible.

B-411.6 Shallow water tints

The AHO uses the two shades of blue tint (dark blue and light blue) on Australian paper Nautical Charts. All New Charts must use this convention, and New Editions, where the current published version of the Chart has a solid blue ribbon, should be updated to follow this convention where possible.

Where a decision is taken not to update the New Edition of a paper Chart to the two shades of blue tint, the depth ranges for the solid blue and blue ribbon must remain as on the existing version of the Chart.

Where a Notice to Mariners Block correction is compiled, the method of depiction of shallow water tints and the depth ranges for which the tints apply must be the same on the Block as for the subject Chart.

Blue tint must not to be broken for compass roses.

*Charts at scale 1:300 000 and larger **

For New Charts and New Editions, the depth ranges for paper Chart shallow water tints should be:

- 0-5m: Dark blue tint
- 5-10m: Light blue tint

*Charts at scale 1:500 000 **

For New Charts and New Editions, the depth ranges for paper Chart shallow water tints should be:

- 0-5m: Dark blue tint
- 5-10m: Light blue tint

* Depending on the nature of the seafloor, the depth ranges of dark and light blue tints may need modification to better highlight shallow waterways and dangers. Any variation from the above standard portrayal must be approved and recorded in the Chart's production file together with a reason for the variation.

Charts at scale 1:1 500 000

For New Charts and New Editions, the depth ranges for paper Chart shallow water tints must be:

- 0-30m Dark blue tint

Charts at scale 1:3 500 000

For New Charts and New Editions, the depth ranges for paper Chart shallow water tints must be:

- 0-30m Dark blue tint
- 30-200m: Light blue tint

Charts at scale 1:10 000 000

For New Charts and New Editions, the depth ranges for paper Chart shallow water tints must be:

- 0-200m Dark blue tint

B-412 Soundings

For guidance on survey deconfliction during the compilation process, refer to SP_03_05_AA214644_Deconfliction of Bathymetry Using ZOC Attributes.

Depiction of soundings on paper Charts – italic and upright

The following applies to all new paper Charts and full paper Chart New Editions (i.e. excluding NEILOBs) commenced from 07 December 2015.

Soundings derived from surveys assessed as higher than ZOC D should be portrayed on paper Charts in italic figures (INT1 – I10).

Soundings derived from
- surveys assessed as ZOC D;
- uncontrolled reconnaissance surveys;
- surveys assessed as lower quality than the charted ZOC indicates; or
- reported

should be portrayed on paper Charts in upright (hairline) figures (INT1 – I14). (See also B-412.4 and B-424).

Where the most reliable survey covering an area has areas of "no bottom" (NBA) soundings (see B-412.3) which can be replaced on the Chart by soundings from older, less reliable surveys, decisions as to whether these soundings should be considered as reliable or unreliable should be confirmed by DDHPS at the Final Chart Review. During the compilation process, any issues relating to the style of sounding to be used on the Chart should be resolved by DDHPS.

Italic soundings

In general, soundings must be shown on paper Charts as italic when the ZOC category of the sounding source is determined as C or better (i.e. soundings are from a controlled systematic hydrographic survey).

Upright (hairline) soundings

In general soundings must be shown on paper Charts as upright when the ZOC category of the sounding source is D (i.e. soundings are not from a controlled systematic hydrographic survey).

Rules for metric soundings

Metric soundings must be shown on Charts in accordance with the following rules:

- All depths shoaler than 31 metres must be shown in metres and decimetres.
- All depths deeper than 31 metres must be shown in metres.
- Drying heights and least depths in dredged areas and in maintained channels must be given in metres and decimetres.
- Depths over wrecks, obstructions, artificial reefs, isolated rocks or dangerous shoals, which have been swept or otherwise accurately measured, must be shown in metres and decimetres up to 31 metres. If the depth is an estimated safe clearance (see B-422.5), it should be shown to the nearest metre (shoal bias).

Rounding metric units

Rounding of metric source units, where conversion is not involved, may be required subject to the depth range in which the final value falls. The source value must have the tidal correction applied prior to rounding in accordance with the following rules:

Centimetres and smaller units to decimetres

Many modern surveys have depths depicted to centimetre, and sometimes millimetre, precision to depths of 31m. Tidal adjustments supplied by the Tides and Geodetic Section may also be quoted to centimetre precision. In all cases, tidal adjustments must be applied as supplied by the Tides and Geodetic section (i.e. no rounding) before the rounding is applied to surveyed depths, where required.

Rounding centimetre values to decimetre, or millimetre values to centimetre, must be done in accordance with the following specification:

Soundings:

- 0·001 to 0·009m round down to the next centimetre.
- 0·01 to 0·04m round down to the next decimetre.
- 0·05 to 0·09m round up to the next decimetre.

e.g. 13.649 rounds to 13.6m
13.650 rounds to 13.7m

Drying heights:

- 0·001 to 0·009m round down to the next centimetre.
- 0·01 to 0·04m round down to the next decimetre.
- 0·05 to 0·09m round up to the next decimetre.

e.g. drying 1.349 rounds to 1.3m
drying 1.350 rounds to 1.4m

Depth range of final value is greater than 31·0.

Rounding must be to the whole metre.

- 0·1 to 0·6m round down to the next whole metre.
- 0·7 to 0·9m round up to the next whole metre.

Note that where depths over 31 metres are supplied in decimetres or millimetres, the rounding rules for decimetres and millimetres as specified above must be applied before rounding the decimetre part to metres.

Example:

Source	Tidal Correction	Adjusted Value	Rounded (Final) Value
40m	-0·66m	39·34m	39·0m
40m	-1·1m	38·9m	39·0m

Converting imperial units to metric units

The imperial value must first be converted to feet, then multiplied by a conversion factor of **0·3048** to obtain the corresponding metric value, i.e.:

- Value in whole fathoms: Metric value = (Fathoms value x 6) x 0.3048.
- Value in fathoms and feet: Metric value = ((Fathoms part x 6) + Feet part) x 0.3048.
- Value in feet: Metric value = Feet value x 0.3048.
- Value in fathoms and fractions: Metric value = (Fathoms value (feet part as decimal) x 6) x 0.3048.

The imperial value must be converted to the metric equivalent prior to applying the tidal correction. The resulting metric value may require rounding subject to the depth range in which the final adjusted depth value falls (see Rules for metric soundings above).

Example: Source survey in whole fathoms

Imperial Value	Conversion	Metric Value	Tidal Correction	Adjusted Value	Rounded (Final) Value
3f	(3 x 6) x 0.3048	5·4864m	-0·46m	5·0264m	5·0m
24f	(24 x 6) x 0.3048	43.8912m	-0·1m	43.7912m	44m

Example: Source survey in feet

Imperial Value	Conversion	Metric Value	Tidal Correction	Adjusted Value	Rounded (Final) Value
108ft	108 x 0.3048	32.9184m	-0·6m	32.3184m	32m
21ft	21 x 0.3048	6.4008m	-0·27m	6.1308m	6.1m

Example: Source survey in fathoms and feet or fathoms and fractions

Imperial Value	Conversion	Metric Value	Tidal Correction	Adjusted Value	Rounded (Final) Value
1f 5ft	((1 x 6) + 5) x 0.3048	3.3528m	-0·4m	2.9528m	3.0m
8¾f	(8.75 x 6) x 0.3048	16.0020m	-0·1m	15.9020m	15.9m

B-412.1 Style of sounding numerals

Soundings on paper Charts must be depicted in the Univers True Type font (Light line-weight - italic for “reliable” soundings and upright for “unreliable” soundings (see B-412)), using the subscript method of representation. The metre figure must be 1·62mm in height and the decimetre figure must be 1·30mm in height.

Metric Soundings

Where shown on paper Charts, the top of the decimetre figure should be level with the centre of the metre figure.

The centre of gravity (digitised position) of the sounding figures must be derived as shown in Figure 400.7.

Figure 400.7: Italic paper Chart sounding styles

B-412.2 Out of position soundings

Where a charted critical sounding fouls an intertidal reef or obstruction area, the sounding must be shown in its true position, and the reef edge or obstruction boundary must be broken (gapped) on the paper Chart to clear the sounding. However for coral areas, shoal soundings close to the reef edge must not have extended depth contours which exaggerate the shoal – coral by its very nature is usually 'steep to' and mariners are aware of this fact. Where a

charted critical sounding fouls the charted coastline, the sounding should be deleted and its position enclosed by a danger line if considered dangerous to navigation – the coastline must not be broken (gapped) on paper Charts for any soundings. In all such cases, consideration must first be given as to the navigational significance of the sounding relative to the usage of the Chart, with the view of selecting another nearby sounding, or not charting the sounding at all.

B-412.3 "No bottom" soundings

For parts of Australian waters the best depth information available for charting is characterised by swaths of No Bottom At values (NBAs). This data tends to be collected using airborne laser bathymetric systems (LADS, LIDAR, etc) when the depth to the sea floor can not be reliably measured.

Australia considers that the best depth information available to it at the time should be shown on charts. This includes depths identified as NBAs.

For paper charts these areas should be shown as areas containing a selection of NBA values (I13) spaced at the same interval that selected soundings would normally have been shown.

Where the limit of the NBA area is not clear on the chart a magenta pecked line (N1.2) must show the approximate extent of the NBA area.

The legend '*Surveyed by Laser*' is to be centred within the NBA area if space permits or if it is required to show the NBA limit (N1.2) the legend is to be placed along the inside of the limit and reading from the bottom of the Chart.

Soundings and contours must be shown in preference to NBA values.

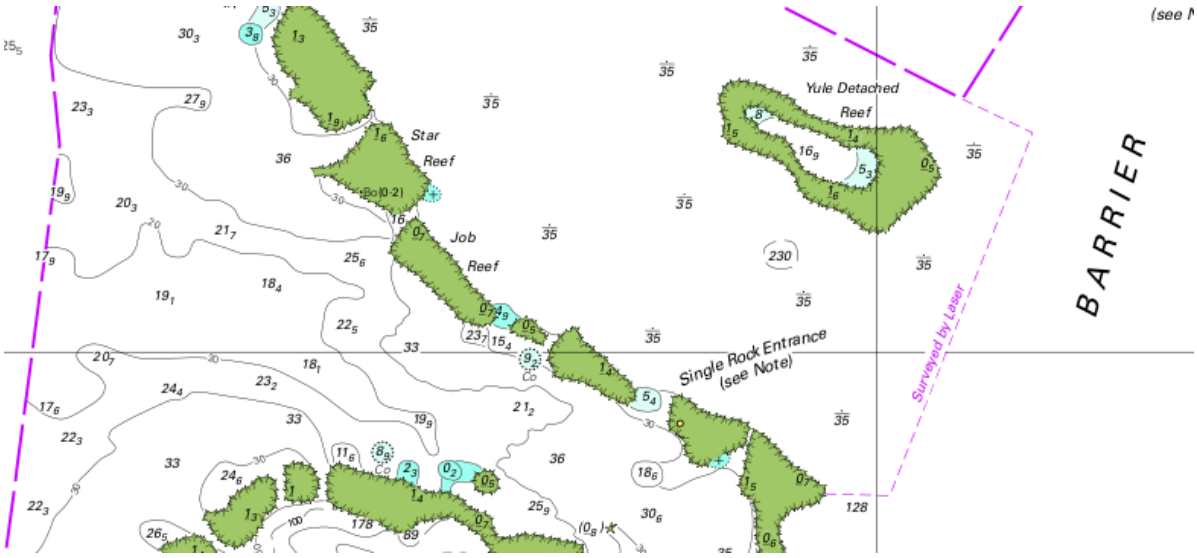


Figure 400.7.1 : NBA area with extent defined by magenta dashed line.

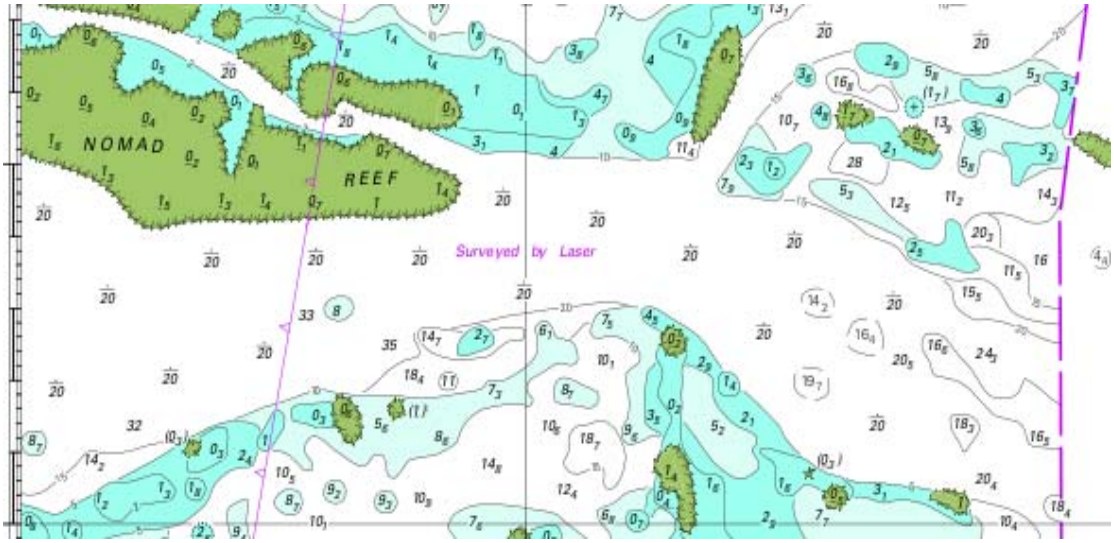


Figure 400.7.2 : NBA area with extent defined by charted features (reef, soundings and contours).

B-412.4 Unreliable soundings

The following applies to all new Charts and full New Editions (i.e. excluding NEILOBs) commenced from 07 December 2016.

For ENC, individual charted soundings derived from surveys that have been assessed as being of a lower reliability than indicated for the area by the underlying **M_QUAL** meta object (e.g. a ZOC C sounding in an area indicated as ZOC B) must be encoded as approximate soundings (see SPEC_05_55_AA34159 Australian Use of the Object Catalogue AUOC, clause 5.3).

For paper Charts, all soundings derived from surveys that are assessed as ZOC D must be depicted as upright (hairline), in addition to soundings that are of lower reliability than indicated for the area by the underlying **M_QUAL** as specified for ENC above.

Soundings sourced from the HMIE MDDB that have been categorized as “lower level ZOC C” (C2) may be considered as ZOC D soundings for the purpose of these specifications, on a case by case basis in consultation with DDBDA.

For *PA*, *PD*, *ED*, *SD* and reported soundings, see B-424 and AUOC clause 5.3.

Where shown on paper Charts, the top of the decimetre figure should be level with the centre of the metre figure.

The centre of gravity (digitising position) of the sounding figures must be derived as shown in Figure 400.8.

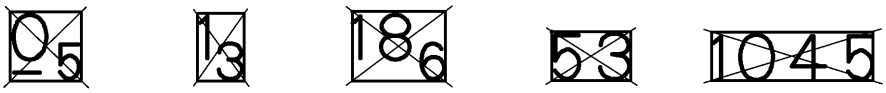


Figure 400.8: Upright (hairline) paper Chart sounding styles

B-413 Intertidal Areas: Drying Heights, Tint, Watercourse

The tidal range for any area must be determined by the Tides and Geodetic Section, which is stored as the Tidal Polygon layer in the HMIE.

B-413.1 Drying heights

Where the adjusted value for a drying height exceeds the difference between Chart Datum and the high water datum (Height Datum) for the Chart, it must be referred to the Regional Production Manager, MNAM and the MIS Section for resolution. This may include amending the value to fall in the intertidal range, or declaring the value a height above Height Datum (spot height).

Drying contours, other than the drying line (zero metre depth contour) must not be shown on Australian Nautical Charts.

B-413.2 The tint

Where required, intertidal areas on Australian paper Nautical Charts must be shown using a specific solid green colour ("Intertidal Green').

B-413.3 A natural watercourse

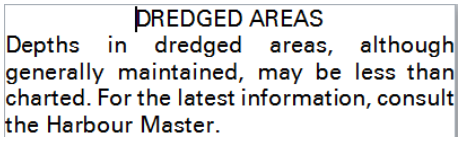
B-414 Dredged areas

Decimal zeros must not be omitted from the dredged depth legend.

Colours shown within dredged areas on paper Charts must comply with specified depth colour banding for the Chart (see B-411.6) for the entire limit of the dredged area.

For paper Charts, dredged area limits must be broken (gapped) for symbols, soundings, compass roses and text. Where possible, text associated with features adjacent to dredged areas must be positioned so as not to encroach on the area. Light flares associated with navigational aids marking dredged areas should be positioned so as to avoid the area where possible.
Where the end of a dredged area leads into deeper water (i.e. the dredged depth is within or shoaler than the depth range of the surrounding area), the end of the dredged area on the paper Chart must be left open.

A chart note (AU766_xx) must be included in all Australian Port charts to highlight to mariners that, although maintained, the dredged areas are subject to siltation between dredging and therefore the minimum depths are not always like charted and they must always check with the relevant port authority.


DREDGED AREAS
Depths in dredged areas, although generally maintained, may be less than charted. For the latest information, consult the Harbour Master.

B-414.1 Areas not regularly maintained

B-414.2 Not currently used

B-414.3 Not currently used

B-414.4 Tables of dredged depths

Tables of dredged depths must not be included on Australian paper Nautical Charts.

B-414.5 Soundings within dredged areas

Soundings must not be placed within dredged areas on Australian paper Charts. For ENC, see SPEC_05_55_AA34159 Australian Use of the Object Catalogue AUOC, clause 5.5).

