

Contract Specifications for Electronic Navigational Charts, Version 1.4.1, October 2009

1 October 2009

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Record of Changes

Version	Date	Amendment
V1.0 Customer Services	5 September 2007	<p>Section 2 updated.</p> <p>Section 3 amended. FTP definition removed.</p> <p>Section 4.1 para 5 changed. ENC's now to span 180° meridian.</p> <p>Section 4.2.1 para 5 removed due to changes to section 4.1 para 5.</p> <p>Section 5.1.3 para 1 and bullet point 1 amended for clarity.</p> <p>Section 5.12.2 para 1. Changes relating to M_ACCY.</p>
V1.1 Customer Services	6 March 2008	<p>Section 4.1 amended. Changes to ENC coverage of insert plans, sheet of plans and continuation plans.</p>
V1.2 Customer Services	4 April 2008	<p>Section 4.1 amended. Changes to ENC coverage of insert plans, sheet of plans and continuation plans.</p> <p>Section 4.2.2. amended. Changes to ENC naming conventions.</p>
V1.3 Customer Services	30 May 2008	<p>Section 5.7 amended. Paragraph removed regarding M_CSCL capture.</p> <p>Section 5.13.1 amended. Changes relating to LNDGRNs.</p> <p>Section 5.15.1 amended. Changes to relating to SLOGRD.</p> <p>Section 5.17 amended. Changes to CONVIS attribution</p> <p>5.19.1 amended. Major rewording of entire section</p> <p>5.19.2 added. New section regarding consistent encoding of depth areas</p> <p>5.19.3 added. New section regarding DRVAL values in specific areas.</p> <p>5.19.14 amended. New paragraph regarding rocks with solid contours</p>

<p>V1.3</p> <p>Customer Services</p>	<p>30 May 2008</p>	<p>5.24 amended. Major rewording.</p> <p>5.24.2 amended. Major rewording.</p> <p>5.26 amended. New cautionary notes policy.</p> <p>Appendix A amended. Updated to reflect changes in section 5.19.14 and 5.24.</p>
<p>V1.4</p> <p>Customer Services</p>	<p>1 June 2009</p>	<p>4.1 ENC Coverage. Paragraph 4 reworded as cannot have one ENC that crosses the 180° line.</p> <p>4.3.2 ENC Naming. Paragraph 1 - DSID and DSPM added next to comment field for clarity.</p> <p>4.3 ENC Content. Magnetic Variation. Small-scale charts now included.</p> <p>5.1.3 Gaps in data renamed Avoiding Gaps in Data Coverage. Inappropriate content removed.</p> <p>5.1.4 Chart Overlaps. Previous content removed. New rules for dealing with paper chart overlaps added as 5.1.2.</p> <p>New section added - 5.1.3 Ensuring Continuity of Objects Across ENC Boundaries.</p> <p>New section added, 5.15.5 Capturing and Maintaining Notices to Mariners Information.</p> <p>New section added - 5.1.5 Cartographic Presentation. Populated with content previously from 5.1.3 Gaps in data.</p> <p>5.11 Source ID. Section removed.</p> <p>5.12.2 Positional Accuracy. Reference to M_ACCY removed.</p> <p>5.13.1 Topographic features. Named beaches no longer to be captured on COALNE, to be captured as a LNDRGN(P).</p> <p>5.13.3 Names of charted features. Clarification added to ensure geographic names captured as per paper chart (including correct use of caps).</p> <p>5.15.1 Bluffs and Steep Coastline. Section rewritten for clarity.</p> <p>5.15.3 Islets. Capture now to be LNDARE (P).</p> <p>5.15.5 Non-navigable waters. Change of wording in first sentence for clarity. Extra guidance for encoding conspicuous non-navigable waters.</p>

		<p>Section 8.2 amended. Format of the supplied report</p> <p>5.1.2 Source Data Overlaps, whole section was moved to 4.2</p>
<p>V1.4.1</p> <p>Customer Services</p>	<p>01 October 2009</p>	<p>Appendix 1 added</p> <p>DEPARE lines no longer required in LINZ ENC's.</p> <p>Existing sections to be replaced with updated sections:</p> <p>4.3 ENC Content – extra features to be captured at various scales</p> <p>5.12.3 Names of Charted Features – further clarification for encoding OBJNAM and NOBJNM</p> <p>5.18.12 Depth Area Standard Depth Ranges – remove information regarding DEPARE lines</p>

Introduction

The information described in this specification is to be used to produce consistent New Zealand ENC's and as a supplement to International Hydrographic Organisation standards and associated publications. It defines the requirements for ENC's, specific to New Zealand, that are not clearly defined in the IHO S-57 Standard.

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SPECIFICATIONS FOR ELECTRONIC NAVIGATIONAL CHARTS (ENCs)

1 Scope

This specification is provided as the authoritative reference for the encoding of features in New Zealand ENCs.

This specification is to be used as a supplement to the IHO publication S57 and has three purposes:

1. To clarify those clauses that are left open to national discretion.
2. To expand those clauses which require further definition.
3. To provide additional information required for New Zealand ENC production.

Unless otherwise specified in this document S57 will be followed.

This document must be used in conjunction with the standards and publications listed in section 2.

It is suggested that if this document is to be printed it should be in colour due to the nature of encoding examples included in the document. This will ensure clarity.

Requesting further clarification:

For items in the LINZ ENC Specification that require further clarification, contractors are encouraged to contact LINZ.

2 Related Standards and Publications

Essential Reading	LINZ Contract Specifications for Paper Hydrographic Charts version 1.2, July 2009, <i>Customer Services, Land Information New Zealand</i>
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- INT 1 Symbols, Terms and Abbreviations used on charts, Edition 6, 2008, *International Hydrographic Organisation*.
- S-4 (M-4) Regulations of the IHO for International (INT) Charts and Chart Specifications of the IHO, Edition 3.006, April 2009. *International Hydrographic Organisation*.
- NP 9 Admiralty Sailing Directions Antarctic Pilot, current edition, *United Kingdom Hydrographic Office*.
- NP 51 Admiralty Sailing Directions New Zealand Pilot, current edition, *United Kingdom Hydrographic Office*.
- NP 61 Admiralty Sailing Directions Pacific Islands Pilot, Volume II, current edition, *United Kingdom Hydrographic Office*.
- NP 62 Admiralty Sailing Directions Pacific Islands Pilot, Volume III, current edition, *United Kingdom Hydrographic Office*.
- NP 83 Admiralty List of Lights and Fog Signals, Indian and Pacific Oceans, South of the Equator, Vol K, current edition, *United Kingdom Hydrographic Office*.
- NZ 204 New Zealand Nautical Almanac, current edition, *Land Information New Zealand*.
- NtMs New Zealand Notices to Mariners, *Land Information New Zealand*.
- S-52 Specifications for chart content and display aspects of ECDIS, 5th Edition, December 1996 (*amended March 1999 and December 2001*), *International Hydrographic Organisation*.
- S-57 IHO Transfer Standard for Digital Hydrographic Data, Edition 3.1, November 2000, *International Hydrographic Organisation*.
- S-58 Recommended ENC Validation Checks, Edition 4.0, June 2009, *International Hydrographic Organisation*.

S-62 ENC Producer Codes, Edition 2.4, November 2007, *International Hydrographic Organisation*.

New Zealand's System of Buoys and Beacons, 2004 edition, *Maritime Safety Authority of New Zealand*.

3 Terms, Definitions and Abbreviations

ECDIS	Electronic Chart Display and Information System.
ENC	Electronic Navigational Chart.
IHO	International Hydrographic Organisation.
LINZ	Land Information New Zealand.
NtMs	Notices to Mariners.
QA	Quality Assurance.
QC	Quality Control.
VAT	Validation and Testing.

Further abbreviations can be found in:

IHO S-52 Appendix 3, Glossary of ECDIS related Terms.

IHO S-57 Appendix A, IHO Object Catalogue.

LINZ Contract Specifications for Paper Hydrographic Charts,
Section 3, Abbreviated terms.

INT 1 Symbols, Terms and Abbreviations used on charts.

4 General Information

All ENC's will be produced to the IHO standard S57 v3.1, in accordance with this document.

4.1 ENC Coverage

The paper chart will form the basis of the ENC(s) and the following rules must be adhered to:

1. Where a large scale inset(s) plan resides on the chart, each inset(s) will be captured as a separate ENC.
E.g.
 - a. NZ5322 will become 3 separate ENC's.
 - b. NZ232 will become 4 separate ENC's
2. Where a continuation plan resides on the chart, at the same scale as the main chart panel, it is to be included with the main panel into a single ENC, e.g. NZ5412 and NZ5411.
3. If the chart is a sheet of plans, each plan will be captured, as a separate ENC.
E.g.
 - a. NZ5212 will become 3 separate ENC's,
 - b. NZ5114 will become 2 separate ENC's,
4. If the chart extends both sides of the 180° meridian, it will be captured as two ENC's - one ENC covering the area east of 180° and another ENC covering the area west of 180°.

4.2 Source Data Overlaps

Any overlaps between the source data provided i.e. paper charts and/or ENC's must be taken into account when determining the coverage of the ENC dataset.

The following guidelines apply:

- Charts of different scale, capture both charts in their entirety
- Charts of the same scale;
 - different dates - the ENC shall be captured from the most recent data;
 - same dates - the contractor shall decide from which chart to capture data.

Contact LINZ for further clarification as and when required.

4.3 ENC Identification

4.3.1 ENC Numbering

Datasets will be numbered in accordance with Appendix B1, section 5.6.3 of S57.

All data sets produced must have the value CC populated as “NZ” (National Topographic/Hydrographic Authority New Zealand). The contractor’s producer code is not to be used.

The contractor will provide an identification code (dataset ID) at the time of production. It will consist of

- Usage code 1 digit
- Chart number 5 digits
- Plan Number 1 digit *Only to be used when more than one plan exists*
- Version number 3 digits *All ENCs accepted by LINZ will be version 1*

Where a chart number is less than 5 digits, the remainder of the number will be padded using zeros (between the usage code and the chart number).

Example **NZ400532.000** Approach Chart, NZ532, version 1

For those Antarctic charts with 6 digits, a zero will be removed,

Example **NZ314906.000** Coastal Chart, NZ149006, version 1

Where a chart becomes multiple ENCs a plan reference number is to be entered. The panel number will match that used in the *NZMariner* and will be provided in the LINZ ENC brief.

Example **NZ552122.000** Harbour Chart, NZ5212, plan 2, version 1

4.3.2 ENC Naming

The following naming rules will apply to the ENC name as used in the README.TXT file, the NZM_NPUB.TXT file, and the DSID and DSPM ‘Comment’ fields.

The paper chart title and *geographical area reference* (See para. C-209. IHO M4) will form the basis of the ENC name(s).

