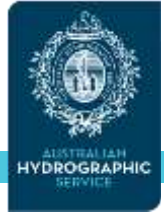


AHO's experience on HD bathymetric ENC's

ENCWG3 Wollongong 16 – 18 April 2018

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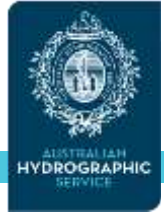
Background



- 2016 – As part of the AHO’s “ENC first” production strategy, AHO staff commenced attending an IMO approved generic “ECDIS” training course (around 40 people so far).
- One of the main concerns from mariners was the lack of bathymetric detail inside dredged areas.
- 2017 - The AHO decided to investigate the possibility of producing high density bathymetric ENC products using current standards.
- The ports of Cairns (larger cruise ships) and Townsville (one of the first ports in Australia to use PPU’s) were selected as the test areas to ‘prove the concept’.
- The AHO’s regional production manager and one of the production supervisors organised meetings with the main stakeholders in both ports (Harbourmaster; pilots; port surveyors)



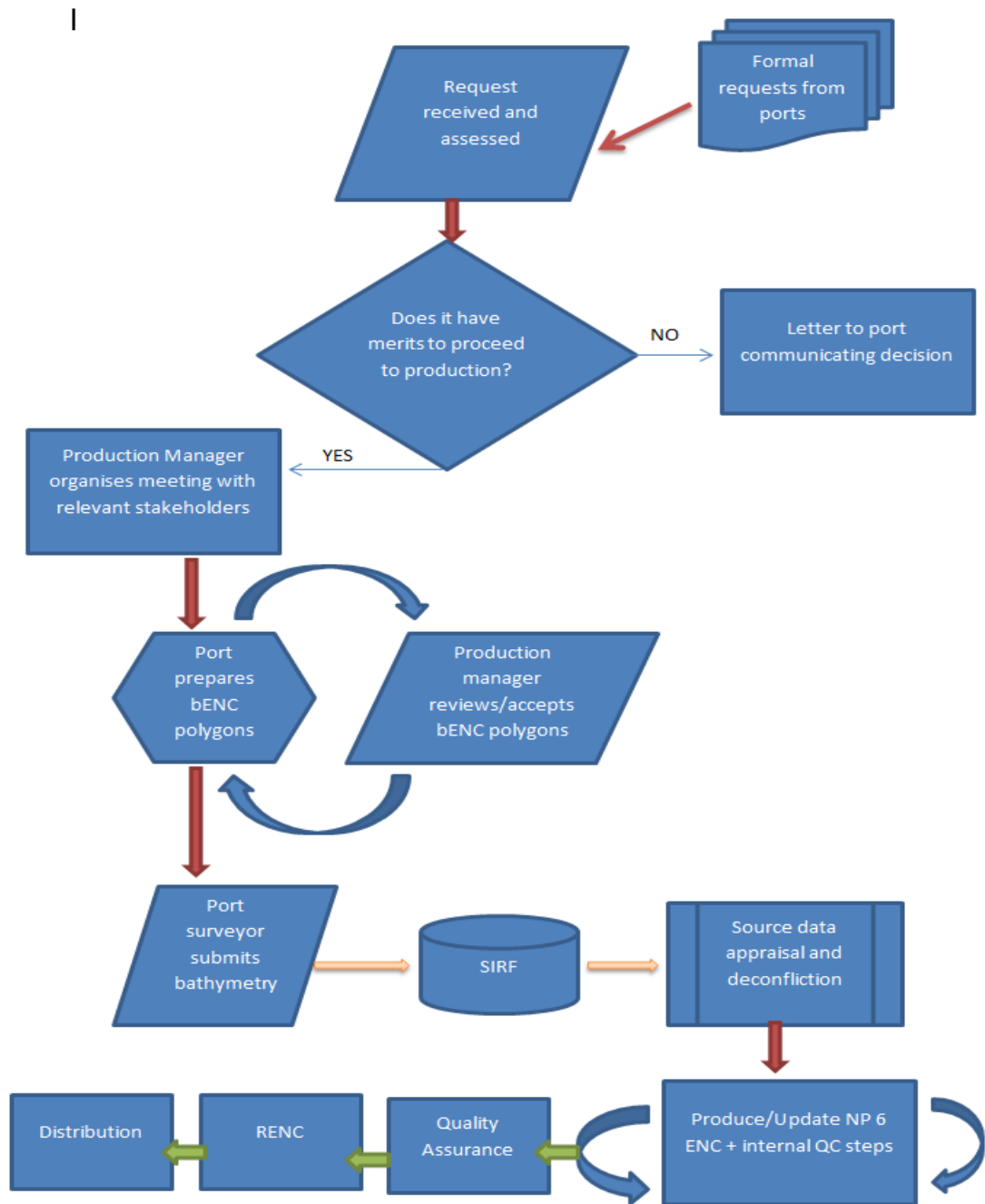
Technical considerations



- Areas with different re-surveying frequencies were split into different AU6 ENC cells.
- M_COVR CATCOV=1 limits "negotiated" among stakeholders and submitted by the harbourmasters
- Surveys must overshoot the M_COVR boundary by at least 20 meters.
- Surveys must provide full sea bottom coverage and be within ZOC A1 horizontal and vertical accuracy.
- The AHO decided that a 'cut and replace' approach was the most efficient production strategy.
- The automation in the production of contours and depth areas was key to support a short turn around production.