B-414.6 Areas being dredged

B-415 Swept Depths and Areas; Areas Investigated for Deep Draught Vessels

B-415.1 Swept areas

B-415.2 Areas investigated by sonar

There must be no indication of the limits of sonar swept areas included on the face of the paper Chart or in ZOC diagrams on Australian Nautical Charts.

B-415.3 Under Keel Clearance Management (UKCM) systems

When requested by the corresponding port authority, an Under Keel Clearance Management system operational area within a port should be encoded using one of the following two options:

1. When the extent of the UKCM system aligns very closely with the limits of an existing dredged area, the preferred option is to replace the existing 'Dredged Areas' note (see B-414) with the new UKCM note for both ENC and paper Chart.
   Additionally paper Charts require the legend *'UKCM (see Note)'* to be centred within the dredged area if space permits.

2. When the UKCM system operational area is significantly different than the area covered by an existing dredged area, then:
   - for ENCs, a new ADMARE object of type area should be encoded; JRSDTN=3, INFORM=Under Keel Clearance System, TXTDSC=xxx_nn.TXT, SCAMIN as per SCAMIN policy guidance and
   - for paper Charts UKCM systems operational limits should be depicted using a magenta dashed line (INT1 N 1.2). The legend *'UKCM (see Note)'* is to be placed along the inside of the limit and reading from the bottom of the Chart.

The Torres Strait UKCM system operational area is not to be depicted on ENC or paper charts.

B-416 Areas of Continual Change

B-416.1 Discontinuities between surveys

In order to ensure consistency between nautical products (i.e. ENC and paper Chart) there should be no "white" gap left on the Chart corresponding to areas between surveys that do not match. Where possible, the surveys should be merged, giving preference to the survey of the higher ZOC, or the survey showing the shoaler or more recent picture where the survey ZOCs are the same quality. However, where it is not possible to merge the survey information (refer diagram at S-4 – B-416.1), the discontinuity may be indicated using a "narrow" unsurveyed area for ENC, and depicted as a narrow "white" area on the paper Chart.

B-416.2 Changeable areas

B-416.3 Wrecks (or other obstructions) in changeable areas

B-417 Areas with Inadequate Depth Information

Inadequately Surveyed areas

In order to more clearly indicate areas of paper Charts sourced from lower reliability surveys as inadequately surveyed, a legend must be included within those areas where the lower reliability

of the source survey is likely to impact on surface navigation. Generally, this will be in depths of 30 metres or less, and the area categorised as ZOC C or worse.

Where required, inadequately surveyed areas must be labelled as follows (note that the boundary of the area must not be symbolised):

Inadequately Surveyed
(see ZOC Diagram)

Where a clear indication of frequently travelled routes can be determined from vessel tracking data, the legend is to be positioned so as to be prominent for vessels travelling the route.

For use of satellite imagery in inadequately surveyed areas, see B-418.

B-417.1 Warning of potential hazards

B-417.2 Citing the source data

B-417.3 The use of fine upright (hairline) soundings

B-417.4 Selection of charted soundings to give a markedly uneven spacing

B-417.5 Approximate depth contours

See B-411.2.

B-417.6 Areas delimited by a bold line

Inadequately surveyed areas must not be delimited by any type of boundary on the face of the paper Chart, unless the area is unsurveyed (see B-418).

B-417.7 Cautionary notes in situ

Within the body of the paper Chart, references are often made to cautionary and/or explanatory notes that are included in the chart title block. An example is:

Cautionary Area
(see Note)

Where the note is related to a hydrographic feature, the text must be shown in medium italic type whilst for topographic features, the text must be shown in a medium upright type. Notes may be in black, magenta or green, but should be in the same colour as the charted features to which they refer (see B-140 and B-146).

B-417.8 After disaster surveys

For guidance on the re-evaluation of ZOC values for areas affected by natural disasters, see clause B-297.4.

B-418 Unsurveyed Areas

Compilers must take the usage (Navigational Purpose) of the Chart into consideration when determining when to show the boundaries of unsurveyed areas. E.g. Individual small unsurveyed areas (at paper Chart scale) adjacent to the coast and clear of all shipping lanes should not be shown on coastal navigation series (1:150 000 to 1:500 000) paper Charts. A blank area (see B-418.2) should suffice in these circumstances. Small areas close to a main shipping lane or route should portray the limits of any unsurveyed areas. The final evaluation on the depiction of unsurveyed areas on paper Charts should be made in consultation with the Charting Quality Assurance Section.

Within unsurveyed areas on paper Charts, colour tints must only be shown on land areas (buff), large wreck areas which are always dry (INT1 - K20) (buff), drying areas (green), obstruction or submerged wreck areas (dark (shoal water) blue) and areas considered to be coral reefs or possible shoaling areas from satellite imagery (see B-417).

When compiling paper Charts using ENC as source, compilers must note that, due to the S-57 rule that ENC Group 1 objects (which include unsurveyed areas (UNSARE) and depth areas (DEPARE, including the intertidal area)) must not overlap, duplication of unsurveyed area boundaries such that they are truncated at the drying line may result in a misrepresentation of the actual unsurveyed boundary. When producing unsurveyed boundaries from ENC for the paper Chart, compilers must check against source survey data or the ENC M_QUAL (CATZOC) to determine the actual extent of the surveyed area where surveys partially cover intertidal areas, and amend the paper Chart unsurveyed boundary as required.

Depiction from remotely sensed data and topographic maps

The following conventions must be used:

- Satellite imagery and aerial photography may be used to chart reef areas and areas of possible shoaling. It may also be used to reposition charted reefs and shoals derived from unreliable sources (i.e. Old fairsheet that have been locally fitted and the reef/shoal position was estimated only), but must not be used to disprove charted reefs and shoals unless otherwise instructed by DDHPS.
- 'Blue hatched areas' on topographic maps are to be charted as intertidal reef areas (see B-426.3).
- "Blue pecked' lines on topographic maps are to be charted as 'areas of possible shoaling' (see B-426.3).

In the last two cases, where topographic maps have been used as source, an explanatory note titled 'Reef and Shoal Delimitation' must be inserted in the corresponding paper Chart's title block area. The wording of the note must be supplied by the MIS Section. No legend is required within the paper Chart for the note.

B-418.1 Areas delimited by a bold line

For paper Charts, where it is considered necessary to show the limits, unsurveyed areas must be delimited by a dashed magenta line and labelled *UNSURVEYED*. The equivalent limits should also be shown in the ZOC diagram, and where shown must be given a ZOC category of D (see B-297.7). The limits of unsurveyed areas must be derived, where possible, from the survey bounding polygon limits in the HMIE. These limits should be generalised for scale as required.

The legend must not be abbreviated to "UNS" on the paper Chart. Where space is limited the text should be arrowed into the area.

B-418.2 Wide blank areas

B-420 Dangers: General, Danger Line

B-420.1 A danger line

B-421 Rocks, Rocky Areas and Coral Reefs

On Australian paper Nautical Charts, where it is required to show the nature of the surface of a charted intertidal, awash or always submerged rock or coral pinnacle (INT1 – K11-15), the bottom quality abbreviation must be positioned centrally under the sounding where possible.

B-421.1 Rocks (or large boulders) which do not cover (islets)

An islet too small to be shown true to scale that is neither within a foul area delimited by a danger line nor within an intertidal area considered to be coral or rock should be shown as a small circle of coastline thickness filled with land tint. If required, it may be emphasized by a danger circle (K1) and/or associated text. Scattered islets within a foul area (see B-422.8), delimited by a danger line (K1) and shallow water tint, may be shown as black dots, ideally with no dimension less than 0·5mm.

On ENC and paper Charts, for islets of height **less than 5 metres**, with the height taken from a topographic map:

The difference between MSL and MHWS or MHHW must be calculated to one decimal place from the tidal level figures supplied by the Tides and Geodetic Section. The height taken from the topographic map must be corrected by this difference. The height must be shown in **metres and decimetres** (bracketed where space does not permit placing the height on the islet – see B-352) with the rounding of these figures as follows – Note: When the decimal value is zero it must be omitted (e.g. 3.04 must be shown as 3 and not 3·0):

- 0·01 to 0·05m down to nearest decimetre.
- 0·06 to 0·09m up to nearest decimetre.

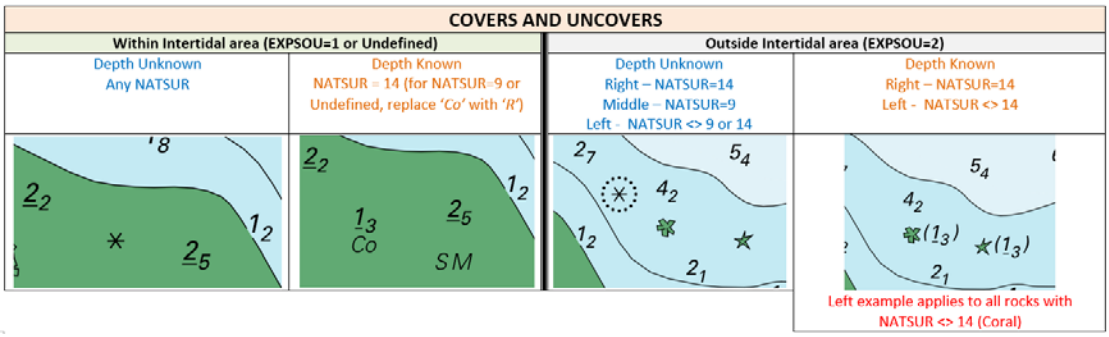
On ENC and paper Charts, for islets of height **5 metres or greater**, with the height taken from a topographic map:

The difference between MSL and MHWS or MHHW must be calculated to one decimal place from the tidal level figures supplied by the Tides and Geodetic Section. The height taken from the topographic map must be corrected by this difference. The height must be shown in whole **metres** (bracketed where space does not permit placing the height on the islet – see B-352) with the rounding of these figures as follows:

- 0·0 to 0·5m down to the nearest metre
- 0·6 to 0·9m up to the nearest metre

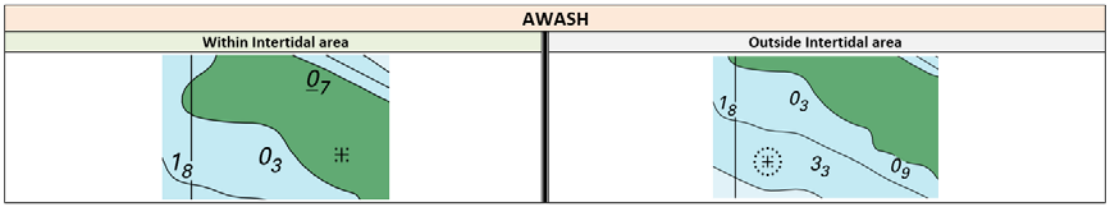
B-421.2 Rocks, boulders and rocky areas which cover and uncover

On paper Charts, UWTROC objects with WATLEV=4 (drying rock - pinnacle) must be represented using the INT1 symbols shown in the Figure below. The symbology varies depending on the values of the attributes VALSOU, EXPSOU and NATSUR.



B-421.3 Rocks which are awash

On paper Charts, UWTROC objects with WATLEV=5 (awash) must be represented using the INT1 – K12 symbol. The danger circle must be only added when the rock sits outside the intertidal area.



B-421.4 Rocks which are always underwater

Identifying UWTROCs from high density bathymetric sources

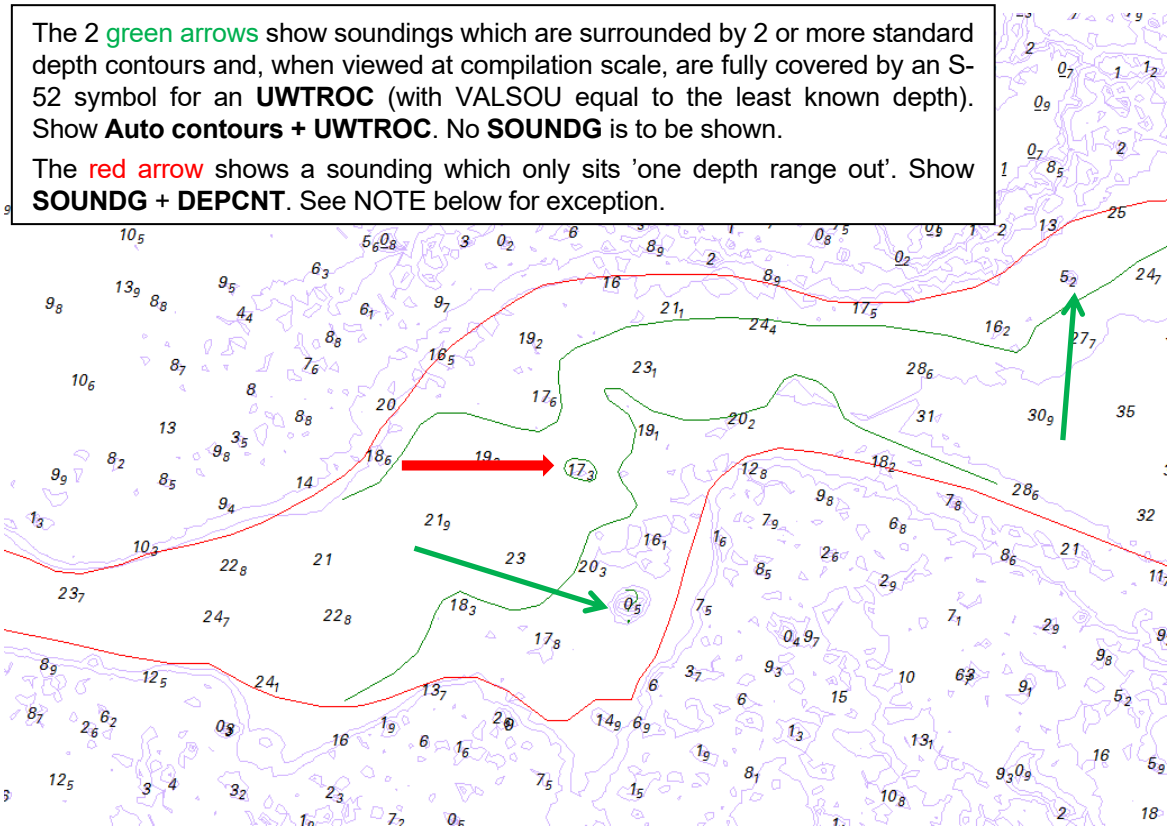
In the absence of other information (survey report, etc), any abrupt reduction in depth in a short length span should be considered an UWTROC. The NATSUR should be encoded as 'Rock' unless evidence exists that the surrounding area is made of coral.

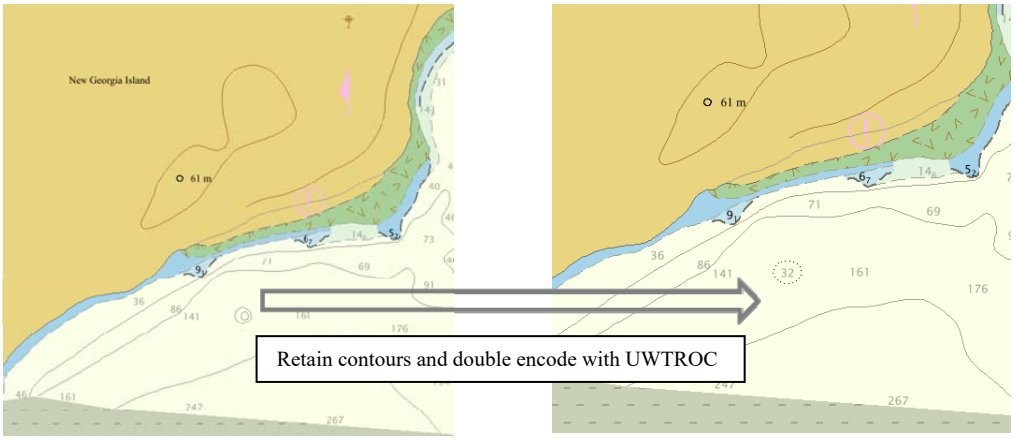
To determine if a shoaling is significant and small enough as to be considered an underwater rock the following elements must be considered:

- Survey must be ZOC A1, ZOC A2 or high density ZOC B (discuss with DDCQS).
- Generate auto contours for the standard depth ranges.
- Do your assessment in the largest scale product available in the area.
- Irrespective of the depth, if two or more depths bands are able to be covered by an **UWTROC** point symbol (with VALSOU equal to the known least depth) the auto contours must be retained and an **UWTROC** point feature with VALSOU equal to the least depth in source must be double encoded (Exceptions to the rule must be listed in the Project Plan and History document).

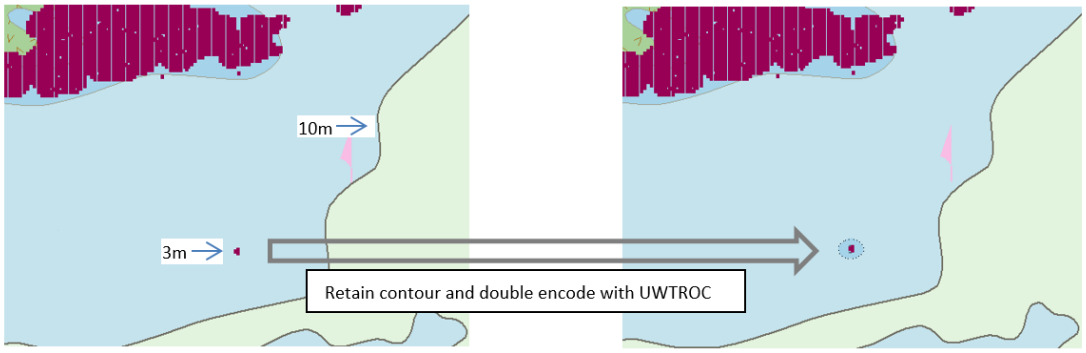
The 2 green arrows show soundings which are surrounded by 2 or more standard depth contours and, when viewed at compilation scale, are fully covered by an S-52 symbol for an **UWTROC** (with VALSOU equal to the least known depth). Show **Auto contours + UWTROC**. No **SOUNDG** is to be shown.