1. The name of an ENC captured from a chart with no inset plans will consist of the geographical area reference, followed by space, dash, space, followed by the

chart title

E.g. *NZ532 Approaches to Auckland* is named.

North Island – East Coast – Approaches to Auckland

2. The name of each ENC captured from an inset plan will consist of the geographical area reference in the chart title followed by the inset name.

E.g. *NZ614 Tasman Bay* becomes 4 separate ENCs named:

South Island - North Coast - Tasman Bay

South Island - North Coast - Tarakohe Harbour

South Island - North Coast - Port Motueka

South Island - North Coast – Mapua

3. The name of an ENC captured from a chart with a continuation plan will consist of the geographical area reference in the chart title followed by the chart title.

E.g. *NZ 5412 Port of Tauranga* is named:

North Island - East Coast - Port of Tauranga

4. The name of each ENC captured from a sheet of plans will consist of the geographical area reference in the chart title, followed by the plan or inset name.

E.g. *NZ5111 Plans between Parengarenga and Whangaruru* will become 3 separate ENCs named:

North Island – East Coast - Parengarenga Harbour

North Island – East Coast - Mangonui Harbour

North Island – East Coast - Whangaruru Harbour

E.g. *NZ5114 Doubtless Bay and Whangaroa Harbour* becomes 2 ENCs named:

North Island - East Coast - Doubtless Bay

North Island - East Coast - Whangaroa Harbour And Approaches

5. The name of each ENC captured from two or more different scale inset plans of the same location will consist of the geographical area reference in the chart title followed by the inset name.

E.g. *NZ232 Lake Taupo (Taupomoana)* will become 4 ENCs named:

North Island – Lake Taupo

North Island – Tapuaeharuru Bay

North Island – Waikato River Entrance

North Island – Horomatangi Reef

4.3.3 ‘Comment’ field of Dataset ID (DSID) and Dataset Parameters (DSPM)

The ‘Comment’ field of the Dataset ID (DSID) and Dataset Parameters (DSPM) shall be populated with the ENC number, source chart number and ENC name in the format

ENC Number<space dash space>Chart Number<space dash space>ENC Name

The ENC Number will be formatted as per section 4.2.1, except that the 3-digit version number '.000' will not be shown.

The ENC Name will be formatted as per section 4.2.2.

E.g.

NZ461511 – NZ6151 – South Island – North Coast – Te Aumiti (French Pass)

4.4 ENC Content

ENC content will be consistent through the series. Data that appears in all three datasets will be consistent and will contain the same features and attributes, albeit generalised due to scale. The datasets will contain the following information:

Feature Description (INT 1 reference)	ENCs smaller than 1:1,250,000	ENCs 1:1,250,000 to 1:50,001	ENCs larger than 1:50,000
Cautionary Notes (A)	✓	✓	✓
Magnetic variation (B)	✓	✓	✓
Magnetic Anomalies (B)	✓	✓	✓
Natural coastline (C)	✓	✓	✓
Major rivers, inlets & waterways (C)		✓	✓
Major rivers, inlets & waterways that don't include navigational information (C)			
Conspicuous topographic features (C)	✓	✓	✓
Topographic contours (C)			
Conspicuous elevations (C)	✓	✓	✓
Supplementary national features (C)			
Significant & conspicuous Buildings (D)		✓	✓
Major built up areas (D)		✓	✓
Major towns and cities (D)	✓		

Conspicuous Landmarks (E)	✓	✓	✓
Port structures & installations (F)		✓	✓
Artificial coastline (F)	✓	✓	✓
Topographic names (G)	✓	✓	✓
Tidal information. Levels, streams & currents (H)	✓	✓	✓
Bathymetric contours (I)	✓	✓	✓
Soundings (I)	✓	✓	✓
Nature of the seabed (J)	✓	✓	✓
Rocks, wrecks & obstructions (K)	✓	✓	✓
Offshore installations (L)	✓	✓	✓
Submariner cables & limits (L)	✓	✓	✓
Tracks routes & channels (M)		✓	✓
Restricted and legal limits & boundaries (N)	✓	✓	✓
Anchorage & pilotage information. (N)		✓	✓
Hydrographic names (O)	✓	✓	✓
Navigational aids (P, Q, R & S)	✓	✓	✓
Port facilities (T)		✓	✓
Small craft symbols (U)			✓*

*Only marinas (INT 1 U 1.1) are to be encoded.

All mandatory attributes will be populated (S57 Appendix B1, section 3.5.2) along with additional attributes defined in section 5 of this specification.

5 Encoding Guidance

This section provides guidance on the encoding of the NZ Electronic Navigational Charts in the S-57 format version 3.1. It is intended as a supplement to S-57 Appendix B.1, Annex A - Use of the Object Catalogue for ENC. The information presented here is not intended to contradict the S-57 standard except where explicitly stated. Any questions regarding these instructions should be directed to LINZ.

5.1 General Principles

5.1.1 Mandatory Attribute Values

All S-57 mandatory attribute values and those required in this specification will be populated. Where the value is unknown it must be encoded with “UNKNOWN” unless otherwise specified in this document.

5.1.2 Avoiding Gaps in Data Coverage

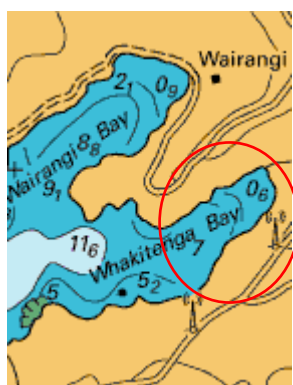
Where there are holes in the ENC due to the removal of tidal, title and source information and the coverage area can be ascertained as land (see example below), the area is to be included as part of the existing LNDARE.



5.1.3 Ensuring Continuity of Objects across ENC Boundaries

It is important to ensure continuity and consistency in the encoding of objects across adjacent ENC boundaries. A contractor must contact LINZ if data is not fully defined along a boundary of the source data.

Paper chart 1



Paper Chart 2 (source for ENC)



In the example above, Paper Chart 2 is being captured and an undefined area exists along the W boundary. LINZ would provide further information from Paper Chart 1.

5.1.4 Capturing and Maintaining Notices to Mariners Information

If the paper chart on which the ENC is based has NTM corrections, the contractor must capture all NTMs by encoding SORDAT/SORIND for the affected objects – refer to sections 5.9 and 5.10.

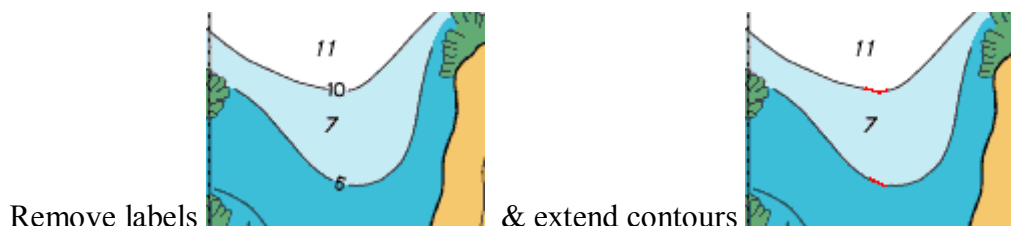
The contractor should source the necessary NtM information from the LINZ website www.linz.govt.nz. Where the required information is unavailable, the contractor should contact LINZ.

The ENCs are to be maintained for NTMs until accepted by LINZ

5.1.5 Cartographic Presentation

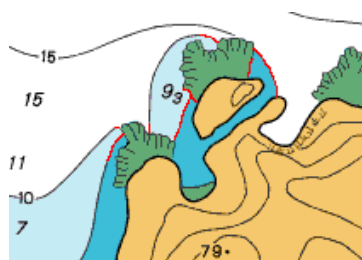
Where gaps appear due to cartographic intervention these are to be handled as follows

- Where detail has been broken for text the contractor is to join these features with a new feature of the same type to ensure the line join.

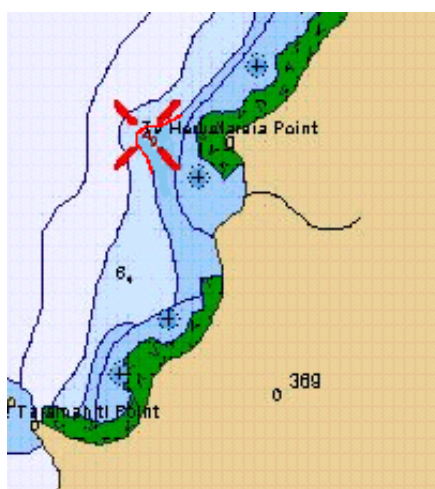


- All depth contours will be complete over the entire ENC.

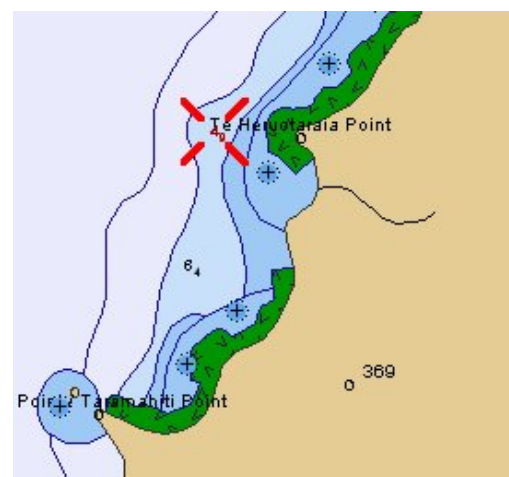
- Colour tints are to be used as a guide to capture and complete the feature.



- Contours are to represent the real world. Information must be encoded so that the data makes sense. Contours must be extended in such a way so that soundings remain in the associated depth areas and do not create errors, for example:

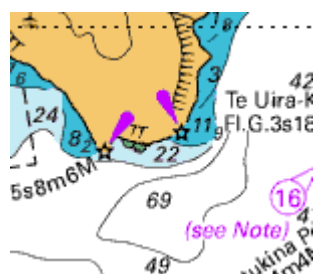


This



rather than

- All depth contours are to be complete; contour lines are to be joined where detail has been broken due to text, and use colour tints (if any) as a guide on where to extend contour lines when ends have been masked on the Raster chart. Also refer to section 5.18.1 for further detail regarding depth contour encoding.
- Coastlines are to be captured in such a way as to ensure that lights and other features remain on land so that separate LNDARE objects are not required.



- New objects/features are not to be used when completing these gaps and the correct feature must be used.

5.1.6 Coordinate Multiplication Factor (COMF)

Coordinates should be held in ENC production systems at a resolution of 0.0000001 (10^{-7}). COMF values for all NZ ENCs will be set to 10000000 (10^7).