Bathymetric ENC production - General workflow



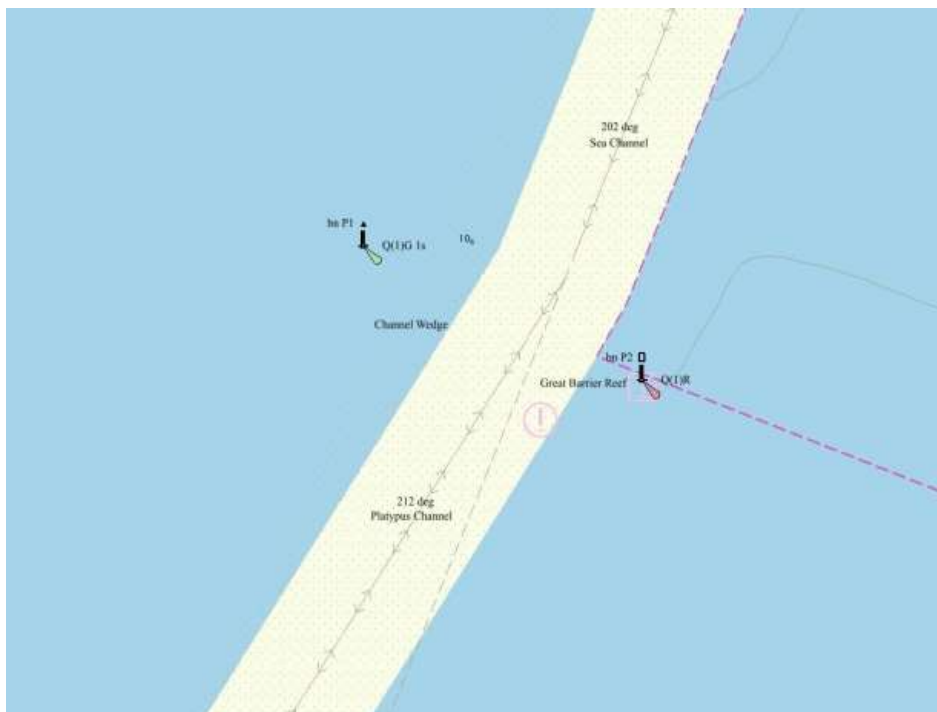
KEY POINTS



- Asses the need of HD bENCs on a port by port basis (e.g. supported by a **business case**).
- Once a decision to proceed has been made it should be followed up by a **meeting** involving the HO's regional production manager, the port's Harbourmaster, a senior pilot, and port surveyors.
- The **area** covered MUST be **as small as possible** in order to safely operate the largest ship calling the port. It must focus on restricted waters (very narrow passages, strong currents, sharp turns, etc). The size of the area directly affects production times and ENC size.
- **One meter contours are AHO's preferred option.** It was selected as the most realistic contour spacing to be offered to mariners based on the uncertainty of all the different measurements involved in the determination of the final depth figures (tidal models, depth (e.g. +/- 0.5m + 1%*d* for an A1 survey). We also consider uncertainties coming from the measurement of the draught of the ship itself (especially when it is also affected by squatting).
- For bENCs covering dredged channels, the use of an "**intermediate contour**" equal to the design depth of the channel (e.g. 11.7m) is strongly recommended as it normally reflects the maximum draught (plus tide, less port's UKC requirements) of vessels able to enter the port.
- **Soundings, spaced at 50/100m** depending on the width of the channel, were also requested by mariners. They are considered important to support the one meter contours utilising the "safety depth" setting in ECDIS. The port survey areas must "overshoot" the bENC extents and must be supplied to the HO in full (there's no such a thing as merging "old" and "new" one meter contours). Harbourmasters and port surveyors must commit to this process in order to maintain consistency on their deliverable making the HO's internal processes repeatable.