The red arrow shows a sounding which only sits 'one depth range out'. Show **SOUNDG** + **DEPCNT**. See NOTE below for exception.





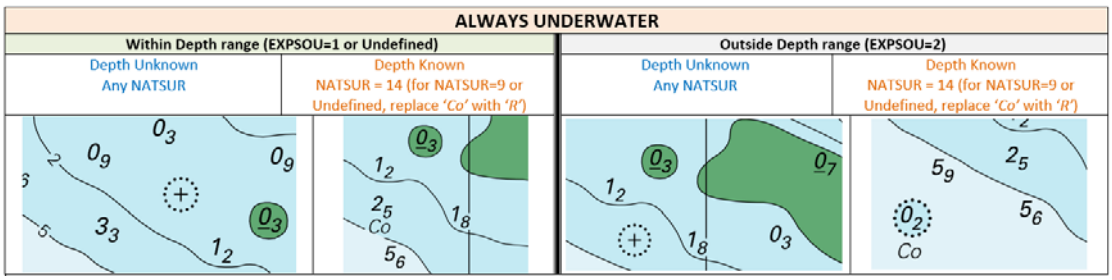
NOTE: In some circumstances an UWTROC maybe the best way of encoding an abrupt reduction in depth where the shallowest depth only sits 'one depth range out'. If it is decided to encode this scenario as an UWTROC in lieu of a SOUNDG, sound evidence must be included in the Project Plan and History (PPH) document. The contour surrounding the shoal is to remain; a sounding will not be required. These situations will normally arise when shoals are located close to the deepest contour defining the **DEPARE**, see diagram below.



It is possible that under the new rules to classify UWTROCs from high density bathymetry, a previously charted UWTROC may now be represented as SOUNDG + DEPCNT. In this case the UWTROC is not required but a SBDARE_p object must be encoded to support the sea bottom characteristics.

Dangerous underwater rock

On paper Charts, UWTROC objects with WATLEV=3 must be represented using the INT1 symbols shown in the Figure below. The symbology varies depending on the values of the attributes VALSOU, EXPSOU and NATSUR.



B-421.5 Submerged coral reefs and pinnacles

B-422 Wrecks, Foul Ground, Obstructions

The encoding and maintenance of wrecks is the responsibility of the MIS section. When high density bathymetry is available, wrecks should be captured as area features. The compilation of depth contours and soundings by CPM staff must exclude the bathymetric data covered by the wreck areas (refer to B-410 and AUOC 6.2.1).

Wrecks may be omitted if they fall into one of the following three categories:

- Where numerous dangerous wrecks exist in close proximity to one another and a selection must be made, the most seaward or representative wreck(s) should be retained.
- In areas covered by larger scale Charts it may not be possible to show all wrecks. In this situation a cautionary note and legend must be added. The wording for the cautionary note must be supplied by the MIS Section.
- On small scale Charts which will only be used for ocean passage and planning purposes (1:1 500 000 and smaller), all wrecks adjacent to the coast or other non-dangerous wrecks should be omitted.

Historic wrecks

The site of a wreck or relic deemed to be historically significant is defined by the Historic Shipwrecks Act 1976. Further, within the Act, a Protected Zone may be declared around the wreck itself. Shipwrecks and relics that have been declared to be historic, as well as those deemed to have protected zones are identified in the Mariners Handbook for Australian Waters (AHP 20), Chapter 3.

All historic wrecks, regardless of whether they are covered by Protected Zones, must be shown on paper Charts using the appropriate symbol as in INT1 – K20 to K31 (see B-422) unless the position or nature of the wreck is unknown. The former symbol INT1 – N26 (removed from INT1 in 2011) must not be shown on Australian Charts. If the position or nature of the historic wreck is unknown, it must be shown as a small circular restricted area boundary symbol, without a wreck symbol; note that this is point representation. Some Protected Zones have a declared radius which is larger than the area covered by the point symbol at Chart scale. In this case, the limit of the Protected Zone should be shown to scale. Where the protected zone limit is shown to scale and the limit clashes with wreck symbology, the limit of the protected zone must not be shown on the chart (e.g. the limit is not to be pushed out to clear the wreck symbol).

The wreck must be supported by a chart note and referenced on the paper Chart using a legend within the area or adjacent to the symbol:

Historic Wk (see Note)	(for historic wrecks without a protected zone)
Historic Wk with Protected Zone (see Note)	(for historic wrecks with a protected zone)

When several historic wrecks are in close proximity, the text may be shared between 2 or more symbols.

The content of the cautionary note must be supplied by the MIS Section.

B-422.1 Large scale Charts

B-422.2 A stranded wreck

B-422.3 A wreck which has been wire swept

B-422.4 A wreck over which the least depth that is known has been found by sounding only

B-422.5 A wreck with estimated safe clearance

Adequate source information from which to determine an estimated safe clearance for a wreck must be available in order to depict a newly reported wreck, or to replace any current charted INT1 – K28 and K29 paper Chart symbols, with an estimated safe clearance. This source information must include details such as the type of vessel, its resting position on the seabed (upright or lying on its side) and its condition (intact or broken up), so that a determination of the likely height above the seabed can be made. This source information, together with the method used to determine the estimated safe clearance, must be included in the Chart file.

B-422.6 A wreck of unknown depth for which a safe clearance cannot be estimated

B-422.7 Changing criteria for wrecks

B-422.8 Foul ground and sites of cleared platforms

B-422.9 Submerged obstructions

On paper Charts, the drying obstruction (pinnacle) symbol(s) (INT1 – K41), where shown, must be enclosed by a danger line, or circle(s), infilled with dark blue tint, if they are located outside a charted drying area.

B-423 Water Turbulence: Overfalls, Races, Tide Rips, Breakers, Eddies

B-423.1 Overfalls, races and tide rips

B-423.2 Breakers

Breakers occur along the shorelines of most exposed coasts in Australian waters. In such a position they are generally not a danger to navigation and must not be charted unless they extend so far offshore as to be a danger to navigation for the intended usage of the Chart. In the absence of survey data in such cases the breaker symbol should be used to define the seaward extent of what would otherwise be a blank or unsurveyed area on (larger scale) Charts. Only the seaward limit of the area should be depicted, with additional symbol lines only being added on paper Charts for extensive areas. Once new survey data is available, **WATTUR** line features that are now conflicting with true depth contours and soundings must be deleted and, for offshore shoals, replaced with **WATTUR** areas or point objects depending on the size of the real world feature at chart scale.

Breakers occurring over offshore bars should be shown on paper Charts using symbols where scale permits. For named features that break, if scale precludes the use of symbology then the international abbreviation "*(Br)*" must be applied in addition to the name. The legend "*Br*", without brackets, must also be applied, in lieu of symbology, for small unnamed shoals or other point features that break, to avoid obscuring other detail. Qualifying terms, such as "*breaks in heavy weather*" or "*breaks in NE swell*" must not be used where the feature over which the breakers occur is itself an obstruction to navigation.

Where a breaker associated with a named feature is to be indicated with qualifying terms e.g. "*breaks in heavy weather*" or "*breaks in NE swell*" then the relevant text, in brackets, must be used, e.g. *(breaks in heavy weather)*. Where the feature is unnamed, the qualifying terms must be expressed e.g. "*Breaks in heavy weather*" or "*Breaks in NE swell*", without brackets. The abbreviation "*Br*" must not be used where there is a qualifying term applied. Note that qualifying terms must only be used where the depth over which the breakers occur is not considered to be an obstruction to surface navigation.

The combination of breaker depiction and overlapping survey detail (contours) should not be necessary. Where this occurs the breaker symbology or legend must be displaced to avoid fouling survey detail.

B-423.3 Eddies

B-424 Doubtful Dangers

For ENC encoding guidance related to doubtful dangers, see SPEC_05_55_AA34159 Australian Use of the Object Catalogue AUOC, clauses 5.3, 6.1, 6.2 and 6.5.

B-424.1 PA – Position Approximate

Soundings associated with Position Approximate must be shown on paper Charts as hairline (upright) soundings.

B-424.2 PD – Position Doubtful

Soundings associated with Position Doubtful must be shown on paper Charts as hairline (upright) soundings.

B-424.3 ED – Existence Doubtful

Soundings associated with Existence Doubtful must be shown on paper Charts as hairline (upright) soundings.

B-424.4 SD – Sounding doubtful:

For paper Charts, the legend *SD* must be used beside a hairline (upright) sounding figure over a shoal or rock, covered by an area of quality of data ZOC B or higher, where the position is not in doubt, but the actual depth may be less than indicated. Such depths are usually indicated in the survey report as Least Depth Not Found (LDNF), i.e. the shoal has not been examined (by interlining or side-scan sonar).

B-424.5 Reported dangers

B-424.6 Discoloured water

B-424.7 Imprecise Shoal Areas

425 Nature of The Seabed: General

Descriptions of the nature of the seabed must be placed on the Chart as close as possible to their position on the source data without obscuring or moving more important information. A selection of representative seabed qualities from the source should be made where possible, using an average 50mm spacing at Chart scale as a guide.

B-425.1 Colours of seabed materials

Colours of seabed materials must not be shown on Australian Nautical Charts.

B-425.2 Deep water

B-425.3 Symbols and abbreviations

B-425.4 Style of abbreviations

B-425.5 Standard abbreviations

B-425.6 Marine vegetation

B-425.7 Hard seabed

B-425.8 Underlying material

B-425.9 Mixed qualities

If known, the abbreviation for the dominant quality must be shown first with, for paper Charts, a **half space** between the qualities, e.g.:

M S

M G S Sh

In the abbreviation for a mixed seabed quality where one or more qualities contain a qualifying term (see INT1 – J30-38), the dominant quality must still be shown first with, for paper Charts, a **half space** between constituents, but no space between the qualifying term and its associated quality, e.g.:

M fS

M fS Sh S

cS G

B-426 Nature of the Seabed: Intertidal Areas

Boulders

If it is required to portray an intertidal boulder (rock or coral) because of its prominence, it must be portrayed on paper Charts as a drying rock symbol (INT1 – K11, see B-421.2) with the international abbreviation "*Bo*" next to it, or "*BO*" if visually conspicuous. A boulder that is always dry should be encoded as an islet (INT1 – K10) with similar accompanying descriptive text in the upright style (see B-421.1).

B-426.1 Areas which are not rocky or composed of coral

On Australian paper Nautical Charts, the dashed line symbol (INT1 – J20) method for showing seabed characteristics for small intertidal areas is generally not used, although such symbology may be used for larger areas. Where it is required to show the nature of the seabed for smaller intertidal areas which are not rocky or composed of coral, the drying line must be shown and the bottom quality legend should be shown centrally within the area or, if space is limited, centrally below the drying area.

B-426.2 Rocky areas

To facilitate compilation in a multi-product environment, the digitising position of the line on ENCs must correspond to the seaward edge of the intertidal area (low water line), noting that the outer edge of the charted symbol on paper Charts will project slightly outward from this line.

The seaward edge of the symbol on paper Charts must follow as closely as possible the actual shape of the foreshore rock as shown on the corresponding ENC (i.e. no generalisation). The extent of any generalisation of the symbol (generally the distance perpendicular from the coast) on the paper Chart should be based on the following:

- To match the physical extent of the intertidal portion of the rock ledge as much as possible.
- To prevent the symbol from being displaced offshore significantly (a factor of chart scale). This is particularly important when the displacement of the symbol will give mariners a wrong impression of the coast.
- To prevent the paper Chart symbol lines which are perpendicular to the drying line from overlapping each other when the symbol is curved around an angular section of intertidal rock ledge.

In order to reduce the possibility of rock ledge paper Chart symbology overlapping itself (as would result from the third bullet point above), point symbology unique to Australian Nautical paper Charts should be used to depict small areas that cannot be shown as their true shape but are too large to be safely depicted as a rock pinnacle (INT1 – K11) at the paper Chart scale. The symbol of best fit should be selected from:

Figure 400.9: Examples of AHO rock reef paper Chart point symbology

Some large offshore sloping rock reef may not have the rear edge of the reef defined in the source survey. In this case the rear edge should be represented by indefinite low water line and/or by the edge of the intertidal colour tint (for the paper Chart).

A danger circle (INT1 – K1) may be inserted on the paper Chart, centred on the rock symbol, to provide additional emphasis to the mariner if considered necessary by the compiler.

For generalisation of bathymetry around rock reefs, see clause B-403.1.

B-426.3 Coral reefs and foreshores

To facilitate compilation in a multi-product environment, the digitising position of the line on ENCs must correspond to the seaward edge of the intertidal area (low water line), noting that the outer edge of the charted symbol on paper Charts will project slightly outward from this line.

The seaward edge of the symbol on paper Charts must closely follow the actual shape of the coral edge as shown on the corresponding ENC (i.e. no generalisation). The extent of any generalisation of the symbol on the paper Chart should be based on the following:

- To match the physical extent of the coral as much as possible. The AHO uses several paper Chart symbols for coral depending on the extents and Chart scale (see below):
- To prevent the symbol from being displaced offshore significantly (a factor of chart scale). This is particularly important when the displacement of the symbol will give mariners a wrong impression of the coast.
- To prevent the paper Chart symbol lines which are perpendicular to the drying line from overlapping each other when the symbol is curved around an angular section of intertidal reef.

In order to reduce the possibility of coral reef paper Chart symbology overlapping itself (as would result from the third bullet point above), point symbology unique to Australian Nautical paper Charts should be used to depict small areas that cannot be shown as their true shape but are too large to be safely depicted as a coral pinnacle (INT1 – K11) at paper Chart scale. The symbol of best fit should be selected from:

Figure 400.10: Examples of AHO coral reef paper Chart point symbology

Some large offshore sloping coral reef may not have the rear edge of the reef defined in the source survey. In this case the rear edge should be represented by indefinite low water line and/or by the edge of the intertidal colour tint (for the paper Chart).

A danger circle (INT1 – K1) may be inserted on the paper Chart, centred on the coral symbol, to provide additional emphasis to the mariner if considered necessary by the compiler.

For generalisation of bathymetry around rock reefs, see clause B-403.1.

Remotely sensed data - intertidal areas and areas of possible shoaling

In some cases, the source of reef and shoal areas is limited to data derived from remotely sensed data (eg. Satellite imagery, orthorectified aerial photos) or Topographic maps. Such data can only be used to capture intertidal regions when they sit:

i. In an Unsurveyed area; or
ii. close to land where hydrographic surveys do not reach the area; or
iii. in between loosely spaced SBES track lines (ZOC C or D); or
iv. in well surveyed areas (ZOC B or better) but where temporal resolution is key to accurately represent the ‘latest picture’ (eg. areas of continuous change such as the mouth of rivers, etc).

From February 2019, the coral reef symbology shown in Figure 400.11 below must only be used for areas identified as 'Blue hatched areas' in topographic maps. Any reef that has been visually identified using satellite imagery and/or orthorectified aerial photos must be depicted like any other reef (INT1 – J22).

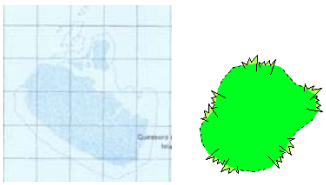


Figure 400.11: Example of AHO paper Chart symbology for coral reefs derived from topographic maps (blue hatched area).

From February 2019, the areas of possible shoaling symbology shown in Figure 400.12 below must only be used for either areas interpreted as such from satellite images/aerial photos or when referring to areas surrounded by 'Blue dashed lines' in topographic maps.

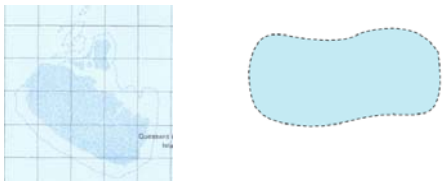


Figure 400.12: Example of AHO paper Chart symbology for areas of possible shoaling derived from topographic maps (blue dashed line).

Where topographic maps have been used as source, an explanatory note titled 'Reef and Shoal Delimitation' must be inserted in the corresponding paper Chart's title block area. The wording of the note must be supplied by the MIS Section. No legend is required within the paper Chart for the note.

B-427 Nature of the Seabed: Outside the Low Water Line

B-428 Special Seabed Types: Sandwaves, Kelp, Springs

B-428.1 Sandwave areas may be dangerous to mariners

For extensive or navigationally significant sandwave areas the legend *Sandwave Area* must be shown on the paper Chart. A cautionary note indicating the minimum depth surveyed over the sandwave area should accompany this legend. The content of the note must be supplied by the MIS Section.

B-428.2 Kelp

On Australian paper Nautical Charts, the following convention should be followed when depicting weed or kelp beds:

- The legend *Wd* (INT1 – J13.1) should be used for all areas of seaweed. It should also be used for areas of kelp beds in shallow waters or areas not significant to navigation, or in extensive areas of kelp beds.
- The symbol INT1 – J13.2 should be used for genuine kelp beds in areas considered significant to navigation and/or in deeper water (10 - 60 metres) to indicate the presence of submerged rocks and to warn of the possibility of fouling of ships' propellers.