5.2 Datum & Projections

5.2.1 Projection

All ENCs will be produced using the projection of the source chart to ensure that ENC datasets are captured accurately. This also ensures conformation to skin of the earth requirements.

5.2.2 Horizontal datum

All ENCs will be captured on World Geodetic System 1984.

5.2.3 Vertical datum

Where the attribute VERDAT relates to a height, it must always be populated as Mean High Water Springs.

Where the attribute VERDAT relates to a depth, it must always be populated as Approximate Lowest Astronomical Tide.

5.2.4 Measurements

All depths and heights will be in metres and decimetres. See also section 5.19.2 Sounding Units.

Where information is taken from a fathoms chart or survey the information will be converted using the conversion tables found in Specifications for New Zealand Hydrographic Charts.

5.3 Scale Minimum

SCAMIN values will not be populated unless specified.

5.4 Use of INFORM

The INFORM attribute shall only be used when the information is of importance to navigation, or is specified in this document. The service provider shall note the use of these in a quality assurance report for acceptance by LINZ.

Notes contained in the Light List for any light sector pertaining to appearance or coverage in certain ranges or geographical locations are to be considered of importance to navigation, and must always be included in INFORM for the light sector object the note pertains to.

Any additional information about a light contained in the Remarks column of the NZ Light List must be encoded in INFORM for the LIGHTS object, unless it includes the note '(T)' (temporary) or '(TE)' (temporarily extinguished), in which case the information is not encoded.

5.5 Digitising Tolerances

The vector line created when digitising a linear feature from a raster image should follow the centre of the raster line and should remain within the width of the raster line at all times. This excludes where data has been moved to match adjoining or overlapping data.

5.6 Interpretation of Charted Features

Publication INT 1 "Symbols Terms and Abbreviations used on Charts" is to be used to aid in the identification of charted features.

5.7 Compilation Scale

The Compilation Scale shall be encoded in the Data Set Parameter field (DSPM) for the cell in the Compilation Scale of Data (CSCL) sub-field. The Compilation Scale will be based upon the radar range scales in the following table. This will be the nearest larger scale unless advised by LINZ.

Selectable Range	Standard scale (rounded)
200 NM	1:3,000,000
96 NM	1:1,500,000
48 NM	1:700,000
24NM	1:350,000
12 NM	1:180,000
6 NM	1:90,000
3 NM	1:45,000
1.5 NM	1:22,000
0.75 NM	1:12,000
0.5 NM	1:8,000
0.25 NM	1:4,000

For example a chart at a scale of 1:50,000 will be encoded with a compilation scale of 1:45,000.

If the scale of the source chart is larger than 1:4,000 or smaller than 1:3,000,000 then the compilation scale will be the actual scale of the chart.

5.8 README File

For each ENC or exchange set produced, a README.TXT file shall be created.

The file shall contain one entry for each ENC dataset file (or a single entry for a single ENC) in the exchange set. The contents will appear on separate lines and will consist of the ENC identification, the ENC issue date, a Cautionary Note and a Copyright Note, as detailed below:

ENC Identification:

ENC Number – Chart Number – ENC Name

The ENC Number will be formatted as per section 4.2.1

The ENC Name will be formatted as per section 4.2.2

E.g. *NZ455511 – NZ5551 – North Island – East Coast – Tokomaru Bay*

Issue date:

If no NtMs apply to the paper chart that the ENC is based on, the issue date for the ENC will be the month and year that the ENC_ROOT folder is created.

E.g. *ENC Issued 06 2004*

If there is an NtM related to the paper chart that the ENC is based on, the issue date will be the most recent NtM, even if this does not affect the ENC.

E.g. *Correct to NtM 215/2006*

Cautionary note:

A cautionary note will be inserted to advise users on what CATZOC U stands for. The note should read:

“CATZOC U stands for survey data that has not been assessed. It does not stand for unofficial, unsurveyed, unsatisfactory, or untrustworthy data.”

Copyright note:

A crown copyright note will be included and will read:

“Crown Copyright. This ENC is protected under the Copyright Act 1994 and international convention. You shall not copy, reproduce, adapt, change or commercially exploit, in whole or part, this data or the format in which it is stored without prior written permission of LINZ.”

If a dataset is cancelled (normally when the chart is withdrawn), the README file will have the following wording added above the ENC number :

THIS DATASET IS CANCELLED AS OF DD/MM/CCYY

e.g.

THIS DATASET IS CANCELLED AS OF 25/07/2008

NZ455511 - NZ5551 – North Island – East Coast – Tokomaru Bay

Correct to NtM 52/2007

5.9 Source Date SORDAT

All data supplied as S-57 must have the correct SORDAT values according to this specification. SORDAT values will be populated for individual bathymetric features when their values are known and provided in the underlying M_QUAL object.

Where the paper chart is the source, SORDAT shall be the date in the latest publication note on the chart. This shall be considered the New Edition date and not the Reprint date.

Where a publication (Nautical Almanac, Notice to Mariners, NZ Pilot) is the source, SORDAT shall be the publication date.

The format of the SORDAT is CCYYMMDD and where the month or day is not known insert the value 01, e.g. 20030101.

When a feature on the chart includes a date in its label, for example, an obstruction with “reported 1996”, that date shall take precedence over the print date, (described in paragraph 1 of this section), even if the print date is later than the label, e.g. 19960101

Where an update is applied to an ENC, the SORDAT shall be the date of the source actioning the change, i.e. the NtM Edition Date, e.g. 20040430.

5.10 Source Indication **SORIND**

All data supplied as S-57 must have the correct SORIND values according to this specification. SORIND values will be populated for individual bathymetric features when their values are known and provided in the underlying M_QUAL object.

SORIND is made up of four parts: Country, Authority, Source and ID.

- Where the SORIND is a chart: NZ,NZ,graph,Chart NZ(chart number).
E.g. NZ,NZ,graph,Chart NZ5322
- Where the SORIND is a NZ publication: NZ,NZ,publn,Publication name (Nautical Almanac).
E.g. NZ,NZ,publn,Nautical Almanac
- Where the SORIND is an NtM: NZ,NZ,publn,NtM(space)<NtM number>/<4-digit year>.
E.g. NZ,NZ,publn,NtM 23/2004

5.11 Position

5.11.1 Quality of Position

Quality of Position (QUAPOS) shall not be encoded, except as described below.

Features that are charted as position approximate, position doubtful, or reported (eg. dashed depth curves, PA, PD, or ‘Rep’ wrecks or obstructions, etc.) shall have the appropriate value of QUAPOS encoded on the spatial object as described below.

- A feature labelled “PA” shall be encoded with a QUAPOS of approximate.
- A feature labelled “PD” shall be encoded with a QUAPOS of position doubtful.
- A point feature labelled “rep” shall be encoded with a QUAPOS of reported (not confirmed).

- Conspicuous landmarks symbolised as an open circle (INT 1, B33) shall be encoded with a QUAPOS of approximate.
- Any feature that has QUAPOS encoded by chart symbology (eg. dashed depth contours or colour tint without associated contours) shall have the appropriate value encoded as described above.
- A feature labelled “ED” shall be encoded with a STATUS of Existence Doubtful.
- All wrecks sourced from charts shall be encoded with a QUAPOS of surveyed unless an associated note states otherwise. Eg PA PD.
- Wrecks sourced from other sources (NZ Pilot) shall be encoded with a QUAPOS of approximate.

5.11.2 Positional Accuracy

POSACC is required to be populated for M_QUAL. It will be calculated using the chart scale divided by 1000. e.g. A chart at 1:18,000 has a POSACC of 18.

5.12 Geographic Names

Geographic names on the chart shall be encoded as the appropriate areas, such as Built-up Areas (BUUARE) Land regions (LNDRGN) or Land Areas (LNDARE).

For areas that use the coastline as the limit on the chart, these must use the coastline as the limit in the ENC.

Geographic names that pertain to individual features that have the attribute OBJNAM are to have the name shown on the chart placed in OBJNAM. Small features such as points of land or peninsulas will have geographic names collected using LNDRGN.

Where a placename refers to a township/settlement represented on the chart as a single building then it is to be captured using BUUARE of type point, with the point placed on the building symbol, the building itself is not captured.

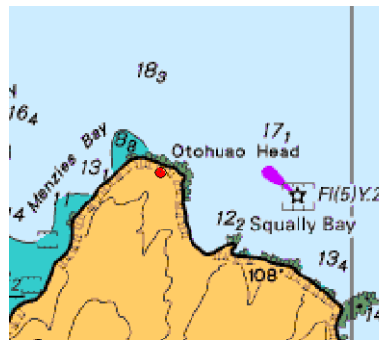
5.12.1 Topographic features

The following is intended as a guide to encoders.

Peninsulas will be captured as LNDRGNs of type area. The area will be formed using the exact coastline and a closing line at the end of the feature.



- Points, Headlands and Capes will be captured as LNDRGNs of type point. The point will be positioned on the landward side of the COALNE to ensure the point object does not share the geometry of the COALNE.



- Named beaches will be captured as a LNDRGN(P) in the most appropriate position, with the charted name encoded on OBJNAM.

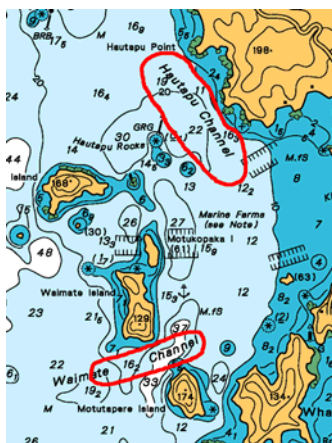


5.12.2 Hydrographic features

Bays will be captured as SEAAREs of type area. The area will be formed using the exact coastline and a closing line at the end of the feature (i.e. headlands). Smaller bays inside larger bays will not be excluded from the area of the larger bay, i.e. the SEAARE of the small bay may overlap that of the larger bay. The charted name will be encoded as the OBJNAM.



Straits, channels and passages will be captured as SEAAREs of type area. These areas are to be exclusive of each other. The charted name will be encoded as the OBJNAM.

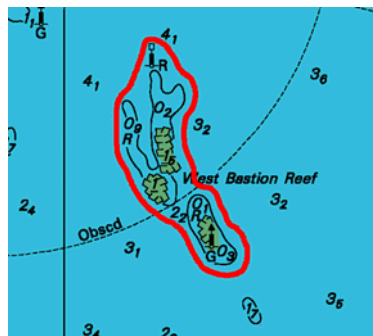


Gulfs, harbours and Firths are to be captured as SEAAREs of type area. These areas are not exclusive of each other. The area will be formed using the exact coastline and a closing line at the end of the feature. The charted name will be encoded as the OBJNAM.



Where a group of objects make up another object (reef) the area will be captured as SEAAREs of type area. If the individual objects have a name it will be captured as the OBJNAM. The overarching object will have the overarching name captured as the OBJNAM.