- Let the Harbourmaster, local pilots and port surveyors come up with the **extents of the bENC cells**. By doing that they are committing to the project. Port stakeholders are quick to ask HO's for more contours over large areas but they seem not to be aware of the fact that those areas must be re surveyed periodically and that in the end it will affect their resources. From our experience, making them accountable for one of the key moving parts of the project ends up resulting on very "sensible" product extents. We intend to produce our AU6 ENC based on survey extents created by the Ports.



- Port surveyors and HO's tides and bathymetric data validation representatives must agree, beforehand, on **file formats, metadata and LAT adjustment values** in order to speed up the registration, processing and validation of the incoming data as much as possible. Ideally, the updated ENC cell must be released to the RENC in not more than 7 working days since the receipt of the new bathy by the HO.
- Maximum ENC cell size is still **5MB** so if an area becomes too large it must be **split in more than one product**.
- The survey must be processed as one entity. A surface will be created and the depth contours (DEPCNT) and depth areas (DEPARE) will be auto generated. The result file will be cropped using the "official ENC extents"; all the previous contours and areas will be **deleted** from the AU6 cell **and replaced** with the new ones.
- **Soundings** will be also **auto generated** by the software.
- Any **other non-bathymetric data** overlapping the area will be included in the AU6 (e.g. nav aids, wrecks, etc) High resolution coastline will be retained at the AU5 level and the AU6 will run very close to it without duplicating the data. This will avoid topology issues while trying to join auto generated contours and depth areas against other non-bathymetric features. On the AU5, a M_CSCL object with the same scale than the AU6 (extending up to 100m from the seawall) can be added to avoid the over scale warning pattern display on ECDIS. This provides a seamless display.



AU5 ENC showing DRGARE and no bathy



AU5 ENC with overlapping AU6 (bENC)