B-428.3 Springs in the seabed

B-428.4 Underwater volcanic activity

B-429 Oceanic Features

B-429.1 Seamounts

B-429.2 Details of any new shoal or seamount

B-430 Harbours: Regulations and Limits

For general information relating to the depiction of maritime boundaries within harbours and ports, see B-440.

B-430.1 Defined harbour limits

The legend for the Port limit must be placed inside the area defined by the line symbology (see INT1 – N49) on paper Charts. For Port limits the legend should include the Port name where space permits *[Name] Port Limit* .

Port Pilotage area limits

Port Pilotage areas must be depicted on paper Charts, where required, as for Port limits. The legend should include the Port name where space permits *[Name] Pilotage Limit* .

Where Port Pilotage areas are co-incident with Port limits, the legend must be in the format *[Name] Port/Pilotage Limit* .

B-430.2 Speed restrictions

B-430.3 Port security limits

From August 2013, there is no longer a requirement to show port security zones on AHO nautical charting products. Port security limits shown on paper Charts must be removed by Revised Print correction or through a New Edition of the Chart at the first available opportunity. For removal of port security limits from ENC, see SPEC_05_55_AA34159 – AUOC, clause 11.2.9.

B-431 Harbours: Anchorages, Anchor Berths and Prohibited Anchorages; Moorings; Waiting Areas

For depiction of dolphins, see B-327.1.

Paper Chart symbol definition

The symbols defining maritime limits, prohibited areas, submarine cables and various routes frequently consist of a line (or line symbol e.g. dashed line, T symbol or submarine cable symbol) with the defining symbol placed at intervals along the line. Examples include the territorial sea and Exclusive Economic Zone limits, prohibited anchoring areas and submarine power cable areas.

The defining symbol should be placed on the line (or lines) at intervals that ensure that the line is clearly defined. The interval may vary depending on:

- The length of the line (or lines) i.e. to ensure that each line or area has at least one defining symbol (smaller areas may have the defining symbol inside the area, rather than on the bounding line).
- The restrictions of other information on the chart i.e. it may be necessary to adjust the intervals of the defining symbol around other information.
- The relative data content of the particular area on the chart i.e. in very open areas a line may be clearly defined with minimum defining symbols, while in a busy area more symbols may be required to clearly define the line. Some limits may require multiple symbols where there are common limits.

Some average intervals of the defining symbol on an extensive piece of line include:

- Anchorage area and prohibited anchorage: 40mm
- Submarine power cable: 40mm

B-431.1 Reported anchorages not defined by a regulatory authority

It is no longer Australian policy to depict reported anchorages on paper Charts (INT1 - N10) and ENCs (**ACHARE**, *CATACH=1* or Unknown or Undefined) except in some areas frequented by cruise ships and other leisure craft vessels where a well-established reported anchorage is frequently used (*CATACH* should be populated with a meaningful value – e.g. 2 to 10). Consequently, reported anchorages should be removed from Charts when a New Edition is produced, unless otherwise notified by MIS staff.

B-431.2 Designated anchor berths

Anchor berth symbols must be positioned at the actual declared position of the anchorage, i.e. the symbol must not be offset.

Where swinging circles at anchor berths are shown, the circle must be depicted true to scale for the maximum radius allowable at the berth.

B-431.3 Anchorage areas

B-431.4 Areas in which anchoring is prohibited

B-431.5 Mooring buoys

For all New Charts and New Editions commenced from June 2010, the following Specification for depiction of mooring buoys must be applied:

On Australian Nautical Charts, all mooring buoys must be depicted as they are described in the source, i.e. using the relevant buoy shape, filled or unfilled on the paper Chart in accordance with the colour of the mooring buoy, and appropriate colour abbreviation.

The paper Chart symbol for visitors' moorings (INT1 – Q45) must not be used. There is no requirement to indicate that a mooring is a visitors' mooring on Australian Nautical Charts.

When the shape and colour of a mooring buoy are unknown, INT1 Q40 first example (barrel (nun) with no infill colour) must be used.

On rare occasions, a mooring buoy may also have a topmark to indicate a specific navigational purpose for the buoy. Where this occurs, the relevant topmark symbol must take precedence over the small ring symbol used to indicate a mooring buoy on the paper Chart.

B-431.6 Mooring trots

B-431.7 Numerous moorings

B-431.8 Very large tanker loading buoys

B-431.9 Waiting (holding) areas

B-432 Recommended Tracks And Routeing: General

B-432.1 The term "Recommended tracks"

B-432.2 The term "Routeing"

B-432.3 A routeing (i.e. regulatory) element may be combined with recommended tracks

B-432.4 Maximum draught and minimum depth

B-432.5 Related features

B-433 Leading and Clearing Lines; Transits

Leading and clearing lines are often termed transits or transit lines.

Leading and clearing lines must be broken (gapped) on paper Charts for symbols (with the exception of light flares), soundings, compass roses and text. Where possible, text associated with features adjacent to leading and clearing lines must be positioned so as not to interfere with the line.

B-433.1 Leading and clearing marks

Where possible, light flares must be orientated on paper Charts along the transit line for leading lights and lights in line.

Where the scale of the Chart is too small to chart individual leading marks, all marks must be encoded in their true position (for data management purposes) but only one of the marks portrayed on the product, with the other leading mark(s) being masked. The rear mark must be given preference for retention in this case.

B-433.2 Leading and clearing lines: legends (including bearings)

Bearings for leading and clearing lines must be quoted on Australian Nautical Charts to the nearest 0.5 degree. If the rounded bearing is a whole degree value, the decimal (·0) must not be shown on the paper chart, example 100°, 100·5°, 101°and 101·5° (see B-130 and B-132).

B-433.3 Leading lines

In some port areas, particularly where navigation is constrained due to the geography of the area, leading lines may be established with reciprocal leads to cater for both inbound and outbound traffic. In the real world, navigation lines and recommended tracks that are intended to be reciprocal very rarely exist as exact reciprocals – differences of up to, and sometimes exceeding, a metre may occur in the positions of the respective leading lines and their associated navigational aids. This would result in separate geometry for each of the tracks comprising the inbound and outbound leads existing in the database (Navigation Aids Usage) if the leads were to be captured in their true positions. In such cases, in order to depict the reciprocal transits and recommended tracks on a single straight line on Charts where possible, the leads and associated aids to navigation must be “generalised” in the source database (Navigation Aids Usage).

B-433.4 Clearing lines

B-433.5 Transits marking isolated dangers

B-434 Recommended Tracks and Fairways

Recommended Tracks and Preferred Routes must be broken (gapped) on paper Charts for symbols (with the exception of light flares), soundings, compass roses and text. Where possible, text associated with features adjacent to Recommended Tracks and Preferred Routes must be positioned so as not to interfere with the line.

B-434.1 Recommended tracks

Recommended tracks not based on a system of fixed marks (INT1 – M4) must be shown on Australian Nautical Charts where the track has actually been observed and surveyed for that specific purpose during the process of conducting a planned hydrographic survey. In general, a recommended track is a route that has been specifically examined to ensure, as far as possible, that it is free of dangers and along which mariners are advised to navigate.

A recommended track not based on a system of fixed marks must be supported by a chart note and referenced on the paper Chart by the following legend, evenly spaced along the track:

Recommended Track
(see Note)

The content of the note must be supplied by the MIS Section.

B-434.2 Legends on tracks: bearings

Bearings for tracks must be quoted on Australian Nautical Charts to the nearest 0.5 degree. If the rounded bearing is a whole degree value, the decimal (·0) must not be shown on the paper chart, example 100°, 100·5°, 101° and 101·5° (see B-130 and B-132).

Preferred Route

Preferred routes must not to be confused with recommended tracks. A preferred route is a track along which vessels are advised to follow. It is the best known track through an imperfectly surveyed area or through a surveyed area where reported information does not indicate that the track was actually examined specifically as a "recommended track".

The paper Chart symbol for a preferred route is based on the symbol for a recommended track not based on a system of fixed marks (INT1 – M4). The preferred route symbol is distinguished from the recommended track symbol in that it must have regular gaps in the pecked linework as shown in the following figure:

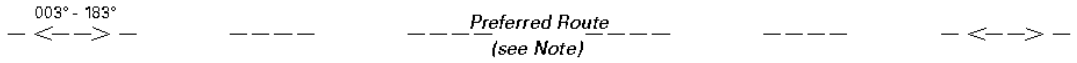


Figure 400.15: Example of Preferred Route symbology

A preferred route must be supported by a chart note and referenced on the paper Chart by the following legend, evenly spaced along the route:

Preferred Route
(see Note)

The content of the explanatory note must be supplied by the MIS Section.

B-434.3 Legends on tracks: maximum authorised (or recommended) draught

B-434.4 Variations with Chart scale

B-434.5 A fairway designated by a regulatory authority

Fairways (or Shipping Fairways) are designated by a regulatory authority and must be depicted on paper Charts by:

- a magenta fairway limit (INT1 M18) leaving the entry/exit points (ends) open
- an associated name or legend, example '*SHIPPING FAIRWAY*' and
- a chart note.

Fairways must be highlighted with a grey tint (8%); the exception is fairways within port limits that cover more than 50% of charted navigable water, in this case the grey tint is not to be shown.

Fairway with grey tint

Fairway without grey tint

The fairway must be supported by a chart note and referenced on the paper chart by a legend. (see diagrams above). Two variants of the chart note are required; one for fairways

extending outside port limits (offshore), the other for fairways within port limits (inshore). MIS section is to supply the relevant chart note for inclusion in nautical charts.

SHIPPING FAIRWAY
Use of the shipping fairway is not mandatory, but strongly recommended. The International Regulations for Preventing Collisions at Sea 1972 apply to all vessels navigating within or outside the Shipping Fairway. Use of the fairway does not give vessels any special right of way.

Sample chart note for fairways <u>outside</u> of port limits. (latest version must be supplied by MIS).

SHIPPING FAIRWAY
The International Regulations for Preventing Collisions at Sea 1972 apply to all vessels navigating within, crossing, or near the Shipping Fairway. Vessels shall avoid anchoring within the fairway, except in an emergency.

Sample chart note for fairways <u>within</u> port limits. (latest version must be supplied by MIS).

Additional diagrams

Fairway with minimum depth

Fairway with maximum authorised draft

B-435 Ships Routeing Systems

B-435.1 Traffic separation schemes and inshore traffic zones

B-435.2 Precautionary areas

B-435.3 Deep Water routes

B-435.4 Recommended routes

B-435.5 Recommended direction of traffic flow

B-435.6 Two-way routes

On Australian Nautical Charts, the limits of Two-Way Routes must be depicted on paper Charts by a bold dashed magenta line (INT1 – M15). Dashed outline arrows (INT1 – M11) must be used to indicate the nature of the route. In two-way sections, the arrows should be depicted parallel to each other in pairs and pointing in opposite directions parallel to the direction of traffic flow to reinforce the “keep to starboard where practicable” rule (e.g. the left pointing arrow above the right pointing arrow for a horizontal route). One-way sections within a two-way route should be indicated by use of a single arrow parallel to the direction of traffic flow.

A Two-Way Route must be supported by a chart note and referenced on the paper Chart by the following legend, evenly spaced along the route and oriented parallel to the direction of traffic flow:

TWO-WAY ROUTE
(see Note)

The content of the cautionary note must be supplied by the MIS Section.

B-435.7 Areas to be Avoided (ATBA)

The content of the cautionary note associated with an Area to be Avoided must be supplied by the MIS Section.

B-435.8 IMO associated rules and recommendations on navigation

B-435.9 Mandatory routeing system

B-435.10 Archipelagic Sea Lanes (ASL)

B-435.11 No anchoring areas

B-436 Boundaries of Routeing Measures

B-436.1

B-436.2

B-436.3

B-437 Environmentally Sensitive Sea Area (ESSA)

In Australia, the term 'Marine Protected Area' (MPA) has been adopted in preference to other terminology, such as 'Marine and Estuarine Protected Area' to standardise terminology across Australian jurisdictions. Within State, Territorial and Commonwealth waters, MPAs may comprise reefs, seagrass beds, tidal lagoons, mudflats, salt marshes, mangroves, rock platforms, shipwrecks, archaeological sites, underwater areas of the coast and seabeds in deep water, which have been reserved by legislation to protect part or all of the enclosed environment for conservation, scientific, educational or recreational purposes.

There are a wide variety of MPAs in Australia which may also be referred to as 'Marine Sanctuary', 'Marine Park', 'Marine Reserve', 'Wildlife Sanctuary', 'Protected Seascape', 'Marine component of a National Park', 'Environmentally Sensitive Sea Area' and 'Antarctic Specially Protected Area'.

B-437.1 Environmentally Sensitive Sea Area (ESSA)

Environmentally Sensitive Sea Area (ESSA) is an international generic term, which may be used to describe a wide range of Marine Protected Areas (MPAs), considered sensitive for a variety of environmental reasons. The types of MPAs considered being ESSAs which exist in Australia consist of:

- Antarctic Specially Protected Areas
- Conservation Parks
- Marine and Coastal Parks
- Marine National Parks
- Marine National Nature Reserves
- Marine Parks
- Marine Reserves (see B-437.7)
- Marine Sanctuaries
- National Nature Reserves
- National Parks (Marine Component)
- Particularly Sensitive Sea Areas (see B-437.6)

B-437.2 General considerations for the charting of ESSA

Australian Nautical Charts must portray the external limit of an ESSA where there is a specifically identified requirement, and where it is practicable, given the scale of the chart and the extent of the ESSA. Decisions regarding the depiction of an ESSA on various scales of Chart must be made by DDCPM, in consultation with the MIS Section. The Great Barrier Reef Marine Park is considered to fall within a special instance of an ESSA (see B-437.6).

All details associated with ESSAs must be charted on paper Charts in green (the colour internationally associated with environmental matters), including symbols, text and notes. The limit to be charted must coincide with the outer limits of all of the differing measures which may apply in all, or part, of an ESSA.

The symbol to be used for the charting of ESSAs must be INT1 – N22.4 (green option), with the use of the maritime limit in general or restricted area symbol dependant on whether or not there are associated navigational restrictions (ADMARE vs RESARE encoding in the ENC). The width of the green band must be 1mm. Multi-feature lines must not be used where an ESSA boundary is co-incident with another boundary. See B-439.6 for examples of the depiction of coincident limits.

When an ESSA contains an area where the entry is prohibited it must be charted in magenta using INT1 – N2.2a line symbology. When any part of this limit coincides with the ESSA limit, a combined line symbol INT1 – 2.2a + green band (see figure below) must be used.

Where a charted ESSA has an accompanying explanatory or cautionary note, the reference(s) to the note must be placed along and inside the limit of the ESSA, evenly spaced, reading from the bottom of the Chart.

If required, ESSAs must be depicted on Charts at scale 1:1 500 000 and larger, noting that ESSA should only be depicted on 1:1 500 000 Charts where there is no coverage at larger scales.

B-437.3 Nature Reserves

Marine Reserves (MR)

Within Australian waters, there may be a requirement to depict sensitive zones within an Environmentally Sensitive Sea Area (ESSA) to inform mariners of additional legislated restrictions that apply to access, discharge of waste and other activities. Currently, these sensitive zones must only be depicted within the Great Barrier Reef Marine Park (see B-437.6), on all ENCs of Navigational Purpose 3, 4 and 5. The limit to be charted must be the outer limit of the higher level restrictions. The content of the related cautionary note must be supplied by the MIS Section. **NOTE:** From March 2014 these Marine Reserves must no longer be shown on paper Charts.

B-437.4 ESSA specifically designated in response to wider environmental considerations

B-437.5 Special Area

B-437.6 Particularly Sensitive Sea Area (PSSA)

Currently, Australia's only IMO declared PSSA is the Great Barrier Reef, Torres Strait and Coral Sea Particularly Sensitive Sea Area. The outer edge of the PSSA is defined by the IMO with some sections corresponding to the outer edge of the Great Barrier Reef Marine Park, the inner edge of the PSSA corresponds to Mean Low Water. For charting purposes, this is to be interpreted as the High Water Line. The Great Barrier reef, Torres Strait and Coral Sea PSSA must be depicted on all charts of scale 1:1 500 000. The symbol to be used for the charting of

the PSSA on paper Charts must be INT1 – N22.4 (green administrative area option). The width of the green band must be 1mm.

The outer limit of the PSSA must be supported by a chart note and referenced on the paper Chart by the following legend, evenly spaced along the inside of the limit and reading from the bottom of the Chart:

PSSA (see GBRMP Note) – where coincident with the GBRMP limit

PSSA (see Note) – where independent of the GBRMP limit

The content of the GBRMP and PSSA cautionary notes must be supplied by the MIS Section.

B-437.7 Other environmental areas, defined nationally or internationally

Great Barrier Reef Marine Park (GBRMP)

The Great Barrier Reef Marine Park (GBRMP) covers most of the north-east coast of Australia, and as such falls on a large number of charts. In order to ensure consistency, the following additional guidelines must be followed:

- The inner boundary of the GBRMP, with the exception of Exclusion Zones as described below, corresponds with Mean Low Water. For charting purposes, this is to be interpreted as the High Water Line and must not be symbolised.
- Along the Queensland coast, there have been approximately 30 areas comprising major ports and infrastructure that have been excluded from the GBRMP, known as “GBRMP Exclusion Zones”. It must be noted that these Exclusion Zones do not form part of the inner boundary of the PSSA, which corresponds with Mean Low Water along its entirety. The GBRMP Exclusion Zones must only be depicted on Charts at scale 1:150 000 and larger. The symbol to be used for the GBRMP Exclusion Zones on paper Charts must be INT1 – N22.4b (green restricted area option). The width of the green band must be 1mm, and the restricted area symbology must point into the GBRMP.
- The limit of the Exclusion Zones must be supported by a chart note and referenced on the paper Chart by the following legend, positioned along the GBRMP side of the limit and reading from the bottom of the Chart:

  GBRMP (see Note)

  The content of the cautionary note must be supplied by the MIS Section.