A SEAARE of type area will cover the physical extents of the object.



5.12.3 Names of charted features

OBJNAM will be populated with the name as depicted on the chart, i.e. taking into consideration whether it is upper/lower case.

Name on Chart	OBJNAM attribute
MOUNT TARANAKI or MOUNT EGMONT	MOUNT TARANAKI or MOUNT EGMONT
Mount Taranaki or Mount Egmont	Mount Taranaki or Mount Egmont
STEWART ISLAND / RAKIURA	STEWART ISLAND / RAKIURA

NOBJNM will only be used where a secondary name appears in brackets next to the object name.

Name on Chart	OBJNAM attribute	NOBJNM attribute
Motumahanga (Saddleback Island)	Motumahanga	Saddleback Island
Young Nicks Head (Te Kuri)	Young Nicks Head	Te Kuri

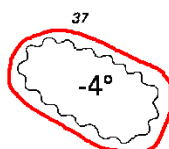
5.13 Magnetic Variation

Magnetic variation on compass roses shall be encoded using MAGVAR. Values for RYRMGV, VALACM and VALMAG shall be sourced from the paper chart. VALMAG will always be encoded in decimal degrees to 2 decimal places; e.g. 19°35' becomes 19.58°.

MAGVAR will be encoded as an area when the VALACM & VALMAG do not vary over the entire chart.

In other cases MAGVAR shall be shown as a point, using the centre of the compass rose on the chart.

Where local magnetic anomalies exist they are to be populated as LOCMAG areas. The limits and VALLMA are to be sourced from the paper chart using the limits of the area (INT 1, B82.1).



For **magnetic anomaly** the VALLMA attribute is in minutes (and not degrees). Where deviation has a direction (i.e. chart has only + or – and not +/- preceding number) one of the following notes should be added to INFORM: “Deviation is positive” or “Deviation is negative”. Where deviation is both positive and negative (depicted by the +/- character) no INFORM note is to be used.

5.14 Natural Features

In general, land features shall not be collected. Exceptions to this are any conspicuous features precisely charted as landmarks, geographic names and any other features specifically outlined in this specification.

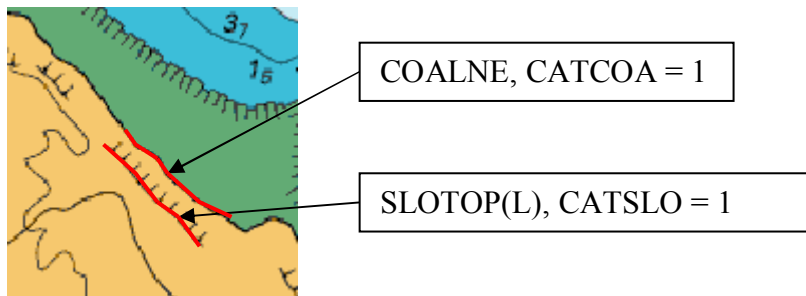
National supplementary features are not to be captured.

5.14.1 Bluffs and Steep Coastline

Only cliffs that are conspicuous to the mariner shall be encoded.

Where the cliff is adjacent to the coastline, both of the following must be encoded:

- COALNE, CATCOA = 1 (steep coast) directly adjacent to the cliff symbology
- The crest of the cliff line will be captured as SLOTOP(L) with CATSLO=6.



5.14.2 Spot Elevations

Only major spot elevations are to be encoded. Major spot elevations can be considered hills or locations that are in bold print on the chart, or spot heights associated with Landmarks. Inland elevations are only to be captured when they are considerably higher than those on the coast. Considerably higher can be considered 500 metres or more.

Major spot elevations shall be encoded using Land Elevation (LNDELV). Spot elevations charted with no specific associated reference point (heights of trees etc) will not be collected except when referring to an island, see section 5.14.3.

Elevations noted in the NZ Pilot must be included.

If an elevation has an associated name it will be populated as OBJNAM.

Spot heights associated with a mast or tower are to have two objects created, one for the spot height and one for the tower.

5.14.3 Islets

Small islets that are charted with a generalised symbol rather than the actual outline of the islet shall be collected as Land Area (LNDARE) objects of type Point.

Islets and small islands that are depicted with a height next to them on the chart in brackets shall be collected as Land Areas (LNDARE) with a Land Elevation (LNDELV). If there is no position marked on the chart for the Land Elevation, it shall be centred in the Land Area.

5.14.4 Land Contours

Land contours will not be collected unless specified by LINZ.

5.14.5 Non-Navigable Waters

When encoding rivers and streams objects they shall not be captured beyond the first bend or bridge crossing. Where the river is shown on the chart as an area and is not collected beyond a bridge, the bridge will be collected as an area BRIDGE object with LNDARE beneath. No coastline object is required along the seaward edge of the bridge.

Inland lakes charted as non-navigable shall not be captured, unless they are interpreted as conspicuous.

E.g. NZ5612, ENC for Napier Harbour.

In the example below, the non-navigable water body is beyond the bridge. However, it should be encoded as it is conspicuous to the mariner.



5.14.6 Vegetation

Vegetation will not be collected unless depicted as visually conspicuous on the chart (eg denoted by a word in bold upper case **TREES**) or mentioned in the NZ Pilot.

5.14.7 Marsh Areas

Marsh areas shall be collected as described in S-57 Appendix B.1, Annex A, Section 4.7.3.

A Marsh area that is land locked, i.e., no edges, of the area coincident with the coastline shall not be collected.

5.15 Cultural

5.15.1 Settlements

Only significant buildings are to be encoded. Conspicuous buildings can be considered those with **BLDG** or **BUILDING** on the chart, or a bold outline on the building symbol. The NZ Pilot must also be used for guidance on conspicuous buildings.

Any buildings, landmarks, tanks or silos that fall within the water area of the chart will be encoded with a coincident Land Area (LNDARE) of type point or area as appropriate. If point LNDARE is used, it shall share a common node with the feature.

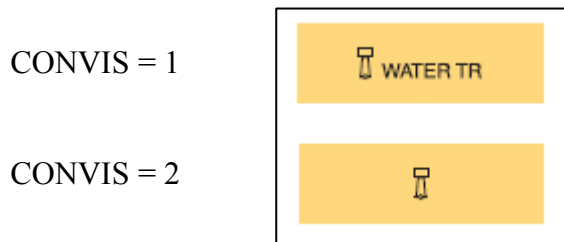
Collect areas of buildings that are not individually navigationally significant as BUAAREs type area, by collecting an area around the outer edges of the buildings and/or street patterns.



Conspicuous buildings shall be collected using BUISGL. This includes conspicuous buildings within a built up area.



Landmarks not charted with capital letters are to be encoded with CONVIS = 2.



Any landmarks that fall within the water area of the chart will be encoded with a coincident Land Area (LNDARE) of type point or area as appropriate. If point LNDARE is used, it shall share a common node with the feature.

All Landmark objects are to have STATUS attribute encoded as Permanent. If a text description Occasional is located beside the landmark, it will refer to a light sector on top of landmark, and the light sector STATUS will be set to occasional.

5.16.1 Radio Towers And Radio Stations

A Landmark symbol charted with information concerning a radio station, such as call letters and frequency, will be collected as a landmark tower with a slave RDOSTA.

5.17 Ports

5.17.1 Dykes

Dykes that do not border navigable water shall not be collected.

5.17.2 Dams

Dams that do not border navigable water shall not be collected.

A dam whose seaward edge is coincident with the coastline must be captured using DAMCON, with a SLCONS object of type line along its seaward edge, and a CATSLC value of unknown.

5.17.3 Shoreline Constructions

Shoreline constructions charted as areas on land (filled with pale green tint on the paper chart) shall be collected as part of the land area (LNDARE). If the shoreline construction has a clearly delineated area on the paper chart, an area Shoreline Construction (SLCONS) shall also be collected coincident with that part of the LNDARE that is covered by the shoreline construction. If the shoreline construction's area is not clearly delineated on the paper chart, a linear SLCONS shall be collected along the seaward edges of the shoreline construction.

Shoreline constructions charted as areas in the water (filled with dark green or blue tint on the paper chart) shall be collected as shoreline construction (SLCONS) areas with the attribute WATLEV populated with the appropriate value. The area shall also be incorporated into the surrounding depth areas for Thematic Group 1 coverage.

If the shoreline construction is charted as Ruins or Ruined the SLCONS object shall have the attribute CONDTN populated with 2, ruined.

A COALNE object is not required where it would be coincident with a linear SLCONS object or the seaward edge of an area SLCONS object on land.

5.17.4 Dolphins

All features charted as dolphins, small open or filled squares (INT 1, Symbol F20) with "Dn" next to it, shall be encoded as Mooring Facilities (MORFAC) with Category of Mooring Facility (CATMOR) set to dolphin.

If a small square is labelled as a submerged dolphin, it shall be collected as a point Obstruction (OBSTRN) with a CATOBS of Snag.

A small square symbol (INT 1, F20) if not labelled on the chart, is assumed to be a structure used for mooring and will be collected with a CATMOR of dolphin.

5.17.5 Pontoons

Features shall be encoded as Pontoons (PONTON) only when explicitly indicated as such on the chart.

5.17.6 Berths

Berths that are named on the chart shall be collected as point Berths (BERTHS) on top of the corresponding shoreline construction feature.

5.17.7 Water level effect

Mooring facilities located in the water must have the Water Level Effect (WATLEV) value populated as always dry.

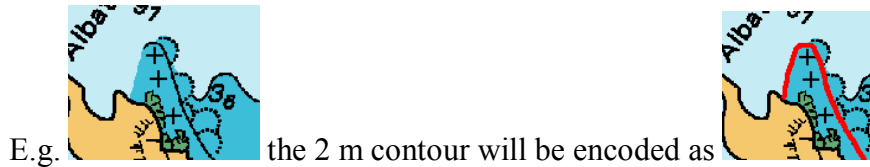
5.18 Depths

Encoding examples for these objects can be found in S57 Appendix B1, Annex A section 5.

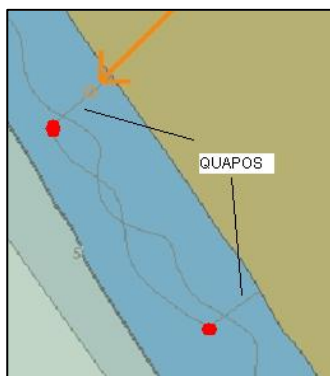
5.18.1 General

All depth contours shall be collected. Depth contours that are broken on the LINZ paper chart for text or symbology (eg, contours labels, light flares, etc.) shall be connected through the text or symbology (i.e. not broken).

Charted depth areas that have partial contours which are supported with a colour tint, shall be collected using the contour and the edge of the tint as the boundary of the depth area. Where contours are not present the contour is to immediately join the shoaler feature. Quality of position shall not be used on the depth area in these cases.