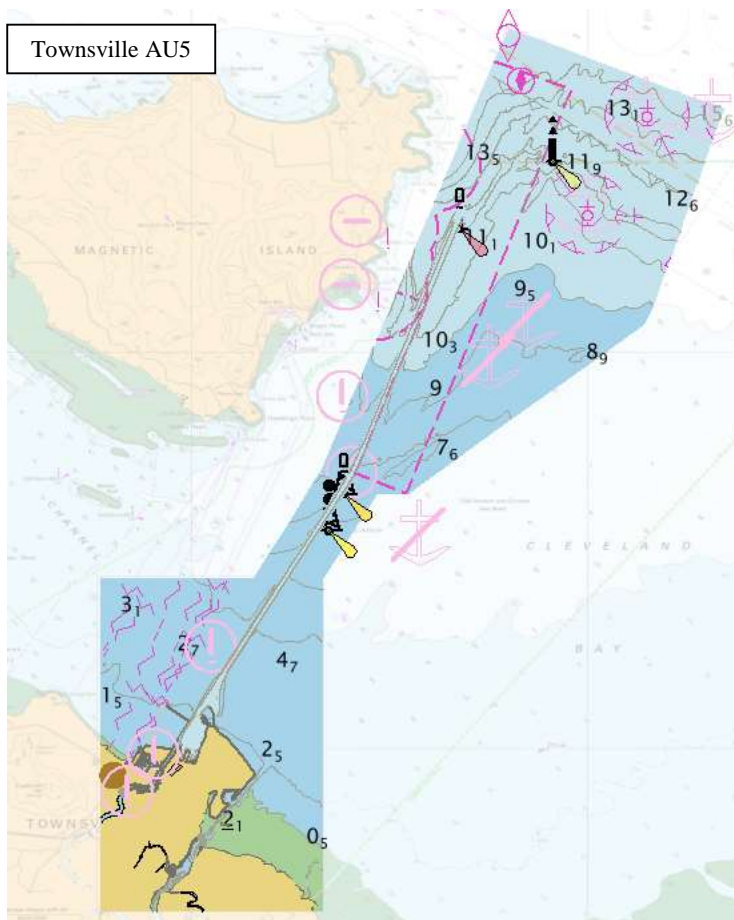
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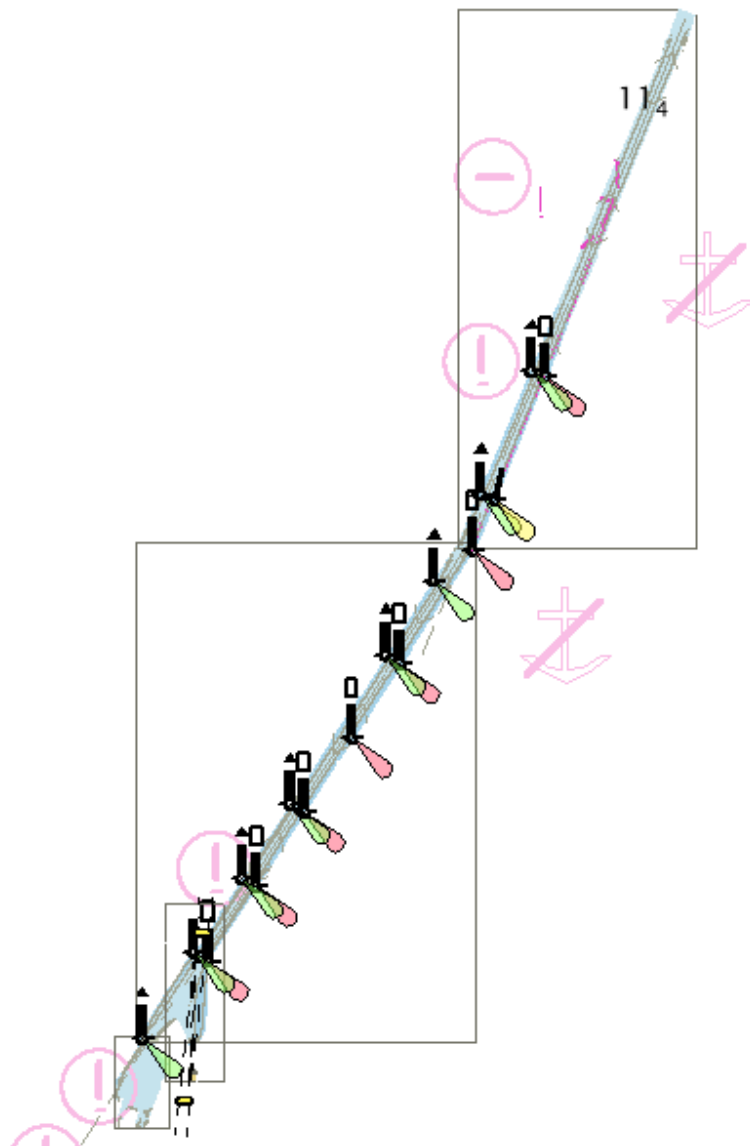


Townsville AU5



Townsville AU6 coverage





QUESTIONS ?