B-437.8 Not currently used

B-437.9 Coral

B-438 Ferries

B-438.1 Ferry routes

B-438.2 Cable ferries

B-438.3 Long distance ferries

439 Restricted and Other Maritime Areas

Areas where entry is prohibited for certain classes of vessels must be approved by the Australian Maritime Safety Authority before being inserted on Australian Nautical Charts. Subject to this, anchoring may be prohibited for areas within the limits of internal waters or the Territorial Sea. Beyond these limits a suitably worded caution and reference must be provided. Refer to Mariners Handbook for Australian Waters (AHP 20), Chapter 5.

B-439.1 The limits of non-restricted areas

Tint bands must not be added on paper Charts unless specified separately within this document.

The limits of inadequately surveyed areas must not be charted (see B-417.6).

B-439.2 The limits of restricted areas

Tint bands must not be added on paper Charts unless specified separately within this document.

B-439.3 The nature of the restriction

Where symbols are shown within the limit on paper Charts, they must be oriented so that the symbol is parallel to the limit line, and centred along the line.

B-439.4 Small restricted and other maritime areas

B-439.5 Areas charted by special symbols

Designated Shipping Areas (DSA)

Currently in Australia, Designated Shipping Areas (DSA) only exist within the area of the Great Barrier Reef Marine Park and are described in Part 4 of the Great Barrier Reef Marine Park (GRMPA) Zoning Plan 2003. Shipping areas are intended to facilitate passage through the marine park by ships, and are areas within which ships may navigate through the marine park subject to limitations as prescribed in the regulations to the GBRMPA Zoning Plan 2003. These limitations relate to size, capability and role of the vessel.

For Australian Nautical Charts, DSAs must be depicted on all Charts of scale 1:500 000 and larger.

The limits of DSAs, where required, must be depicted on paper Charts using the magenta maritime limit in general symbol (INT1 – N1.2), with a 1mm magenta tint band superimposed along the inside of the limit but note the following for DSA limits coincident with the GBRMP limits.

For paper charts of scale 1 : 500 000 and larger, DSA limits must be depicted using the magenta maritime limit in general symbol (INT1 – N1.2), with a 1mm magenta tint band superimposed along the inside of the limit but note the following for DSA limits coincident with the GBRMP limits.

- where the DSA outer limit is coincident with the GBRMP limit, the text *'DSA (see Note)'* must be placed at intervals on the inside of the DSA/GBRMP limit and within close proximity to the *'GBRMP (see Note)'* text; line symbology representing the DSA is not required.
- where the DSA inner limit is coincident with the GBRMP limit there must be no reference or line symbol representing the DSA.
- The Chart Note to be added to the title should be AU170_XX (All commercial vessels.....).

For paper charts of scale 1 : 1 500 000 where the DSA is contained within the charted area, the text *'Designated Shipping Area (see Note)'* is to be shown at intervals within the extents of the DSA area on two lines; line symbology representing the DSA is not required.
The Chart Note to be added to the title should be AU169_XX (Limits of Designated Shipping Areas are not shown on this chart. .....)

The content of the cautionary notes must be supplied by the MIS Section.

Torres Strait Quarantine Zone

The Torres Strait Quarantine Zone is currently the only declared quarantine zone to be shown on Australian Nautical Charts. The zone must be shown on all Charts at scale 1:500 000 and larger. Where it is required to show the Torres Strait Quarantine Zone on paper Charts, it must be done using the general maritime limit of non-restricted area (usually implying non-permanent physical obstructions – INT1 – N1.2), with a defining quarantine symbol placed along the limit (magenta circle and cross as depicted in INT1 – N12.8). The defining symbol must be placed as specified in B-439.6 – Symbol definition below. The text *TORRES STRAIT QUARANTINE ZONE* must be placed at least once along the inside of limit, reading from the bottom of the Chart.

Figure 400.17: Example of AHO Quarantine Zone symbology

There must be no explanatory note associated with the Torres Strait Quarantine Zone.

Swing (Turning) Basins

Swing basins (sometimes termed turning or manoeuvring basins) are declared regulatory areas, within ports and other areas where shipping movements are restricted, in which large vessels can perform tight turning manoeuvres to facilitate berthing requirements. These areas must not be confused with swinging circles around anchor berths (see B-431.2).

Most swing basins are located within dredged areas, and as such on paper Charts the identifying charted text must be shown in black in the centre of the area. The boundary of the swing basin need not be charted as it will be assumed to be the dredged limit. In rare cases, a swing basin will be declared in an area where no dredging has taken place. In order to be consistent, such areas, where required to be charted, must be shown in black, with the limit depicted using INT1 – N1.1. The descriptive text should be centred in the area, also in black. Note that this is an exception to the rules governing the use of colour specified in B-141 and B-142.

B-439.6 Cartographic principles for portraying maritime limits

Most maritime limits are proclaimed by international or national authorities, such as IMO, AMSA or GBRMPA. As such, the geographic extents of these limits are embedded in legislation. These limits must not be offset or re-positioned, unless it is considered that safe navigation could be compromised (e.g. where a maritime limit is coincident with a light sector limit). Where a maritime limit is coincident with a paper Chart graticule line, the graticule line must be broken (gapped) for the limit. Where the limit is supposed to merge into the coastline or Low Water Line, and the best source available to the AHO does not support this, the situation must be brought to the attention of the MIS Section for referral to the relevant authority.

Other than where described in the Specifications, the depiction of parts of maritime limits having multiple purposes (coincident limits) on paper Charts using a single multi-feature symbol is prohibited on Australian Nautical Charts.

Paper Chart symbol definition

The symbols defining maritime limits, prohibited areas, submarine cables and various routes frequently consist of a line (or line symbol e.g. dashed line, T symbol or submarine cable symbol) with the defining symbol placed at intervals along the line. Examples include the territorial seas and exclusive economic zone limits, prohibited anchoring areas and submarine power cables.

The defining symbol should be placed on the line (or lines) at intervals that ensure that the line is clearly defined. The interval may vary depending on:

- The length of the line (or lines) i.e. to ensure that each line or area has at least one defining symbol (smaller areas may have the defining symbol centred inside the area, rather than on the bounding line – see B-439.4).
- Restrictions resulting from the depiction of other information on the chart i.e. it may be necessary to adjust the intervals of the defining symbol around other information.
- The relative data content of the particular area on the chart i.e. in very open areas a line may be clearly defined with minimum defining symbols, while in a busy area more symbols may be required to clearly define the line.

Some average intervals of the defining symbol on an extensive piece of line are:

- Anchorage area and prohibited anchorage 40mm
- Submarine power cable 40mm

Note that for Straight Territorial Sea Baselines, the interval for the defining symbols should be 50mm or closer (see B-440.4).

Coincident limits

The following table shows examples of the charting of coincident maritime limits on paper Charts. This table does not cover all possible scenarios – other instances of coincident maritime limits may exist. See also B-436.3. When it is not clear how to portray other instances of coincident limits, the issue must be referred to DDCPM for possible referral to the CTWG.

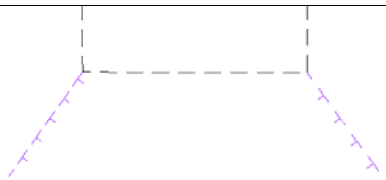
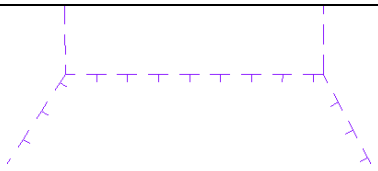
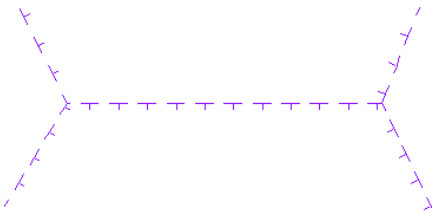
	Merging limits	Symbol
1	Maritime limit in general implying fixed obstructions/Restricted area **M1.1/M2.1**	
2	Maritime limit in general implying no fixed obstructions/Restricted area **M1.2/M2.1**	
3	Coincident edges of adjoining restricted areas **M2.1**	

Table 400.1: Examples of co-incident limits

B-440 International Boundaries and National Limits

General comments on international and national boundary depiction

Land boundary symbols must be in black on paper Charts. International and national boundaries and limits shown in water areas must be depicted in magenta. Legends placed on limits in water areas must be positioned on the inside of the area defined by the limit.

Where Territorial Sea information is shown (Territorial Sea Straight Baselines, seaward limit of Territorial Sea and Contiguous Zone – see B-440.4 to B-440.6), an accompanying Maritime Jurisdiction explanatory note in magenta i.e. AUSTRALIAN MARITIME JURISDICTION (AMJ), must be included in the title area of the paper Chart (see B-242). A reference legend must not be placed in the main Chart area. The wording of the explanatory note must be supplied by the MIS Section.

International and national limits must be shown on charts of scales 1:500 000 and smaller. The outer limit of the Exclusive Economic Zone (EEZ) must also be shown (see B-440.9).

All cautionary/explanatory notes associated with international and national boundaries included on Charts must be supplied by the MIS Section. On paper Charts, the note name and any associated note reference must be shown in accordance with B-242 and B-242.1.

Reason for showing maritime boundary information

Maritime boundary information and related Chart notes are shown on Charts to provide mariners with a level of information that may effect or restrict their voyage. This information will be taken into account when conducting passage planning or during a voyage. Such information may be:

- Limits of a country's legislated maritime jurisdictional claim;
- Limits of any domestically legislated area which has attached rights, restrictions, responsibilities or penalties.

The following principles should be observed:

- All Australian jurisdictional maritime zones and limits should be shown (NOTE: Land national park zones and limits must not be shown on Australian Nautical Charts);
- All Australian treaty lines and zones should be shown;
- All domestically legislated areas, the outer limit only should be shown. Where the legislated areas have many internal zones only those which have direct effect on the mariner should be shown.

If in doubt, refer to DDCPM.

Maritime boundaries, delimited area detail and Chart scale

The types of maritime boundaries charted will vary with the Chart purpose, scale, and availability of source data. Therefore Table 400.2 below provides **guidance** on the depiction of maritime boundaries appropriate for the various Chart scales. Where a scale range is specified, the larger and smaller scales shown are inclusive.

Maritime Boundary Content : Chart Scale

Boundary	*AUOC Ref*	*S-4 Part B or Aus Chart Spec Paragraph*	*Chart Scale(s)*
Aircraft Operations	4.8.12	B-449	150000 and larger
Cable Area	11.5.1	B-443	500000 and larger
Submarine Cable Area	11.5.3	B-443	500000 and larger
Firing Areas	11.3.1	B-441	500000 and larger

Maritime Boundary Content : Chart Scale

Boundary	*AUOC Ref*	*S-4 Part B or Aus Chart Spec Paragraph*	*Chart Scale(s)*
Exercise Areas	11.3.1	B-441	500000 and larger
Submarine Exercise Area	11.3.2	B-441.5	500000 and larger
Naval Waters	Not Discussed	Not Discussed	150000 and larger
Deguassing Ranges	11.10	B-448	150000 and larger
Antarctic Specially Protected Area	11.14	B-437	500000 and larger
Environmentally Sensitive Sea Area [ESSA]	11.14.1	B-437	1500000 and larger*
Particularly Sensitive Sea Area [PSSA]	11.14.1.1	B-437	1500000 and larger
Protected Zone Historic Shipwreck	11.11	B-449	500000 and larger
Submarine Pipeline Area	11.6.1	B-444	500000 and larger
Mariculture Areas	11.9	B-447	500000 and larger
Territorial Sea Basepoint	11.2.4	B-440.4	90000 - 500000
Territorial Sea Straight Baseline	11.2.4	B-440.4	90000 - 500000
Normal Baseline (Coastline LAT)	Not Discussed	Not Discussed	All
River Closing Line	*Not Discussed*	*Not Discussed*	NA
Bay Closing Line	*Not Discussed*	*Not Discussed*	NA
Territorial Sea	11.2.4	B-440.5	90000 - 500000
Contiguous Zone	11.2.5	B-440.6	90000 - 500000
Exclusive Economic Zone	11.2.8	B-440.9	90000 - 3500000
Continental Shelf Extended	11.2.7	B-440.8	90000 - 3500000
Seabed Boundary Area	Not Discussed	Not Discussed	90000 - 1500000
Water Column Boundary Area	Not Discussed	Not Discussed	90000 - 1500000
Protected Zone	Not Discussed	Not Discussed	90000 - 3500000
Joint Petroleum Development Area	11.7.4	B-440.3	90000 - 3500000
Treaty (National) Boundary	11.2.1	B-440.3	90000 - 3500000
Aboriginal Waters	11.2.10	B-449.7	500000 and larger
Anchorage Area	9.2.1	B-431	500000 and larger
No Anchoring Area	9.2	B-435.11	500000 and larger
Archipelagic Sea Lanes & components	10.2.8	B-435.10	3500000 and larger
Cruise Ship Anchorage	9.2.1	B-431	500000 and larger
Dumping Grounds	11.4	B-442,B-446	500000 and larger
Designated Shipping Area	10.2.9	B-439.5	500000 and larger
Compulsory Pilotage Area	13.1.2	B-435	500000 and larger
Ship Reporting System	12.13.1	B-435	1500000
Vessel Management Systems	Not discussed	B-435	500000 and larger
Area To be Avoided	10.2.7	B-435.7	1500000 and larger

Maritime Boundary Content : Chart Scale			
Boundary	***AUOC Ref***	***S-4 Part B or Aus Chart Spec Paragraph***	***Chart Scale(s)***
Safety Zones		B-439,B-445	500000 and larger
Restricted Area	11.1	B-439	500000 and larger
Prohibited Area	9.2.3	B-439	500000 and larger
Caution Area	6.6		500000 and larger
Quarantine Area	11.1	B-439.5	500000 and larger
Port Limit	9.1.1	B-430.1	500000 and larger
Pilotage limit	13.1.2	B-430.1	500000 and larger
~~Security Regulated Port~~	~~11.2.9~~	~~B-430.3~~	~~500000 and larger~~
Roadstead	Not Discussed	Not Discussed	500000 and larger

Table 400.2: Relationship between Navigation Purpose and level of depiction

* ESSA should only be depicted on 1:1 500 000 and 1:500 000 Charts where there is no coverage at larger scales (i.e. the whole ESSA area is not contained in a larger scale Chart).

B-440.1 International boundaries on land

B-440.2 Customs limits

Where a customs limit is shown on paper Charts, the customs symbol in the line symbol must be oriented so that the parallel lines in the circle are parallel to the limit line.

B-440.3 International maritime boundaries

B-440.4 Baselines

Australian Straight Territorial Sea Baselines must be shown on all Australian Nautical Charts between scales 1:90 000 and 1:500 000. River and bay closing lines must not be shown.

The geographic location of the Territorial Sea Baseline is embedded in legislation. Therefore, the location of the Straight Territorial Sea Baselines and their associated base points must not be offset or repositioned on the Chart. The base points, which define the Straight Territorial Sea baselines, are located on the Low Water Line. Where the latest source of information available in the AHO (charted Low Water Line) does not support this, the situation must be brought to the attention of the MIS Section for referral to the relevant authority.

B-440.5 The Territorial Sea

The seaward limit of Australian Territorial Seas must be shown on all Australian Nautical Charts between scales 1:90 000 and 1:500 000.

B-440.6 The Contiguous Zone

The seaward limit of the Australian Contiguous Zone must be shown on all Australian Nautical Charts between scales 1:90 000 and 1:500 000.

B-440.7 A fishery zone

The limits of the Australian Fishing Zone must not be shown on Australian Nautical Charts.

B-440.8 The Continental Shelf

B-440.9 Exclusive Economic Zones (EEZ)

Australian Exclusive Economic Zone (EEZ) limits must be shown on Australian Nautical Charts of scale 1:500 000 and smaller, including International (INT) series Charts.

The EEZ limit must be supported by a chart note and referenced on the paper Chart by the following legend, evenly spaced along the inside of the limit and reading from the bottom of the Chart:

AUSTRALIA EEZ (see AMJ Note)

The content of the explanatory note (i.e. AUSTRALIAN MARITIME JURISDICTION (AMJ)) must be supplied by the MIS Section.

B-441 Military Practice Areas; Minefields

From the 4th of June 2018 military exercise areas must not be shown on Australian Charts unless directed otherwise by MIS section.

Note: military exercise areas that may affect the mariner when activated will be broadcasted by AMSA (NAVAREA and/or AUSCOAST warnings) or promulgated by AHO Notices to Mariners. Notification that an exercise area is active is not limited to those charted by the AHO.

B-441.1 Some degree of restriction

B-441.2 Firing danger areas at sea

B-441.3 The limits of firing danger areas

B-441.4 Mine laying (and counter-measures/clearance) practice areas

B-441.5 Submarine exercise areas and transit lanes

B-441.6 Other naval exercise areas

On the largest scale chart of an area, the following must be shown:

- Military areas that restrict or prohibit the entry of persons or vessels, using the restricted area symbol INT1 – N2.1 or N2.2 on paper Charts.
- Naval waters that do not generally restrict or prohibit the entry of persons or vessels, except at certain times, using the magenta maritime limit in general symbol INT1 - N1.2 on paper Charts.
- The legend *Naval Waters* within the limits of the area on paper Charts.

The symbol to be used for the boundary of the area on paper Charts is to be determined by the MIS Section.