Where depth areas are not closed on the source, the area should be closed using edges without associated depth contour. For these edges correct QUAPOS attribution is to be added.



On some paper charts the contours are generalised so that closely spaced contours are removed to leave only one. In such cases the contour must be encoded with the shallowest depth.

For example: The diagram below shows that the area has soundings which justify a depth area of 10-15m. There are 2 encoding options.

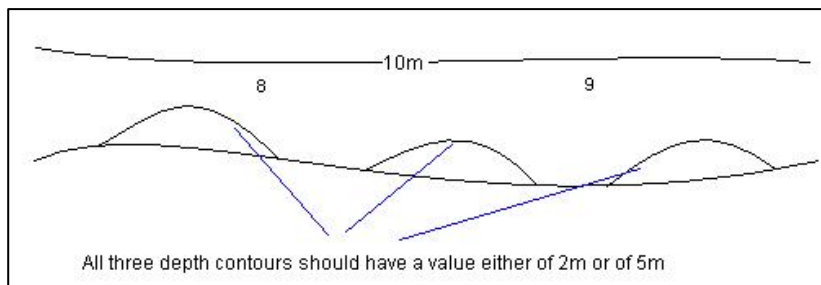


Encode a depth area from 10-15m and the contour value in question should be changed to 15m.

Encode a depth area from 15-20m and encode the QUASOU = 2 for the soundings contained within.

5.18.2 Consistent encoding of Depth Areas

If the depth area has no soundings available, no indication of the value of the depth contour and no further information, the VALSOU of each depth contour is to be consistent.



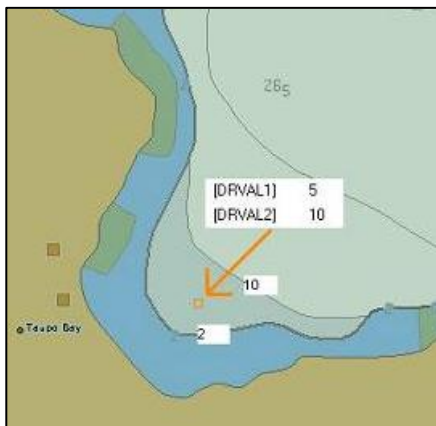
Where the depth area is bounded by two depth contours and the depth contours do not follow the standard depth ranges, DRVAL1 should take the value of the next shallower standard depth contour value.

For example In the diagrams below the standard depth contours are:

10m, 5m, 2m, 0m

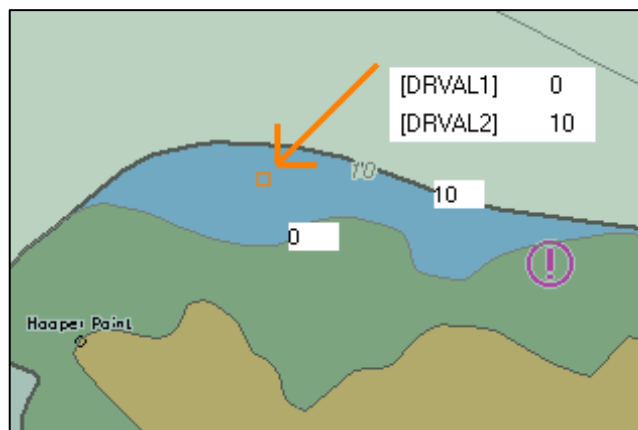
In figure 1 there is no charted 5 metre contour and thus DRVAL1 must = 5m

Figure 1 Correct



In Figure 2, no 5m and 2m contours are charted. DRVAL1 is incorrectly captured as 0m. DRVAL1 needs to be encoded as 5m

Figure 2. Incorrect



The tint colour is a major component in determining the depth range. If the tint contour is, for instance, the 20m contour, and there are no other contours (or soundings) shoreward of the 20m contour, and the blue tint goes all the way to the shore, the DEPART should have a DRVAL2 of 20 and DRVAL1 of next shallowest standard depth contour; see S57 Appendix B – Annex A.36 #5.

For optional depth areas refer to Fig 5 Section 5.4.2 of S-57 Appendix B.1, Annex A.

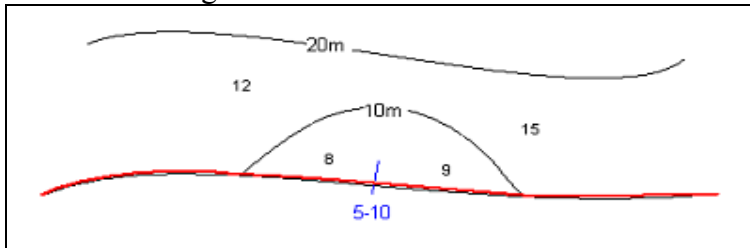
5.18.3 Encoding Guidance for Use of DEPART attributes DRVAL1 and DRVAL2 for depth areas adjacent to COALNE and with discontinuity in the succession of minimum and maximum depths

Safety contours are generated from the depth area ranges. A safety contour should follow the path of a depth contour where possible and not the coast line. In this way the safety contour will be displayed where possible without gaps.

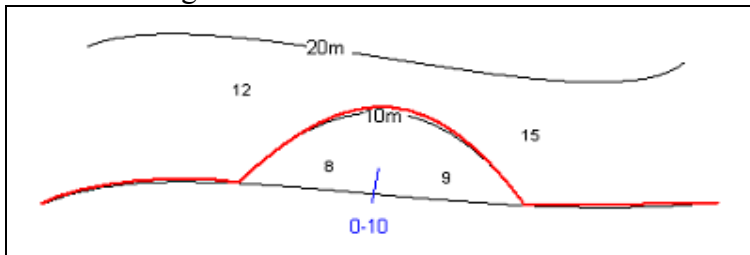
If a depth area includes an obstruction area of underwater rocks and/or wrecks, i.e. an OBSTRN (area) with no additional source information (soundings) and is **bounded by the coast line**, the values of the DEPART attributes should be DRVAL1 = 0 and DRVAL2 = 2. *If additional information (soundings) is available the depth range may be greater, i.e. DRVAL1 = 0 and DRVAL2 = 5.*

If a depth area is bounded by **one depth contour** and the **coastline** the DRVAL1 value will be 0 and the DRVAL2 should be the value of the bounding depth contour.

Before encoding:



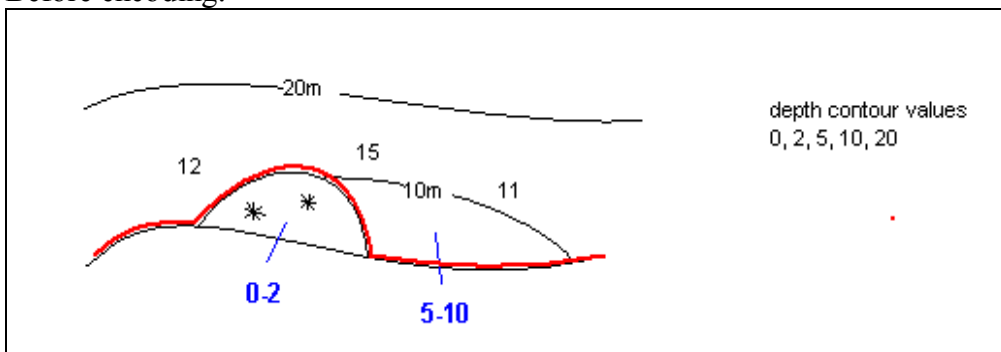
After encoding:



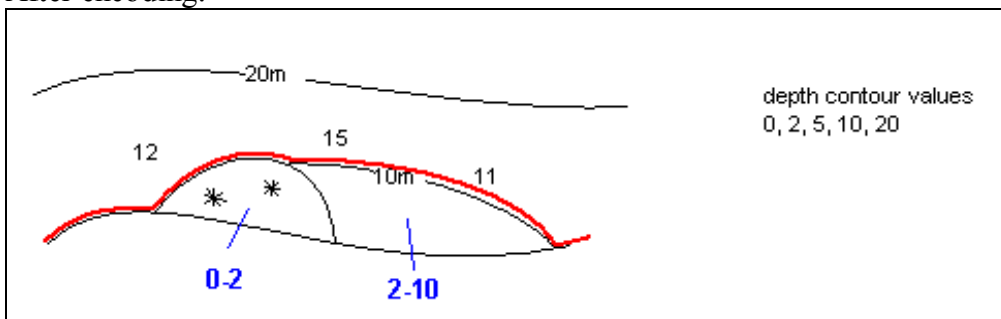
The safety contour is displayed as a red line with the value of 5m.

If a depth area is bounded by **two or more** depth contours and also by the **coastline** the DRVAL1 value should be the value of the next shoalest available contour and DRVAL2 should be the value of the deeper contour.

Before encoding:



After encoding:



The safety contour is displayed as a red line with the value of 5m.

5.18.4 Sounding Units

ENC files produced under this specification shall be in metres and decimetres up to but not including 31m. Between 21m and 31m the decimetres shall be rounded to the nearest 0.5m. Soundings 31m and deeper will be in whole metres.

5.18.5 Sounding Groups

Soundings which do not have EXPSOU encoded will be captured in groups according to the standard DEPART they relate to i.e. -h-0, 0.1–2m, 2.1–5m, 5.1–10m, (on some charts 10.1–15m), 10.1–20 20.1–30... etc not 0–5m, 0–10m, 0–20m... etc.

In cases where a paper chart has non-standard depth contours (e.g. NZ4314 Inset has 2, 4, 6 and 8m), soundings shall be grouped according to those depth ranges, but following the above principles.

Soundings which have EXPSOU encoded as 2 should be grouped as a separate group.

Soundings which have EXPSOU encoded as 3 should be grouped as a separate group.

Exception: Exclude swept depths; make these ‘stand alone’ soundings.

5.18.6 Digitising Soundings

Soundings digitised from charts will be positioned in accordance with the LINZ Contract Specifications for Paper Hydrographic Charts, section 7.8.3.2.

5.18.7 Contours

All depth contours on the charts are to be captured in the ENC as continuous DEPCNTs. Refer to section 5.1.3 and INT 1, I30 for additional guidance.

Dotted danger lines will be captured as OBSTRNs. Refer to section 5.20.3 for further guidance.

5.18.8 Value for "-h"

The DRVAL1 for the first depth area adjacent to the shoreline shall be encoded as “-h” as per S-57. “-h” will be the MHWS value given on the paper chart.