B-441.7 Areas established for a unique exercise

B-441.8 Minefields

Mine danger areas and former mined areas

In some areas of Australia's coastal waters, wartime mined areas still exist where it cannot be guaranteed that all mines have been recovered. Such areas must be indicated on Charts as unexploded mines may break free of their anchor lines and thus cause a hazard to navigation.

Where required, former mined areas must be shown at scale 1:500 000 and larger, supported by a chart note, and referenced on the paper Chart using the legend:

Former Mined Area
(see Note)

The content of the cautionary note must be supplied by the MIS Section.

B-442 Dumping Groups: General; Harmful Materials

B-442.1 The dumping of harmful materials

B-442.2 Dumping grounds for harmful materials

B-442.3 Dumped individual mines or explosives

Unexploded ordnance

In addition to mines, explosive devices such as torpedoes, depth charges, bombs and other explosive missiles may exist in areas where they have been previously dumped or dropped. Although these areas may be considered no more dangerous from unexploded devices than from any of the other usual hazards to navigation, there is still a remote risk that such devices may constitute a danger with regard to anchoring, fishing or any form of submarine or seabed activity.

Where required, these areas must be indicated on paper Charts using the magenta maritime limit in general symbol INT1 - N1.2. The area must be supported by a chart note and referenced on the paper Chart using the legend:

Unexploded Ordnance
(see Note)

The content of the cautionary note must be supplied by the MIS Section.

Where the size of the area is too small to adequately depict at the paper Chart scale, a small circle (approximate diameter 7mm) should be shown using symbol INT1 – N1.2, with the accompanying legend adjacent.

B-442.4 Disused dumping grounds for harmful materials

B-442.5 Floating waste bins

B-443 Submarine Cables

Where a charted cable or cable area has an accompanying cautionary note, the content of the note must be supplied by the MIS Section.

B-443.1 The exact route of individual cables

B-443.2 Power transmission cables

B-443.3 Cable areas

B-443.4 Regulations prohibiting anchoring

B-443.5 Cable beacons, notice boards, or lights

B-443.6 Buoys marking cables

B-443.7 Disused submarine cables

B-443.8 Cables, buried

B-444 Submarine Pipelines

Where a charted pipeline or pipeline area has an accompanying cautionary note, the content of the note must be supplied by the MIS Section.

B-444.1 Oil, chemical, gas and water supply pipelines

B-444.2 Outfalls and intakes

B-444.3 Pipeline areas

B-444.4 Regulations prohibiting anchoring

B-444.5 Pipes of all types, buried

B-444.6 Beacons, notice boards or lights

B-444.7 Disused (abandoned) pipelines

B-444.8 Pipeline installations

B-444.9 'Sub-surface pipelines'

B-444.10 Bubble curtain

B-445 Offshore Production

B-445.1 Wells, Wellheads, Templates and Manifolds

If the depth over a well is unknown and it is within the 30m contour, then the paper Chart well symbol must be infilled with dark blue tint.

Outside the 30 metre contour, it is considered safe to show wells of unknown depth on paper Charts without the blue tint.

B-445.2 Platforms (including production platforms)

Where a Chart contains production platforms, the content of the accompanying cautionary note, which applies to associated safety zones, cautionary areas or areas to be avoided, must be supplied by the MIS Section.

Safety zone, cautionary area, area to be avoided

Petroleum Safety Zones (PSZ) are administered by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). These Safety Zones are gazetted and extend for a radius of 500 metres around fixed installations and must be shown on Nautical Charts of 1:500 000 and larger. Entry into these zones for unauthorised vessels is prohibited. For paper charts the limit of the safety zone is to be shown using INT1 N2.1 symbology.

Cautionary Areas that are associated with Petroleum Safety Zones are an integral part of safety management systems. Therefore, Cautionary Areas extending for a radius of 2.5 nautical miles around fixed installations must be shown on the largest scale Nautical Charts. For paper charts the limit of the cautionary area is to be shown using INT1 N1.2 symbology.

The Cautionary Area must be supported by a chart note, the tile being 'CAUTIONARY AREA and PETROLEUM SAFETY ZONE' and referenced on the paper Chart by the following legend:

Cautionary Area
(see Note)

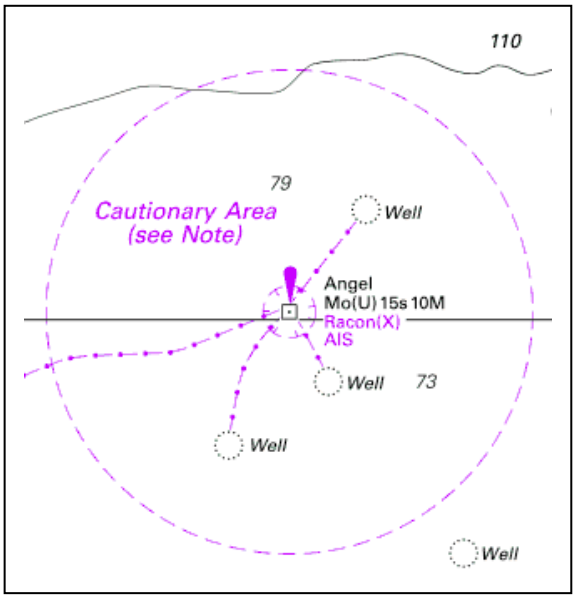


Diagram showing Petroleum Safety Zone and Cautionary Area.

CAUTIONARY AREA AND PETROLEUM SAFETY ZONE
Mariners are advised to exercise caution and allow an adequate safe distance when navigating in close proximity to offshore oil and gas structures. Within the Cautionary Area a Petroleum Safety Zone extends for a radius of 500 metres around offshore structures and entry into the restricted zone is prohibited to all unauthorised vessels. For details see Mariners Handbook for Australian Waters AHP 20.

Sample chart note for Cautionary Areas associated with Petroleum Safety Zones. (latest version must be supplied by MIS).

The limits of Areas to be Avoided (in Bass Strait) that do not correspond to safety zone limits must be shown on the largest scale Chart of the area, on paper Charts using INT1 – N2.1 symbology.

The area must be supported by a chart note and referenced on the paper Chart using the legend:

Area to be Avoided
(see Note)

Disused platform

A disused platform must display the legend ‘disused’ on the paper Chart and must omit the light flare. If a platform has been removed such that it is cleared to the seabed, the site of the former platform must be shown as foul ground (for paper Charts INT1 – K31). Platforms that have been cut-off above the seabed must be shown as obstructions (see B-422.9).

B-445.3 Names of oil- and gas-fields and associated features

B-445.4 Mooring systems

B-445.5 Moored vessels

B-445.6 Safety Zones

B-445.7 Development areas

B-445.8 Wind turbines

B-445.9 Wind farms

B-445.10 Underwater turbines

B-445.11 Current farm (or turbine field)

B-445.12 Wave energy devices; Wave Farms

B-446 Spoil Grounds; Extraction (or Dredging) Areas

For spoil ground areas where post-dumping surveys exist, soundings, contours and the relevant depth band colour tints must be shown.

For areas where post-dumping surveys do not exist, the depth colour tint over the extent of the spoil ground on paper Charts must be governed by the shoalest depth band in which the spoil ground lies. Soundings and depth contours must not be shown in this case, e.g.:

- If the spoil ground overlaps the 2-5 and 5-10m depth bands, the whole area must adopt the colouring of the 2-5m depth band corresponding with the Chart (e.g. dark blue tint);
- If the spoil ground overlaps the 5-10 and 10-15m depth bands, the area must adopt the colouring of the 5-10m depth band corresponding with the Chart (e.g. light blue tint);
- If the spoil ground falls entirely in depths greater than 10m it should be left clear of colour.

B-446.1 Spoil grounds

B-446.2 Disused spoil grounds

B-446.3 Buoys marking spoil grounds

B-446.4 Extraction (or dredging) areas

B-447 Aquaculture: Fish Traps, Shellfish Beds, Fish Havens, Marine Farms

B-447.1 Fishing stakes

B-447.2 Fish traps (or weirs) and tunny nets

Note that paper Chart symbol INT1 – K44.2 is a point, and not an area, symbol. Areas larger than the point symbol at paper Chart scale must use the symbol INT1 – K45.

B-447.3 Extensive areas

B-447.4 Shellfish beds that do not contain physical obstructions

Shellfish Beds that **ARE NOT considered to be dangerous** to surface navigation for the intended usage of the Chart must be shown on paper Charts with magenta linework (INT1 – K47). This includes pearl cultures, the limits of which are not generally known (hence the limits are not charted). The shellfish bed limit symbol (INT1 – K47) introduced at S-4 Edition 4.000 must not be used on Australian paper Nautical Charts.

The area must be supported by a chart note and referenced on the paper Chart using legends (for example):

Shellfish Beds (see Note) *Pearl Culture (see Note)*

The content of the cautionary note must be supplied by the MIS Section.

Shellfish Beds that **are considered to be dangerous** to surface navigation for the intended usage of the Chart must be shown on paper Charts with black linework (INT1 – K48, see B-447.6).

B-447.5 Fish havens (or fishery reefs)

B-447.6 Marine Farms

Due to scale, it may be necessary to add a cautionary note, warning mariners that not all farms are shown on a particular chart. Symbology and the legend *(see Note)* must be shown on paper

Charts in black (see clause B-242). The content of the cautionary note must be supplied by the MIS Section.

B-447.7 Fish aggregating devices (FAD)

See B-460.5 for guidance of the depiction of buoys performing the function of Fish Aggregating Devices.

B-448 Offshore Instruments

B-448.1 A degaussing (or demagnetising) range

B-448.2 The limits of degaussing ranges

B-448.3 Ocean (or Oceanographic) Data Acquisition System (ODAS)

B-448.4 A subsurface Ocean Data Acquisition System (ODAS)

B-449 Various Maritime Areas and Limits

B-449.1 Ice limits

B-449.2 Floating barriers

B-449.3 Incineration areas

B-449.4 Cargo transhipment area

B-449.5 Not currently used

B-449.6 Seaplane operating area

In Australian waters, there are no areas specifically designated for seaplane landing – they can land anywhere, after which they are considered to be vessels, and as such are subject to vessel regulations. There are, however, areas that are regularly used for seaplane landing, as well as declared seaplane landing areas. On Australian Nautical Charts, only declared seaplane landing areas are to be depicted, as identified by the MIS Section.

B-449.7 Indigenous Australian Estate

In Australian waters many areas, covering both sea and land, have been declared Indigenous Australian Estates. These areas are managed and administered by local aboriginal authorities, and restrictions may apply to entry, anchoring, passage or landing.

If it is required to depict an area of aboriginal land and/or waters that has no defined limit, it must be supported by a chart note and referenced on the paper Chart using a legend:

Indigenous Australian Estate (see Note)	For water areas
Indigenous Australian Estate (see Note)	For land areas

The content of the cautionary note must be supplied by the MIS Section.

If it is required to encode an area of aboriginal land and/or waters that has a defined limit on paper Charts, it must be done using the restricted area symbol INT1 – N2.1 for the limit covering the water area. The limit covering the land area must not be depicted. Text legends as above must be placed within the area. The content of the cautionary note must be supplied by the MIS Section.

Indigenous Australian Estates should be shown on Charts at scales 1:500 000 and larger.

B-450 Aids To Navigation, Audible (Sound) and Visual: General

Compilers must note that when compiling aids to navigation on Australian Nautical Charts, all efforts must be made to access and evaluate source information, including images, when determining the appropriate presentation to be used. Any enquiries should be directed to MNM. It is also very important that the guidelines below, and the corresponding guidance in S-4, be followed when determining the appropriate presentation for aids to navigation.

Buoys and beacons on small scale coast Charts

On smaller scale Charts, which cover buoyed channels, only the outer buoys and/or beacons marking the seaward entrance or the principal channel should be shown and on the paper Chart a legend *Channel marked by buoys/beacons* inserted if space permits. An explanatory note indicating that certain lights, buoys and beacons have been omitted must be included in the paper Chart title area. The legend:

Omissions
(see Note)

must be shown on the Chart in areas that are applicable.

The content of the explanatory note must be supplied by the MIS Section.

Buoys and beacons in restricted spaces

If important information restricts the placement of a beacon on the paper Chart, the beacon symbol may be sloped to the left or right. The position circle at the base of the symbol must remain in the correct position and the slope must not exceed 45° from vertical. Exceptionally, a small position circle (INT1 – B32(a)), with the international abbreviation “Bn” may be used (see B-455.5).

If important information restricts the placement of a beacon’s topmark on the paper Chart, the topmark may be sloped to the left or right.

Marking of Dangers

Fixed marks, e.g. beacons or lights on rocks and islets, must be inserted in their true position even though the symbol may obscure the physical feature. Whenever a mark standing in a water area is permanently discontinued and deleted from a paper Chart, the original corresponding ENC or original source must be consulted to verify whether any rock, islet or critical sounding is to be reinstated.

B-450.1 International abbreviations

B-450.2 The international abbreviations for colour are

Historically, Australian paper Nautical Charts depicted the colours orange and amber using the abbreviation for the colour yellow (Y). For all New Charts and New Editions commenced from June 2010, the colours orange and amber must be depicted for aids to navigation structures, where required, using the international abbreviations “Or” or “Am”, as appropriate. Lights that are encoded on ENC as orange or amber are to be depicted as yellow on paper charts in accordance with IALA recommendation.

B-450.3 Legends and abbreviations associated with aids to navigation

B-450.4 For information about buoyage systems

B-450.5 Charting considerations

For ENCs (situations must be analysed at compilation scale)

- when a beacon or buoy symbol clashes against a WRECKS, UWTROC or OBSTRN_p symbol, both objects must be charted. No symbol should be displaced.

- when a beacon or buoy symbol clashes against a critical sounding over a shoal or along a main route the action to take will depend on the nature of the shoal. In simple words, if:
  a. the sounding can be identified as being part of siltation at the base of a beacon or related to the mooring gear of a buoy: the aid to navigation must be charted in its true position and the sounding not charted (refer to AUOC 2.6.2.2 10.l and 10.m for directions on how to manage risk in cases where beacons and/or buoys are temporally damaged or off-station).
  b. the sounding is part of the natural depths in the area and is not related to siltation or mooring equipment: both, the aid to navigation and the sounding must be charted in its true position.

For paper charts

- when a beacon symbol clashes against a wreck, underwater rock or obstruction symbol refer the case to DDCQS in order to discuss which of the options provided in S-4 B-125.2 is the best for the situation.
- when a buoy symbol clashes against a wreck, underwater rock or obstruction symbol, the preferred option is to move the buoy towards the main traffic area and chart the other object in its true position.
- when a beacon symbol clashes against the least depth over a shoal or along a main route, the beacon must be charted in its true position and the sounding removed. In exceptional circumstances the sounding can be retained by using 'out of position' symbology (see B-412.2).
- when a buoy symbol clashes against the least depth over a shoal or along a main route, the sounding must be charted in its true position and the buoy moved towards the main traffic area.

B-451 Audible (Sound) Fog Signals

B-451.1 Whether to chart a fog signal

B-451.2 The position

B-451.3 Abbreviations

B-451.4 Reserve fog signals

B-452 Types of Fog Signal

B-452.1 Explosive

B-452.2 Diaphone

B-452.3 Siren

B-452.4 Horn

B-452.5 Bell

B-452.6 Whistle

B-452.7 Gong

B-452.8 Type of signal not stated

B-452.9 Manually activated fog signals

B-453 Fog Signals: Rhythm and Period

B-453.1 A single sound (blast)

B-453.2 Multiple sounds (blasts)

B-453.3 Morse code rhythms

B-453.4 Composite rhythms

B-453.5 The period

B-454 Fog Signals on Buoys

B-454.1 Wave-actuated fog signals

B-454.2 Fog signals operated automatically

B-454.3 Wave-actuated signals in conjunction with automatic signals

B-455 Visual Aids to Navigation: Beacons and Daymarks, In General

B-455.1 The term "beacon"

B-455.2 Shapes of beacons

Special topmarks, when charted, must be portrayed on paper Charts in 0·10mm linework.

B-455.3 Symbols

B-455.4 Colours of beacons

In Australian waters, beacons within an area are often the same neutral colour (e.g. weathered grey or black) in order to save on maintenance costs; or painted white to be more easily seen at night, or pink, etc to be more easily seen during the day, while the topmark is coloured in accordance with IALA (Region A) convention. Where this occurs, the colour abbreviation must not be shown on the paper Chart.

B-455.5 The symbol for a "Beacon in general"

B-455.6 Beacons on submerged or drying rocks

B-455.7 Numbered or lettered beacons

Where it is required to show the number or letter of a beacon on a paper Chart, the following format must be used, e.g.:

No1 No12 C6 B22

Note that there must be no full stop, space or half space after "No" and no space or half space between letter and qualifying number.

B-455.8 Radar reflectors

B-455.9 Daymark

Daymarks on land that also have a light for night-time navigation (**DAYMAR** + **LIGHTS**) should be charted on paper Charts using the major light star (INT1 – P1(a)), with the appropriate appropriate daymark shape (TOPSHP).

Daymarks on land with an attached light and a supporting structure that is intended to be an aid to daytime navigation (**DAYMAR** + **LIGHTS** + **BCNxxx**/**LNDMRK**), should be charted as a light beacon (INT1 - P4) with the appropriate daymark shape (TOPSHP). Where chart clutter is an issue on the paper Chart the light beacon may exceptionally be depicted using the major light star (INT1 – P1(a)) with the appropriate daymark shape (TOPSHP).

B-456 Symbols for Various Types of Beacon

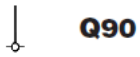
B-456.1 Minor impermanent marks, usually in drying areas

B-456.2 Minor marks, usually on land

Leading beacons in the shape of painted boards must be charted as beacons (INT1 – Q82) with rectangular topmarks and position circles on paper Charts to indicate the precise position.