Where more than one MHWS value appears on a chart, the shoalest one will be used, as illustrated in the following example:

Tidal Levels referred to Datum of Soundings

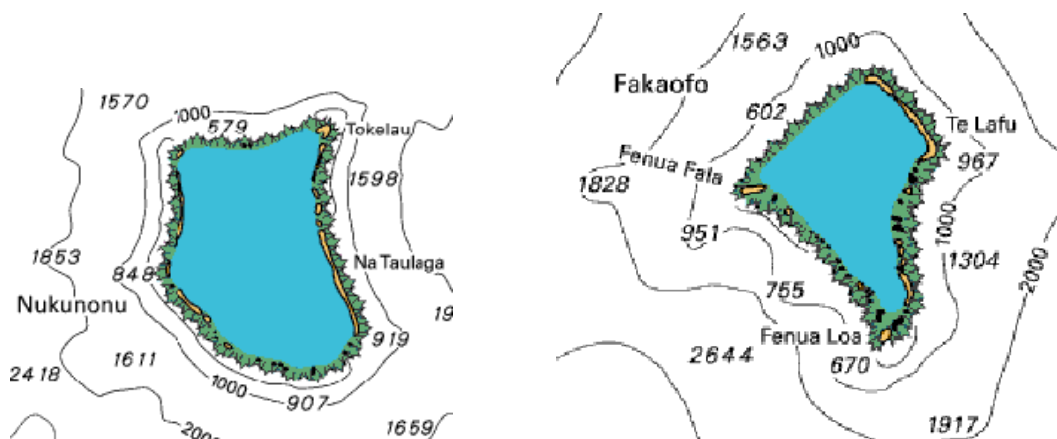
Place	Lat S	Long E	Heights in metres above Datum			
			MHWS	MHWN	MLWN	MLWS
Lyttelton	43 °36'	172 °43'	2.3	2.2	0.5	0.4
Akaroa	43 48	172 55	2.4	2.2	0.7	0.5

Where there are two or more –h values on the source and the extents of these different areas are clearly defined, each area shall be encoded with its relevant –h value.

E.g. For two islands, each -h value shall be encoded for each island respectively.

Tidal Levels referred to Datum of Soundings

Place	Lat S	Long W	Heights in metres above Datum				Datum and Remarks
			MHWS	MHWN	MLWN	MLWS	
Nukunonu Island	9°12'	171°51'	1.5	1.2	0.6	0.4	4.530m below BM Nukunonu Church, an RNZN brass benchmark set in concrete at the base of the steps at the main entrance to the church at Nukunonu Island.
Fakaofu	9 23	171 15	0.9	-	-	-	



5.18.9 Intertidal Areas

Green tint areas that are seaward of the Coastline shall be collected as DEPAREs with the DRVAL1 = -h and DRVAL2 = 0.

If there is no green tint area between the blue tint and the coastline, a linear depth area is to be collected along the coastline with DRVAL1 = -h and DRVAL2 = 0.

If there is neither blue nor green tint directly out from the coastline, a linear depth area is to be collected along the coastline with DRVAL1 = -h and DRVAL2 = the DRVAL1 of the first DEPARE out from the coastline.

When the outer edge of the green tint intertidal area is shown with a dashed line, it is to be collected as a Depth Contour (DEPCNT) with a VALDCO of 0 and an associated QUAPOS of approximate.

When the outer edge of the green tint intertidal area is shown without a line, it is to be collected as a Depth Contour (DEPCNT) with a VALDCO of 0 and associated QUAPOS of unreliable. Refer to section 5.11.1 “Quality of Position.”

The intertidal depth area shall follow the edge of the green tinted area regardless of whether or not a contour is shown.

Where the intertidal area also depicts the nature of the seabed (eg gravel bank) an associated SBDARE must be encoded with the appropriate NATSUR.

5.18.10 Value for DRVAL1

Refer to S57 Appendix B.1-Annex A 5.4.3, point 2.

5.18.11 Deepest Depths

The DRVAL2 for the deepest Depth Area (DEPARE) on the chart shall be encoded with the next deepest standard depth contour that would be shown on the chart.

5.18.12 Depth Area Standard Depth Ranges

Standard depth ranges shall always be used. Standard depth ranges on New Zealand charts are:

-h – 0m

0 – 2m

2 – 5m

5 – 10m

10 – 20m

20 – 30m

30 – 50m

50 – 100m

100 – 200m

200 – 300m

300 – 400m

400 – 500m

500 – 1000m

then 1000m increments.

Refer to 5.18.8 for guidelines on encoding “-h”.

Where necessary, drying contours will also be used, e.g.

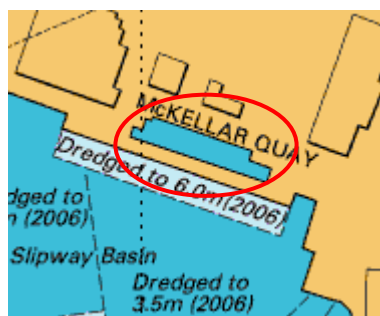
-h – -2m

-2 – 0m

In cases where a paper chart has non-standard depth contours (e.g. NZ4314 Inset has 2, 4, 6 and 8m) depth areas shall be created using those depth ranges.

Non-standard ranges for area DEPAREs such as 0-5 or 2-10 shall generally not be used, however refer to section 5.18.3 for exceptions. Instead DEPARE lines shall be created to deal with discontinuities between adjacent depth areas.

When encoding DOCAREs where depth area range is unknown (see image below), the contractor should always encode DRVAL 1=0m and DRVAL 2=2m, not DRVAL1, DRVAL2 = unknown.



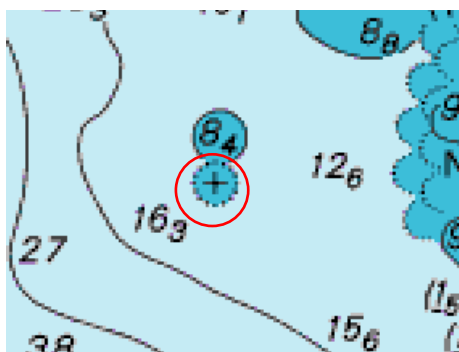
If a situation exists where it is unclear what the depth range should be, seek clarification from LINZ before encoding. Also refer to S57 Appendix B – Annex A., section ‘5 Depths’ for more information.

5.18.13 Depths associated with Rocks, Wrecks, and Obstructions

A paper chart may show a rock pinnacle as a sounding with an adjacent ‘R’ or text and the sounding enclosed by a circle to highlight the rock. This must be encoded as an underwater rock (UWTROC) point. A depth contour and depth area should not be encoded.



Rock pinnacles with a dotted danger circle, but without an associated sounding value, and located in depth areas greater than 2m; must be encoded with EXPSOU=2 (shoaler than surrounding DEPARE).



5.18.14 Depths associated with Shoreline Construction areas

For guidance on encoding depths associated with Shoreline Construction areas see section 5.17.3 paragraphs 2 and 3.

5.19 Rocks, Wrecks & Obstructions

5.19.1 Underwater rocks and Rocks Awash

Where an obstruction is an underwater rock or rock awash it is to be encoded as an UWTRC of type point with no associated DEPARE created. E.g.



For a rock, wreck or obstruction of type point a separate DEPARE is not to be created. Refer to section 5.19.4 of this document and S57 v3.1 Appendix B1 Annex A for guidance on encoding obstructions of type area.

5.19.2 Rocky Foreshore and Ledges

Rocky areas of the foreshore and ledges that are charted with a symbolised line (INT 1, J21) on the chart shall be collected in accordance with Sections 5.2 and 7.1 of S- 57 Appendix B.1, Annex A. The line is to be digitised by connecting the outermost points of the symbolised line. The line shall be encoded as a Depth Contour (DEPCNT) with the Contour value of VALDCO = 0, as per Section 5.2.

The same line will be used to create the SBDARE. The limit of this area is shown on the paper chart using green tint (intertidal area).

The areas covered by the seabed areas shall also be DEPAREs for thematic group 1 coverage.

5.19.3 Piles & Obstruction Points

On LINZ paper charts small solid dots without light flares are piles. These shall be encoded as PILPNT with a CATPLE of stake or post, unless otherwise labelled.

5.19.4 Obstruction areas

Guidance can be found in S-57 Appendix B.1 - Annex A 6.2.2 and 6.3.2.

5.19.5 Wrecks

A WRECKS object of type area must be covered by an area object from Group 1. Where the depth is different to the surrounding depth area the underlying Group 1 area object must use the same spatial object as the wreck.

5.20 Nature of the Seabed

All bottom qualities on charts will be captured using SBDARE type, point. Where multiple descriptions are stated, for example *bkSh.S.M*, these shall be captured as a single item.

Where a description is not a recognised NATQUA or NATSUR item, for example basalt, shingle etc, these will be encoded in INFORM attribute, and where appropriate LINZ will advise an alternative value for NATSUR.

The following seabed areas have not been included in the S-57 attribute value dropdown list

- Globigerina (Gl),
- Foraminifera (Fr),
- Radiolaria (Rd),
- Pumice (Pm),
- Chalk (Ck)

Therefore Fr, Gl and Rd are to be encoded as:

NATSUR	silt/ooze
NATQUA	unknown
INFORM	either Foraminifera, Globigerina or Radiolaria

However, if either of the three seabed areas above has ooze as part of the nature of the seabed eg. Gl.Oz then it is to be encoded as a single attribute value aswell.

eg. Gl.Oz	NATSUR	silt/ooze
	NATQUA	unknown
	INFORM	Globigerina Ooze

The reason for this is because Globigerina ooze is the decomposed form of the organism Globigerina. Not the result of ooze and globigerina being located together on the seabed.

Pm and Ck is to be encoded as:

eg. Pm	NATSUR	rock
	NATQUA	volcanic
	INFORM	Pumice

eg. Ck	NATSUR	rock
	NATQUA	unknown
	INFROM	Chalk

If the seabed area is made from a combination of these areas then they are to be encoded as follows

eg. Gl. Oz. Pm	NATSUR	silt/Ooze, Rock
	NATQUA	null, Volcanic
	INFORM	Globigerina Ooze, Pumice
eg. Gl. Cy. Pm	NATSUR	Ooze/silt, Clay, Rock
	NATQUA	null, null, Volcanic
	INFORM	Globigerina, Pumice
eg. Gl.Oz.Fr	NATSUR	silt/ooze
	NATQUA	unknown
	INFORM	Globigerina Ooze Foraminifera

Another example follows for the encoding of Manganese.

eg. Cy. Mn	NATSUR	Clay, Rock
	NATQUA	unknown
	INFORM	Manganese

Weed is also not included in the S-57 attribute value dropdown list for seabed areas. There are two ways to deal with this issue depending on the circumstances.

If only Wd is to be encoded then the object class **WEDKLP** is to be used.

However, if there are multiple seabed areas to be encoded then they are to be encoded as a **SBDARE** with **Weed** encoded within the **INFORM** attribute panel.

eg. Wd	WEDKLP		
eg. St.Wd	SBDARE	NATSUR	Stone
	NATQUA	unknown	
	INFORM	Weed	

Bottom descriptions that are not in the S-57 list should be included in **INFORM**. For bottom descriptions including small stones, only the stones part will be encoded. Shingle should be encoded as gravel, with 'Shingle' coded in **INFORM**. Polyzoa should be encoded as coral with 'Polyzoa' in **INFORM**.

5.21 Tracks & Routes

5.21.1 Ferry routes

Ferry routes will be encoded as a FERYRT. Unless otherwise stated by LINZ they will be CATFRY of free-moving ferry.

5.21.2 Navigational Lines and Recommended tracks

When a traffic flow is one way, the direction of digitising of an object of type line must be the same as the direction of the traffic flow.

5.22 Areas & Limits

5.22.1 Dredged Areas

The attributes DRVAL1, DRVAL2, QUASOU, TXTDSC, INFORM, SORDAT and SORIND shall be populated for all DRGARE's, using S-57 Appendix B.1, Annex A, Section 5.5 for guidance.

Where DRVAL2 cannot be identified it must be populated as "Undefined".

Date of Dredging, if provided on the source, must be encoded in INFORM for the relevant DRGARE i.e. "2006".

If there is a chart note that needs to be encoded in INFORM, the date of dredging must be encoded in brackets, followed by a full stop and then the chart note i.e. "(2006). Dredged areas may not be regularly maintained. Mariners should contact the harbourmaster for information on the latest depths."

QUASOU for DRGARE will only be populated as maintained depth, or not regularly maintained depending on the associated cautionary note, which appears on the chart.

5.22.2 Marine Farms

Marine farms on New Zealand charts are to be captured as MARCUL with a CATMFA of oysters/mussels unless specified by LINZ.

5.22.3 Marine Reserves

All marine reserves shown on New Zealand charts will be captured as RESAREs. They will have a RESTRN of Fishing prohibited, a STATUS of permanent and a CATREA of fish sanctuary.

Where a text describes a marine reserve of another type CATREA and RESTRN will be altered to reflect the nature of the reserve.

Where a reserve is supported by a cautionary note the text of the note is to be inserted in the INFORM field.

5.22.4 Territorial Sea

Territorial Sea Area objects will be encoded as TESARE with the INFORM populated with “Twelve Nautical Mile Territorial Sea Zone.”

5.22.5 Exclusive Economic Zone

Exclusive Economic Zone objects will be encoded as EXEZNE with the INFORM populated with “200 Nautical Mile Exclusive Economic Zone.”

5.23 Navigational Aids

The Maritime New Zealand publication *New Zealand’s System of Buoys and Beacons* is to be used to provide guidance on NZ light characteristics.

All lit buoys and beacons shall have their light characteristics, elevation, range, structure and light sectors encoded into the ENC.

The contractor shall use the paper chart, NZ Light List and NZ NtMs as the source for navigational aids. Where there is a discrepancy between the NZ Light List and the paper chart information for a navigational aid, the contractor must make a decision on how best to encode and list these discrepancies in the ENC Quality Report (provided when the ENC is delivered).

If the navigational aid is fixed the structure will be encoded following S-57 Appendix B1 Annex A Use of the Object Catalogue Chapter 12.1. Paragraph 12.1.1, except as described in 5.23- 5.23.5 of this document. If the navigational aid is floating, the structure will be a buoy.

5.23.1 Master slave relationships

Navigational aids shall have master/slave relationships established between lights, topmarks and fog signals and their supporting structures. The supporting structure will be the master.

5.23.2 International Numbers

The numbers assigned to lights in the NZ Light List are the International Numbers from Volume K of the Admiralty List of Lights and Fog Signals (NP83).

This International Number is to be encoded for all objects that constitute an Aid to Navigation in the NZ Light List. Encode the International Number in the NINFOM attribute field of the following objects:

BCN*, BUISGL, DAYMAR, FOGSIG, LIGHTS, LNDMRK, MORFAC, OFSPLF, PILPNT, TOPMAR, PYLONS

A CATLIT of directional light should only be attributed to the white sector and not to alternating W/R or W/G, green or red sectors.

5.23.4 Light Support attributes

To determine beacon shape and colour, refer to the Light List in the first instance

- If a beacon's attributes are described in the NZ Light List but its colour is not stated, its colour should be encoded as UNKNOWN; it should not be given the colour of the topmark.
- If a beacon's shape is described in the NZ Light List as "pillar", it shall be encoded with BCNSHP=5, pile beacon, with "Pillar" in the INFORM.

If there is no information in the Light List to determine beacon shape, or the beacon is unlit, refer to the paper chart symbol.

If a light support is on land and is described as a 'tower' in the NZ Light List or is marked by a landmark symbol (INT 1, E2) on the paper chart, and the physical size and height of the structure is significant to the Mariner, it will be encoded as a LNDMRK object, with correct CATLMK attribution (i.e CATLMK = 17 for tower).

Light supports depicted in water must not be encoded as Landmarks, encode such structures as BCN*. Do not create a LNDARE point beneath the support. If the light support structure cannot be determined from the NZ Light list or paper chart, the light support is to be captured as a PILPNT object.

An '(M)' at the end of a beacon name in the light list will be included under INFORM for the beacon as: "Owned by Maritime New Zealand".

If a buoy or beacon is numbered on the paper chart or in column 2 of the NZ Light List (not the International Number shown in column 1 of the Light List), the number will be encoded in OBJNAM in the format:

"No(space)<number>"








E.g. for a buoy numbered "14", OBJNAM will contain "No 14"

The name of the buoy or beacon must be encoded as it stated in the NZ Light List or as per the paper chart.

5.23.5 Topmarks

When encoding topmarks, refer to light list in the first instance.

If no information is available in the light list, determine the colour of a topmark from the paper chart as follows:

-  A Solid triangle represents a Green topmark
-  An open triangle represents a White topmark
-   A solid or open square represents a Red topmark
-  Solid cross represents a Yellow topmark
-  A solid circle represents a Black topmark
-  An open circle represents a Red topmark

If a beacon is encoded as lateral, the topmark colour cannot be encoded as unknown - encode the topmark colour as IALA A Buoyage signals: green for starboard, red for port.

5.24 Small Craft Facilities

Small Craft Facilities will not be encoded except for marinas (INT 1- U1.1). Refer to section 4.3.

5.25 Chart Notes

Unique filenames are required for text notes which have different content for all ENC's. This allows the text files to be stored externally to the LINZ production database.

Notes more than 300 characters are to be captured as an external text file, using the TXTDSC attribute to record the filename reference. Notes less than 300 characters should be captured in the INFORM attribute.

The following file naming convention should be used:

NZxxxnnn.TXT,

where xxx = subject of note (See list below)
and nnn = an incremental number

Subject of Note	Subject Acronym
Buoyage/Beacons/Lights	AID
Restricted Area	RES
Area to be Avoided	TBA
Voluntary Code	VOL
Cable Protection Zone	CPZ
Cautionary Area	CAU
Rips	RIP
Currents	CUR
Tides	TID
Depths	DEP
Ferries	FER
Routeing	ROU
Cable Protection Area	CPA
Currents	CUR
Precautionary Area	PRC

LINZ is to be contacted if a cautionary note cannot accurately be grouped into one of the subject categories. LINZ shall advise accordingly.

The contractor will start incremental numbering from 501.

If one or more files with the same subject already exist, the 3 digit number in the filename is incremented by 1.

The file name will be recorded against the referring features using the TXTDSC attribute.

Notes which do not refer to a specific feature or area (or apply to the entire chart) shall be collected as a single separate text file name 'NZPUBxxx.TXT'. Where 'xxx' is the number last used by a NZPUB file, incremented by 1.

To allow for notes which do not refer to a specific feature or area (or apply to the entire chart), a nautical publication information meta object (M_NPUB), shall be created. The M_NPUB object shall cover the same area as the M_COVR object that has CATCOV=1.

The name of the text file shall be encoded in the Text Description attribute (TXTDSC) of the M_NPUB object.

The text content of the file will have the ENC number and name in CAPS, formatted as per the README file (see section 5.8). The ENC Name will be formatted as per section 4.2.2. The text will also list an index of the notes included and the Cautionary Notes as per the paper chart together with an 'END OF FILE' caption also in CAPS.

Example NZPUBxxx.TXT

NZ461511 - NZ6151 - SOUTH ISLAND - NORTH COAST - TE
AUMITI (FRENCH PASS)

INDEX:

SATELLITE DERIVED POSITIONS
MARINE FARMS

SATELLITE DERIVED POSITIONS

Positions obtained from satellite navigation systems referred to WGS 84 Datum can be plotted directly onto this chart. Caution must be exercised in the transfer of geographical positions to other charts not in terms of WGS 84 Datum.

MARINE FARMS

Marine Farms presenting a hazard to navigation may be encountered in inshore waters. These farms are generally marked by buoys, beacons and lights. Mariners are warned that not all farms may be shown.

END OF FILE

There will be one 'NZPUBxxx.TXT' text file with unique content for each ENC, as the ENC number and title are recorded in the text file. For example, if 5 separate ENCs are produced there will be 5 NZPUB files created:

NZPUB501.TXT
NZPUB502.TXT
NZPUB503.TXT
NZPUB504.TXT
NZPUB505.TXT

For the production of each individual ENC a number of text file notes is likely to be created. An typical example set of notes is shown below:

NZPUB501.TXT
NZCAU501.TXT
NZCAU502.TXT
NZCUR501.TXT
NZFER501.TXT
NZFER502.TXT

Picture Files

5.25.1 Attaching picture files

Where it is required to attach to the ENC a diagram, table or other image from a paper chart or other source, it shall be attached using the PICREP attribute of the most appropriate object. E.g. a diagram of a lateral beacon will be attached using the PICREP attribute of the BCNLAT object.

5.25.2 File Format

The image format for black and white images will be 1-bit (black and white) at a resolution of 300dpi and saved as an uncompressed TIFF file. The image should be cropped so as to leave as little unused white space at the edges as possible.

5.25.3 File Naming

The file naming convention for picture files will be:

Chart number+P+<picture id>, where <picture id> is a sequential numerical identifier for pictures scanned from that chart using the numbers 1 to 9.

E.g. The first picture scanned from Chart NZ7142 will be **NZ7142P1.TIF**.

5.26 Quality Of Data

Where available, CATZOC information will be included in the data pack.

Where no CATZOC information is available, CATZOC is to be populated using "U" data not assessed. See also section 5.8.

6 ENC Quality Control

To ensure data quality, all ENC's produced must undergo validation and testing before they are delivered. ENC's must be checked for data content, data structure and data encoding. This includes visualisation.