Notice boards (signs),

- on land – notice boards are not required to be charted.
- over navigable water – notice boards (signs) must be shown if the structure supporting the notice board is considered a hazard. For paper charts when the structure is a beacon it should be shown by the symbol INT1 Q90 with position circle. For ENC encoding guidance, see SPEC_05_55_AA34159 AUOC, clause 4.8.21.



B-456.3 Not currently used

B-456.4 Beacons which are major structures

Beacons that are distinctive major structures, when charted by pictorial representation, must be portrayed on paper Charts using 0·10mm linework.

B-456.5 Beacons with distinctive shape and colour

B-457 Light Beacons

B-457.1 On large scale Charts

B-457.2 On smaller scale Charts

For Charts at scale smaller than 1:500 000, major navigational or landfall lights only should be charted. Therefore light beacons in the water should not generally be shown on smaller scale Australian Nautical Charts. Exceptionally, charted light beacons located in the water must be depicted on paper Charts using the same symbology used on larger scale Charts (e.g. INT1 – P3(a), P4(a), P5(a)).

B-457.3 Operational lighthouses

B-458 Special-Purpose Beacons

B-459 Buoyant Beacons

B-459.1 A buoyant beacon

B-459.2 The symbols used for buoyant beacons

B-460 Visual Aids to Navigation: Buoyage

Floating marks should not be positioned on paper Charts such that they cover the feature on the Chart that they are meant to be marking. Where required, floating marks marking dangers, e.g. buoys marking shoals, may be displaced in accordance with the IALA Buoyage system, Region A, so that the danger itself is clearly shown in its true position.

B-460.1 The mooring ground tackle

B-460.2 The body of a buoy

B-460.3 Topmarks

B-460.4 The size of buoys

B-460.5 Seasonal buoyage

Fish Aggregating Devices

In some areas of Australia's coastal waters, seasonal buoys are laid, usually by recreational fishing clubs, in order to attract fish. These buoys are known as Fish Aggregating Devices (FADs) (see also B-447.7). In many cases, these buoys also have topmarks and lights attached. FADs must be depicted on the largest scale Charts covering the area.

Where required, FADs must be shown on paper Charts using seasonal buoy symbology (INT1 – Q71), with the buoy float depicted in the symbology that indicates the true shape and colour of the buoy, topmarks and lights as required. The international abbreviation *FAD* must be shown next to the buoy.

Although signs indicating no mooring are often placed on FADs, there must be no indication of this on the Chart.

B-460.6 Names or numbers of buoys

Speech marks must not be used when naming buoys unless they are required to clarify the name or number from other detail e.g. "*'A' buoy*".

Where it is required to show the number or letter of a buoy on a paper Chart, the following format must be used, e.g.:

No1 *No12* *C6* *B22*

Note that there must be no full stop, space or half space after "*No*" and no space or half space between letter and qualifying number.

B-460.7 Retroreflectors

B-461 Buoyage Systems

B-461.1 The 1936 agreement for a uniform system of maritime buoyage

B-461.2 The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA)

B-461.3 The IALA Maritime Buoyage System

B-461.4 IALA System: Direction of buoyage

The IALA Maritime Buoyage System (Region A) marks the waters of Australia, adjacent islands and the Australian Antarctic Territory (see Diagram 2 within NP 735 – IALA Maritime Buoyage System – for the extents of Buoyage regions throughout the world).

Note that leading and clearing marks are <u>not</u> part of the IALA Maritime Buoyage System.

B-461.5 Charting direction of buoyage

B-462 Shapes of Buoys

B-462.1 Features common to all buoys

B-462.2 Conical

B-462.3 Can or cylindrical

B-462.4 Spherical

B-462.5 Pillar

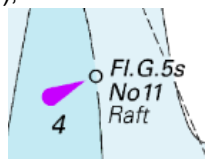
B-462.6 Spar

On Australian paper Nautical Charts, the spar buoy symbol must not be widened in order to show a distinction between an open (or partly open) symbol, and a black “filled in” (or partly black) symbol.

B-462.7 Barrel

B-462.8 Light float

In some inland river systems’ small floating devices are used to support light equipment. In these very particular scenarios the floating light must be depicted on paper charts using the symbol INT1 B33 (small circle without centre point), a flare and the text *'Raft'*.



B-462.9 Super-buoy

B-463 Topmarks on Buoys (and Beacons)

B-463.1 IALA Maritime Buoyage System – Topmarks

B-463.2 Leading topmarks

B-464 Colour of Buoys (and Beacons)

Where known, the colour of the buoy or beacon should be indicated by an abbreviation placed under the symbol on the paper Chart. In extremely congested areas, the colour may be omitted.

In Australian waters, buoys and beacons are often a neutral colour (e.g. weathered grey) or painted white to be more easily seen at night, while the topmark is coloured in accordance with IALA (Region A) convention. Where this occurs, the colour abbreviation must not be shown on the paper Chart.

B-464.1 Colour representation

B-464.2 International abbreviations for colours

B-464.3 Abbreviations for multiple colours

B-465 Radar Reflectors on Buoys

B-465.1 Areas where radar reflectors are fitted to most buoys

B-465.2 In other areas

B-466 Lighted Buoys

B-466.1 The symbol for a lighted buoy

B-466.2 Rhythm of lights on light buoys

B-466.3 The colour of a light on a light-buoy

B-466.4 The period of a light on a light-buoy

B-467 Summary Table of IALA Marks

B-470 Lights: General

The details of all lights on Australian Nautical Charts must be in accordance with the latest information available to the AHO at the time of Chart compilation, as supplied by MNM. The updated Admiralty List of Lights and Fog Signals (Indian and Pacific Oceans, South of the Equator) (NP 83 – Volume K) may also be consulted to ensure that details of charted lights are up-to-date. Where possible, full details of lights must be shown on the largest scale charts.

B-470.1 Charts and other publications

B-470.2 Definitions of the technical terms

B-470.3 The IALA Maritime Buoyage System

B-470.4 Colours of lights

B-470.5 Position of lights

On Australian paper Nautical Charts, the major light star (INT1 – P1(a)) must only be used in cases where the light is fixed to a feature which is attached to the land (e.g. light houses on land, buildings, bridges) or on a dolphin or jetty which is also to be portrayed, and the structure supporting the light (except for light houses) is not intended to be an aid to daytime navigation. The minor light star (INT1 – P1(b)) must only be used as the base for a light beacon symbol (e.g. INT1 – P4(a), see B-457). Due to scale restrictions, sections of the coastline may need to be broken (gapped) or masked from the paper Chart due to the symbology of the major light star symbol (e.g. small island, lighthouse, dolphins). In these cases, the centre of the major light star must be shown using Buff colour tint.

For lights on daymarks refer to B-455.9.

Operational light houses are a special case and should always be depicted on paper Charts using the major light star.

B-470.6 Light Flares

The point of a light flare must be about 1 mm from the charted position of the light on paper Charts, and must be clear of the light star symbol.

Light flares on Australian paper Nautical Charts must be depicted in magenta.

In the case of leading lights, lights in line and directional lights on paper Charts, the flares should be orientated along the line, pointing seaward, providing that by doing so the flares do not obscure other important detail (see B-433.1). In all other cases, light flares must be positioned clear of other charted detail such as:

- Soundings, dangers and other navigational aids;
- Light descriptions (the flare is normally easier to position than the light description);
- Dredged areas (the flare should point outward from the dredged area);
- Natural features such as small islands.
- Maritime boundaries and limits;
- The neatline of the Chart;
- Compass roses.

Where possible, flares must be oriented to “point” to seaward. Preference should be to position the flare pointing at an angle towards the top of the Chart for major light stars and light beacons, and at an angle towards the bottom of the Chart for floating lights.

Black line work must not be broken (gapped) on paper Charts where it crosses a light flare.

B-470.7 Names of major lights

Where it is required to show the number or letter of a light on a paper Chart, the following format must be used, e.g.:

No1 *No12* C6 *B22*

Note that there must be no full stop, space or half space after "No" and no space or half space between letter and qualifying number. Italic text must be used for lights associated with buoys.

B-470.8 Lights off Chart limits

B-471 Light Descriptions

Descriptions of lights should be in accordance with the List of Lights as updated for NTMs, however very few light descriptions are available from this source for light buoys.

Where possible, light descriptions on paper Charts must be positioned adjacent to the symbol depicting the light. In all cases, light descriptions must be positioned clear of other charted detail such as:

- Soundings, dangers and other navigational aids;
- Buildings, landmarks and other prominent charted land detail;
- Natural features such as small islands.
- The neatline of the Chart;
- Compass roses;

And should be positioned clear of:

- Coastline;
- Dredged areas (the description should be positioned outside the dredged area for marks defining the dredged limits);
- Maritime boundaries and limits;
- Roads and railways.

Examples of light descriptions are shown in Figure 400.18.

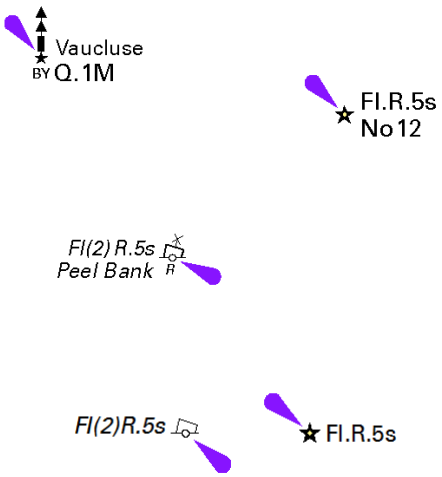


Figure 400.18: Examples of Light Descriptions and their layout

B-471.1 The type of light

B-471.2 The principal character of a light is its rhythm

B-471.3 The colour(s)

B-471.4 Appropriately coloured flares

B-471.5 The period

Where the period is quoted to an accuracy of better than one second, a decimal point rather than a full stop or comma must be used on the paper Chart (see B-130).

If the class (characteristic) of the light (see B-471.2) is quick-flashing (Q), very quick-flashing (VQ) or ultra quick-flashing (UQ), the period must not be shown. Note: This rule does not apply to groups (e.g. VQ(9) 15s).

B-471.6 The elevation

For Australian paper Charts, where the ENC indicates the elevation of a light in metres and decimetres, this value must be rounded down to the nearest whole metre where the elevation of the light is to be included in the charted light description.

B-471.7 The range

In order to maintain consistency with the overwhelming majority of paper charts already published, any light with a light range =< 2NM must have its range removed from its light description.

The only exceptions to this rule are those lights considered essential for marking landfalls and therefore useful to the mariner. In practice they are:

- The first light to be seen by an observer approaching the coast from the open sea.
- The seaward most pair of lights marking the entrance to a channel.
- Leading/directional lights.

For these three examples, light ranges contained in the ENC must be transferred to the paper chart without any further edit. Any other exceptions must be discussed with MCQA & DDCQS first.

B-471.8 Lights exhibited from the same structure

B-471.9 Combining the elements of a light description

Formatting Paper Chart Light Descriptions

Full stops and spacing must be based on the following set of rules as illustrated by the examples in Table 400.4:

Insert full stops:

- At the end of the characteristic rhythm, unless the light is group flashing (e.g. Fl(2)) where no full stop is shown;
- At the end of all colours (not between colours);
- After Al (Alternating).

Omit full stops:

- After s (seconds)
- After m (elevation)
- After M (range)
- Where there is a bracket
- At the end of the light description

If more than one range is given in the light description for a single light, they must be shown as follows:

- Two different ranges: use oblique stroke e.g. 28/22M
- Three or more different ranges: use hyphen e.g. 15-11M

Note that in the following Table, "@" indicates a half-space.

Fl.R	VQ(6)@+@LFl.10s	Q.Bu.6m@6M
Fl.2·5s	Ldg@2F.R	Q(3)@12M
Fl(2)@WR.8s@22m@14/11M	Fl.WR.5s@22m@11/7M	VQ(9)@15s
Fl(3)@15s@7m@10M	Fl.G.3s	Fl.5s@14m@10M
Fl(2)@WR.15s@37m@12/10M	Iso.WR.3s@3M	Q.Y@&@Iso.Y.2s
Al.Oc.WR.20s@16m@10M	F.R.8M	2@F.G(vert)
Oc.WR.10s@18/10M	LFl.8s@12M	Mo(U)@R.2M
Fl(2)@4·5s@9M	Ldg@Iso	2@F.R.2M
FFl.WRG.5s@18m@10-7M	(F.Y@Day)	F@Day
F.Bu(F@Day)	2Lts@≠@270°	

Table 400.4: Examples of light descriptions

Other complex examples include:

Ldg@F.Bu.24m@5M@&@Q.Iso.2s@13m@10M

Dir@Q.Y.4m@&@Fl.Y.3s

B-472 Light Descriptions: Abridging, Omission

B-472.1 Major lights

B-472.2 Lights within harbours and in restricted channels

B-472.3 On multicoloured Charts

B-472.4 Omission of all details (including light stars)

On small scale Charts that have areas covered by larger scale Charts, lights for local use inside harbours, inner waters, rivers and so on, should not be shown. A note indicating that certain lights, buoys and beacons have been omitted must be included on paper Charts in the Chart title area in this case. The legend:

Omissions
(see Note)

must be shown on the Chart in areas that are applicable.

The content of the cautionary note must be supplied by the MIS Section.

B-473 Lights: Time of Exhibition

B-473.1 Unwatched (unmanned) lights

B-473.2 Occasional and private lights

B-473.3 In high latitudes

B-473.4 Daytime lights

Where required, light characteristics for daytime lights must be shown on paper Charts together with the word ”Day” after the light character.

B-473.5 Fog lights

B-473.6 Temporary lights

B-473.7 Extinguished lights

B-473.8 Manually activated lights

B-474 Major Floating Lights

B-474.1 Major floating lights

B-474.2 The symbol for a major floating light

B-474.3 The name of the light

B-474.4 The light description

B-475 Sector Lights and Others Not Visible All Round

B-475.1 Symbols for sector limits and sector arcs

Where a light of a single colour exhibits all-round (i.e. 360°), the arc must not be shown on paper Charts, unless a sector is obscured (see INT1 – P43).

The line of bearing from a light must be interrupted for about 2.5mm on either side of the curve when it crosses the sector arc of another light.

Sector arcs must not cross the coastline onto land. Where a sector arc meets the coastline, it must be terminated, and the small arrow must not be shown at this end of the arc (see INT1 – P45).

B-475.2 Legends on sector arcs

On paper Charts, the colour of the sector and associated text i.e. “Obscd” (INT1 – P43), “F.R” (INT1 – P42) must be shown outside the sector arc; should be centred along the sector arc; and must read from the bottom of the Chart.

B-475.3 All-round lights partially obscured by obstructions

B-475.4 Sector light marking a danger

For sector lights that are not all-round, the sector must be shown on charts.

Sector arcs not marking a danger should be at a shorter radius than those marking the danger.

B-475.5 Sector lights marking fairways

B-475.6 Leading lights and lights in line

For guidance on depicting transits and recommended tracks for reciprocal leading lights, see B-433.3.

B-475.7 Direction (or) lights

Evolving technology in the development of navigational lights has resulted in the installation of complex directional navigation lights where navigation is restricted. These lights may have up

to 7 sectors, with the central sector being a very narrow, sometimes intensified, fixed white sector performing the directional function of the light. In the IALA A System, the sectors flanking this directional light may be alternating and oscillate increasingly from white to green (to starboard) and red (to port) with increasing deviation from the track defined by the directional light. These lights will normally be flanked by narrow sectors of fixed green (to starboard) and red (to port). Additionally, there may be outer sectors that are occulting green (to starboard) and red (to port) which oscillate with increasing period of eclipse to isophased or flashing with increasing deviation from the track defined by the directional light. In some cases these complex lights may not conform to IALA. Each of the outer sectors may be very narrow.

As most of these complex directional navigation lights are installed in harbour areas where vessel movement is restricted, the portrayal of the individual light sectors for these lights may result in excessive clutter and/or confusing presentation to the mariner when combined with all other required harbour navigational information. Additionally, the very narrow light sectors may be impossible to depict adequately on the paper Chart. In general, therefore, individual light sectors for these complex lights should not be shown. Where it is considered that such undue clutter may occur, the following portrayal guidance should be followed:

Note: On ENCs the attribute ORIENT must not be rounded (encode as per source) but any Dir xxx.x legends on paper charts must be rounded to the nearest 0.5 degree. If the bearing is rounded to a whole degree value, the decimal (·0) must not be shown on the paper chart.

For directional lights in the IALA A system that are alternating and oscillate increasingly from white to green (to starboard) and red (to port) with increasing deviation from the track defined by the directional light:

- The transit and directional line (recommended track) only must be shown and the track annotated as normal (i.e. **Dir XXX·x°** near the outer end of the track);

- At the light star, the light description **F & Al.WRG** should be shown. Note that the light description may vary slightly dependant on the nature of the light (e.g. there may be additional sectors of different colour).

- Where there is no directional line associated with the light (i.e. a narrow white sector only is defined to perform the directional function), the white sector only should be shown, and the light description e.g. **Dir F & Al.WRG** should be shown at the light star.

For directional lights in the IALA A system that are occulting green (to starboard) and red (to port) which oscillate with increasing period of eclipse to isophased or flashing with increasing deviation from the track defined by the directional light:

- The transit and directional line (recommended track) only must be shown and the track annotated as normal (i.e. **Dir XXX·x°** near the outer end of the track);

- At the light star, the light description **F & Oc.WRG** should be shown. Note that the light description may vary slightly dependant on the nature of the light (e.g. there may be additional sectors of different colour).