6.1 Verification

Verification involves manually checking that the captured content matches the source. A recommended means to carry out this process is to print the ENC onto film and overlay the source data e.g. paper chart.

6.2 Validation

The following is the minimum validation and testing a contractor should perform:

1. Pass VAT in the software they were created in (including S-58 tests). Data cleaning shall be carried out as required.
2. Pass VAT in Seven Cs ENC Analyzer. The “.ANL file” must form part of the deliverables (refer 7.3).
3. Pass VAT in an ECDIS – check ENC loads with no errors.

For example: Created in CARIS Composer, validated in Seven Cs ENC Analyzer and loaded into ECPINS.

Results of testing must form part of the ENC Quality Report (refer 7.2).

7 ENC Deliverables

The ENC's are to be maintained for NTMs until accepted by LINZ.

7.1 ENC Coverage

A diagram showing the intended coverage of each and every ENC is to be supplied prior to ENC capture.

LINZ will provide either feedback or conformation of the coverage.

7.2 ENC Data

The ENC and its associated files (.txt) are to be supplied as an S-57 exchange set.

7.3 ENC Quality Report

A quality report is to be supplied for LINZ audit. It will contain the following:

- A report detailing the methodology used to geo-reference the source material for each ENC. This report is to detail the registration process and results.
- Copies of all final validation and testing results. This includes a summary of total errors and warnings plus a breakdown of each issue that cannot be resolved. A copy of the SevenCs ENC Analyzer file .ANL must be provided.
- All assumptions and decisions made during production of the ENC. This will include justifications and other options explored plus any consultations with LINZ (date and decision made).

8 LINZ Final Acceptance

Each ENC will undergo LINZ validation and testing. LINZ will advise their acceptance or any remedial work that may be required.

8.1 Final ENC Data

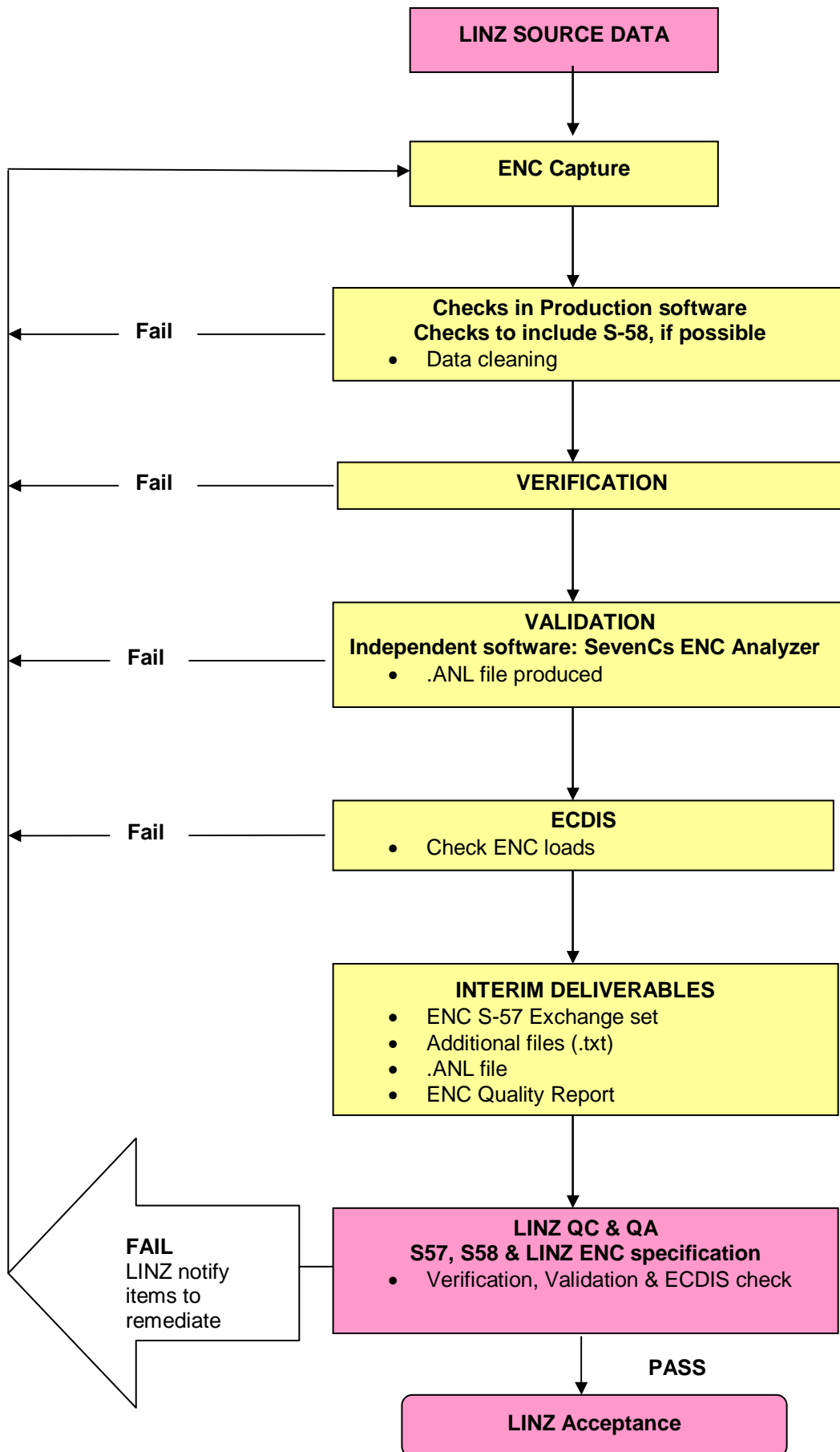
The final ENC and its associate files are to be supplied as an S-57 exchange set.

8.2 Final ENC Quality Report

The final report will include the information supplied in 7.2 and information on any remedial work undertaken.

Annex A

QUALITY ASSURANCE PROCESS



Appendix 1

Sections below supersede those in main document. Updated content or information removed indicated by **red text** or **red text strikethrough**.

Important note: DEPART lines are no longer required for LINZ ENC's, hence changes to section 5.18.12.

4.3 ENC content

ENC content will be consistent through the series. Data that appears in all three datasets will be consistent and will contain the same features and attributes, albeit generalised due to scale. The datasets will contain the following information:

Feature Description (INT 1 reference)	ENCs smaller than 1:1,250,000	ENCs 1:1,250,000 to 1:50,001	ENCs larger than 1:50,000
Cautionary Notes (A)	✓	✓	✓
Magnetic variation (B)	✓	✓	✓
Magnetic Anomalies (B)	✓	✓	✓
Natural coastline (C)	✓	✓	✓
Major rivers, inlets & waterways (C)	✓	✓	✓
Major rivers, inlets & waterways that don't include navigational information (C)			
Conspicuous topographic features (C)	✓	✓	✓
Topographic contours (C)			
Conspicuous elevations (C)	✓	✓	✓
Supplementary national features (C)			
Significant & conspicuous Buildings (D)	✓	✓	✓
Major built up areas (D)		✓	✓
Major towns and cities (D)	✓	✓	✓

Conspicuous Landmarks (E)	✓	✓	✓
Port structures & installations (F)	✓	✓	✓
Artificial coastline (F)	✓	✓	✓
Topographic names (G)	✓	✓	✓
Tidal information. Levels, streams & currents (H)	✓	✓	✓
Bathymetric contours (I)	✓	✓	✓
Soundings (I)	✓	✓	✓
Nature of the seabed (J)	✓	✓	✓
Rocks, wrecks & obstructions (K)	✓	✓	✓
Offshore installations (L)	✓	✓	✓
Submariner cables & limits (L)	✓	✓	✓
Tracks routes & channels (M)	✓	✓	✓
Restricted and legal limits & boundaries (N)	✓	✓	✓
Anchorage & pilotage information. (N)	✓	✓	✓
Hydrographic names (O)	✓	✓	✓
Navigational aids (P, Q, R & S)	✓	✓	✓
Port facilities (T)	✓	✓	✓
Small craft symbols (U)	✓	✓	✓*

*Only marinas (INT 1 U 1.1) are to be encoded.

All mandatory attributes will be populated (S57 Appendix B1, section 3.5.2) along with additional attributes defined in section 5 of this specification.

5.12.3 Names of charted features

OBJNAM will be populated with the name as depicted on the chart, i.e. taking into consideration whether it is upper/lower case.

Name on Chart	OBJNAM attribute
MOUNT TARANAKI or MOUNT EGMONT	MOUNT TARANAKI or MOUNT EGMONT
Mount Taranaki or Mount Egmont	Mount Taranaki or Mount Egmont
STEWART ISLAND / RAKIURA	STEWART ISLAND / RAKIURA
Motumahanga (Saddleback Island)	Motumahanga (Saddleback Island)
Young Nicks Head (Te Kuri)	Young Nicks Head (Te Kuri)

NOBJNM will additionally be used only when the name of a charted feature includes macrons:

Name on Chart	OBJNAM attribute	NOBJNM
Manawatāwhi/Three Kings Islands	Manawatāwhi/Three Kings Islands	Manawatāwhi/Three Kings Islands

15.18.12 Depth Area Standard Depth Ranges

Standard depth ranges shall always be used. Standard depth ranges on New Zealand charts are:

-h – 0m

0 – 2m

2 – 5m

5 – 10m

10 – 20m

20 – 30m

30 – 50m

50 – 100m

100 – 200m

200 – 300m

300 – 400m

400 – 500m

500 – 1000m

then 1000m increments.

Refer to 5.18.8 for guidelines on encoding “-h”.

Where necessary, drying contours will also be used, e.g.

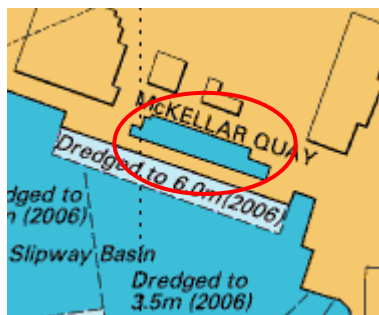
-h – -2m

-2 – 0m

In cases where a paper chart has non-standard depth contours (e.g. NZ4314 Inset has 2, 4, 6 and 8m) depth areas shall be created using those depth ranges.

Non-standard ranges for area DEPAREs such as 0-5 or 2-10 shall generally not be used, however refer to section 5.18.3 for exceptions. ~~Instead DEPARE lines shall be created to deal with discontinuities between adjacent depth areas.~~

When encoding DOCAREs where depth area range is unknown (see image below), the contractor should always encode DRVAL 1=0m and DRVAL 2=2m, not DRVAL1, DRVAL2 = unknown.



If a situation exists where it is unclear what the depth range should be, seek clarification from LINZ before encoding. Also refer to S57 Appendix B – Annex A., section ‘5 Depths’ for more information.