- Where there is no directional line associated with the light (i.e. a narrow white sector only is defined to perform the directional function), the white sector only should be shown, and the light description e.g. **Dir F & Oc.WRG** should be shown at the light star.

Oscillating directional lights which are not IALA should be encoded similar to the above. For instance, where a light contains white sectors that are occulting and oscillate with increasing period of eclipse to isophased or flashing with increasing deviation from the track defined by the directional light:

- The transit and directional line (recommended track) only must be shown and the track annotated as normal (i.e. **Dir XXX·x°** near the outer end of the track);

- At the light star, the light description **F & Oc** should be shown. Note that the light description may vary slightly dependant on the nature of the light (e.g. there may be additional sectors of different colour).

- Where there is no directional line associated with the light (i.e. a narrow white sector only is defined to perform the directional function), the central white sector only should be shown, and the light description e.g. **Dir F & Oc** should be shown at the light star.

When any other combination of light characteristics are used to subdivide the red and green sectors marking the sides of the main approach (usually implemented using a fixed white light), cartographers are to depict the light characteristic on paper charts as follows:

- The transit and directional line (recommended track) only must be shown and the track annotated as normal (i.e. **Dir XXX·x°** near the outer end of the track);

- At the light star, only the light colours (**WRG**) and no light description should be shown.

- Where there is no directional line associated with the light (i.e. a narrow white sector only is defined to perform the directional function), the central white sector only should be shown, and the light description **Dir WRG** should be shown at the light star.

Any issues regarding the portrayal of complex directional navigation lights should be discussed with the Regional Production Manager and DDCQS.

B-475.8 A moire effect mark (or variable arrow mark)

Note: On ENCs the attribute ORIENT must not be rounded (encode as per source) but any bearing shown on paper charts must be rounded to the nearest 0.5 degree. If the bearing is rounded to a whole degree value, the decimal (·0) must not be shown on the paper chart.

B-476 Aeronautical and Air Obstruction Lights

B-476.1 Aeronautical (Aero) lights

B-476.2 Air obstruction lights

B-477 Fog Detector Lights

B-478 Various Special Forms of Lighting

B-478.1 Not currently used

B-478.2 Floodlighting

B-478.3 Synchronized lights

B-478.4 Highlighting of navigation lights

B-478.5 A Strip light

B-480 Radio Position-Fixing Stations: General

On Australian Nautical Charts, radio position-fixing stations should not be shown. Where compilers are unsure as to whether to chart a station (e.g. an emergency station), MNAM must be consulted. Radio position-fixing stations must be removed from all New Charts, New Editions and Notices to Mariners Block Corrections from March 2009.

B-480.1 Aeromarine radiobeacons

B-481 Marine Radiobeacons and Global Navigation Satellite Systems

B-481.1 Circular (non-directional) marine radiobeacons (RC)

B-481.2 Directional radiobeacons (RD)

B-481.3 Global Navigation Satellite Systems (GNSS)

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B-482 Aeronautical Radiobeacons

B-483 Radio Direction-Finding Stations

B-484 Coast Radio Stations Providing "QTG" Service

B-485 Radar Stations and Radar Conspicuous Objects: General

B-485.1 Coast radar stations (Ra)

B-485.2 Radar-conspicuous objects

B-486 Radar Beacons

B-486.1 Ramarks

B-486.2 Racons

B-486.3 Identification and response frequencies of racons

B-486.4 Racon with sector of obscured reception

B-486.5 Leading racons

B-487 Radar Surveillance Stations

B-487.1 Radar range

B-487.2 Radar reference lines

B-487.3 A radar station

B-488 Radio Reporting (Calling-In) Points and Lines; Vessel Traffic Services

B-488.1 Radio reporting points

B-488.2 Radio reporting line

For Australian paper Nautical Charts, radio reporting lines must be charted, where required, by a solid magenta line, with reporting point symbols superimposed at approximately 100mm intervals along the line.

Some ports have implemented an inwards reporting process whereby in-bound vessels are to report to the relevant port or harbour authority as they cross a reporting line. These lines are termed Inward Radio Reporting (or Calling-In) Lines.

Where it is required to depict an Inward Radio Reporting Line on paper Charts, it must be done using a solid magenta line, having Radio Reporting Point (one-way) symbols (INT1 – M40) positioned along the line as the defining symbol (see symbol definition rules in B-131). The defining symbol should be positioned at approximately 100mm intervals along the line, and the symbol must point in a direction inwards and perpendicular to the line (see Figure 400.15). The Radio Reporting Line must be supported by the following legend, positioned along the inside of the limit and reading from the bottom of the Chart:

Inward Reporting (see Note)

The content of the explanatory note must be supplied by the MIS Section.

Figure 400.19: Example of a paper Chart Radio Reporting Line

REEFVTS

"REEFVTS" is an interactive mandatory ship reporting system (SRS) which was adopted by the International Maritime Organisation (IMO) in 1996. It is a joint AMSA/MSQ initiative operated from the ship-reporting centre ("REEFCentre") at Hay Point in Queensland. The purpose of REEFVTS is to enhance navigational safety in the Torres Strait and the inner route of the Great Barrier Reef thereby minimising the risk of a maritime accident and consequential pollution and major damage to the marine environment. A number of mandatory reporting positions have been established within the REEFVTS area (see chart Aus4620 and AHP20 - Mariners Handbook for Australian Waters).

The REEFVTS outer limit must be shown on paper charts of scale 1:1 500 000 using a magenta band with no line. The width of the magenta band must be 2 mm. One edge of the band must indicate the limit of the REEFVTS and the tinted portion of the band fall within the REEFVTS area. This area outer limit boundary must be supported by a legend, positioned along the inside of the limit and reading from the bottom of the Chart:

SHIP REPORTING SYSTEM (SRS) (see Note)

The REEFVTS inner limit usually follows the coastline or is defined by the outer limit of a local port VTS area. The inner limit of the REEFVTS is not to be shown where it is coincident with the coastline but must be shown where it adjoins a local VTS area by labelling the REEFVTS side of the limit with the legend:

REEFVTS (see SRS Note)

A chart note provided by the MIS section must be shown on charts only when any of the following features is depicted: radio calling point symbol; REEFVTS outer limit; REEFVTS inner limit (when shared with a local VTS).

B-488.3 A Vessel Traffic Service (VTS)

A Vessel Traffic Service (VTS) is a service implemented by AMSA (or an authority certified by AMSA) to improve the safety and efficiency of vessel traffic operations and to protect the environment.

In all cases MIS section must determine if this VTS is to be shown on Australian Navigational Charts and if a chart note is required. VTS areas must not be further subdivided into sectors or sections.

B-489 Automatic Identification System (AIS)

AIS Base Stations or Repeaters that are not intended to perform the function of an AIS aid to navigation must not be shown on Australian Nautical Charts. Compilers must consult with MNM if unsure.

For Australian paper charts lines should not be masked where they cross the 3mm radius radio circle. Normal cartographic rules apply for the masking of linework for charted symbols within the radio circle.

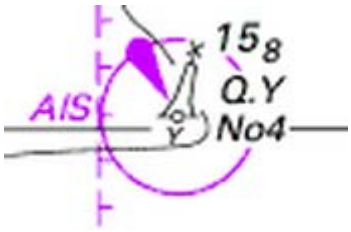

Diagram: Example of contour and graticule passing through AIS radio circle.

B-489.1 An AIS-equipped Aid to Navigation (AtoN)

B-489.2 Virtual aids to navigation

Virtual AIS aids to navigation should only be depicted where it is known that the Virtual aid is intended to be permanent, or deployed for a specified fixed period. Where it is known that a Virtual AIS aid to navigation is moved or withdrawn on a regular basis and/or at short notice, such that implementing these changes through the application of Notices to Mariners is impractical, the Virtual aid should not be shown.

Decisions as to whether a Virtual AIS aid to navigation is to be depicted on a particular Chart, and how it is to be depicted (e.g. in terms of avoiding other important charted information on paper Charts), must be made as for visual aids to navigation – see B-450.

On ENCs, where a V-AtoN is positioned directly over a charted feature (e.g. a submerged danger to navigation like SOUNDG, UWTROC, etc) both features should be shown in their true position.

On paper charts existing S-4 guidance applies. Any enquiries must be directed to MNM and DDCQS.

B-490 Marine Services and Signal Station

B-490.1 Types of station

B-491 Pilot Stations

B-491.1 The position of a pilot boarding place or pilot cruising vessel

In some cases, the position of a pilot boarding place or pilot cruising vessel is defined as an area. Where such an area has been established covering one square nautical mile or larger, the limit must be included on Charts at scale 1:300 000 and larger. On paper Charts, this is done using a magenta dashed line (INT1 – N1.2). The legend "*Pilot Boarding Area*" should be charted within the limits. Where the paper Chart scale does not permit the insertion of the legend within the area, a pilot boarding place symbol (INT1 – T1.1) should be inserted within the area. If considered necessary, a cautionary note may be inserted, to provide additional information about the area. The content of the explanatory note must be supplied by the MIS Section.

Figure 400.20: Example of a pilot boarding area (paper Chart)

B-491.2 Pilots transferred by helicopter

B-491.3 A pilot office

B-491.4 A port which is known to have a pilotage service

B-492 Coastguard Stations

B-492.1 Coastguard stations

B-492.2 Many modern Coastguard services

B-492.3 Maritime Rescue and Coordination Centres

B-493 Rescue Stations and Refuges

B-493.1 The symbol

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B-494 Signal Stations: General

B-494.1 Signal stations

B-494.2 Descriptions of lights

B-495 Traffic Signal Stations

B-495.1 Port entry and departure signals

B-495.2 Lock, docking and berthing signals

B-495.3 Bridge signals

A major light star (INT1 – P1(a)) should be used on paper Charts in lieu of the small light star to show bridge lights on the largest scale Charts.

B-495.4 International traffic signals

B-496 Tidal and Water Level Indicator Signals

B-496.1 Visual scales

B-496.2 Tide signals

B-496.3 Tidal stream signals

B-497 Other Signal Stations

B-497.1 Storm, weather and ice signal stations

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AHO Chart Specifications referenced to S-4 Part B, Section 500

TEXT: LANGUAGE, NUMBERS, ABBREVIATIONS, NAMES, STYLES AND FONTS

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B-530 Numbers

B-531 Whole numbers, fractions and decimals

B-531.1 Whole numbers

B-531.2 Fractional values

In Australian charts, where decimal parts are shown, for example: bearings; positions; tidal heights; dredged depths; etc, the decimal separator must be a decimal point.

B-540 Abbreviations

B-540.1 International abbreviations

B-540.2 Abbreviations

B-540.3 Abbreviations and use of full stops

The descriptor (or generic) term within a geographic name (Point, Cape, Mount, Island, Rock, Shoal etc.) must not be abbreviated on the paper Chart (Pt, C, Mt, I, Rk, Sh etc.) unless space for the name is restricted. Where it is required to abbreviate the descriptor, a full stop must not be placed after the abbreviation.

B-550 Toponyms: General rules

B-550.1 Toponyms: Principle of selection

B-550.2 Consistency of toponyms

B-550.3 To ensure consistency of toponyms.

B-550.4 Alternative and obsolete forms

When a toponym is equally known by two different names (e.g. local/national and English) its preferred version (consult the corresponding sailing directions (Pilot) and MIS section) should be encoded in the OBJNAM attribute (the only one displayed on ECDIS). The other version of the name must be encoded as NOBJNM. In paper charts the least used name (NOBJNM) must follow in brackets the preferred name (OBJNAM) and both names should be represented using the same font and size. If spacing becomes an issue, a holistic approach must be applied to the whole chart where the preferred name should retain the recommended font and size as per the APCTS and the other name should be altered (e.g. Light font instead of Medium; 6 pt font size instead of 8 pt).
See B-552.2(I) for alternative country names.

B-550.5 Distinction between descriptive terms and toponyms

B-551 Toponyms: References and authorities; International and national

B-551.1 International references

B-551.2 Routeing measures

B-551.3 National authorities

All geographic names shown on Australian Nautical Charts must be sourced from the Maritime Gazetteer of Australia (MGA), which is administered by the MIS Section. Any new names derived from other sources must be referred to the MIS Section for approval and possible addition to the MGA.

B-551.4 Non-national waters

B-552 Toponyms: International charts

B-552.1(I) General

B-552.2(I) Countries

B-552.3(I) Features marking or containing boundaries

B-560 Toponyms and legends: Cartographic principles

B-560.1 Placement and arrangement

B-560.2 Straight or curved names

- Where the text is on multiple lines, the text should be aligned, where possible, such that it is centrally justified with the position point of the feature. See B-560.3 below for examples related to light buoys and beacons.
- All names and legends which cannot conveniently be shown horizontally should be curved. Oblique straight names must be avoided, except where required in the

naming of long narrow areas. Names must not be placed horizontally above or below the feature to be named, but may be placed horizontally within a named area.

- Names of coastal features should approach or leave the coast at right angles to the coastline at that point, rather than at a tangent. Thus, where a coastline runs nearer to north-south than to east-west, the horizontal arrangement of names is usually satisfactory. Where the coastline runs nearer east-west than north-south, then the use of curved names is preferable.
- Where a number of curved names and/or legends lie close together, care should be taken to ensure that the curves are parallel to each other. In the case of a "round" island with named coastal features, the names should radiate in a graded series, avoiding sudden changes of curvature.
- In general, curved names or legends must follow one smooth curve. The only exception to this rule relates to the naming of winding rivers, estuaries, roads and railways.
- Where a curve approaches the vertical, care must be taken to ensure that none of the letters is inverted.
- Each charted name or legend must clearly refer to the relevant feature and ambiguity must be avoided. Thus, names must not be separated from the features to which they relate and must not appear indefinitely between two features.

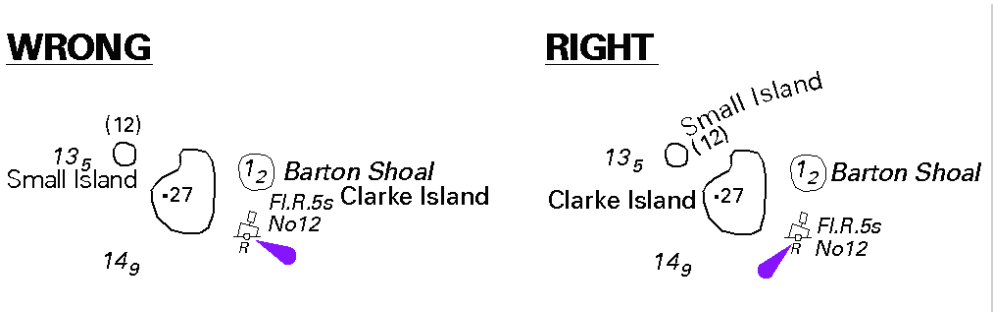

Figure 500.1: Position of text associated with named geographic features

B-560.3 Point names and area names where the name cannot be fitted within the area

- Names of mountains, hills or peaks should be placed directly adjacent to the spot height. The height figure should be placed directly below the name (see B-352).
- Text associated with named and numbered light beacons and buoys should be placed in accordance with the following examples (see also B-470.7 and B-471 and point 1 above):

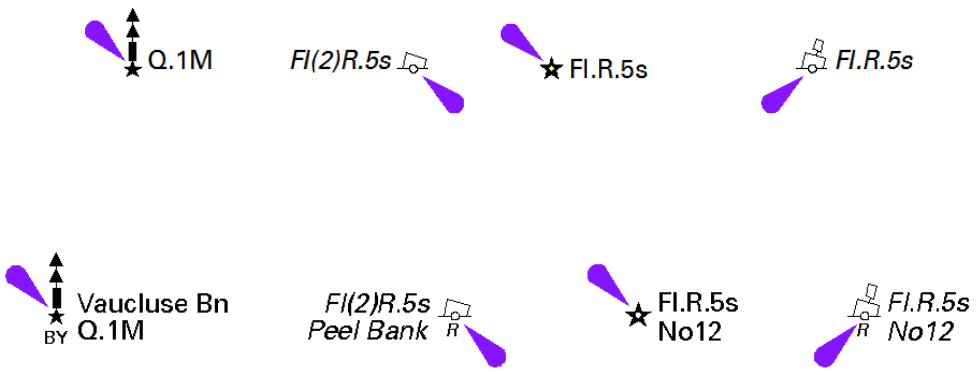

Figure 500.2: Position of text associated with navigation aids

B-560.4 Names of linear features (for example: rivers; canals; pipelines) and long area limits

River, road and railway names should appear above the feature rather than below it.

B-560.5 Area names which can be fitted within the areas concerned

B-561 Text styles and fonts

For guidance on text styles, point sizes, colour and spacing used on Australian Nautical Charts, see SPEC_05_55_AA230048 Paper Chart Text Features and ENC OBJNAM Conventions.

B-562 Text styles: General rules

B-562.1 Distinction between land and water names and legends

B-562.2 Distinction between general geographic and navigationally significant names and legends

B-562.3 Prominence of navigational information

For guidance on how to differentiate prominent features by using different font weights and sizes refer to SPEC_05_55_AA230048 Paper Chart Text Features and ENC OBJNAM Conventions (e.g. Important, Less Important and Unimportant names).

B-563 Choice of font

B-563.1 Use of sans-serif fonts

On Australian charts all text must be based on the sans-serif Univers font.

B-563.2 Use of serifed fonts

On Australian charts serifed fonts must not be used.

B-563.3 Title

Refer to SPEC_05_55_AA230048 Paper Chart Text Features and ENC OBJNAM Conventions.

B-564 Colour

AHO Chart Specifications

referenced to S-4 Part B, Section

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Chart Maintenance

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