

Paper for Consideration by NCWG
S-129 Feature Portrayal

Submitted by:	S-129 Project Team
Executive Summary:	S-129 Feature Portrayal Change Proposals
Related Documents:	S-129 Product Specification Edition 1.1.0

Introduction / Background

An S-129 dataset comprises Under Keel Clearance Management (UKCM) information that can be used as a Nautical Publication Information Overlay (NPIO) within an Electronic Chart Display and Information System (ECDIS). It is based on the IHO's S-100 framework specification and the ISO 19100 series of standards.

S-129 is a vector Product Specification intended for encoding the extent and nature of UKCM information products for navigational purposes. Use of UKCM products conformant to this specification is not limited to navigation systems.

A ship's master has an obligation under SOLAS regulation V/34 to plan their ship's voyage from berth to berth. This Product Specification enables UKCM information to be provided to users of a UKCM service.

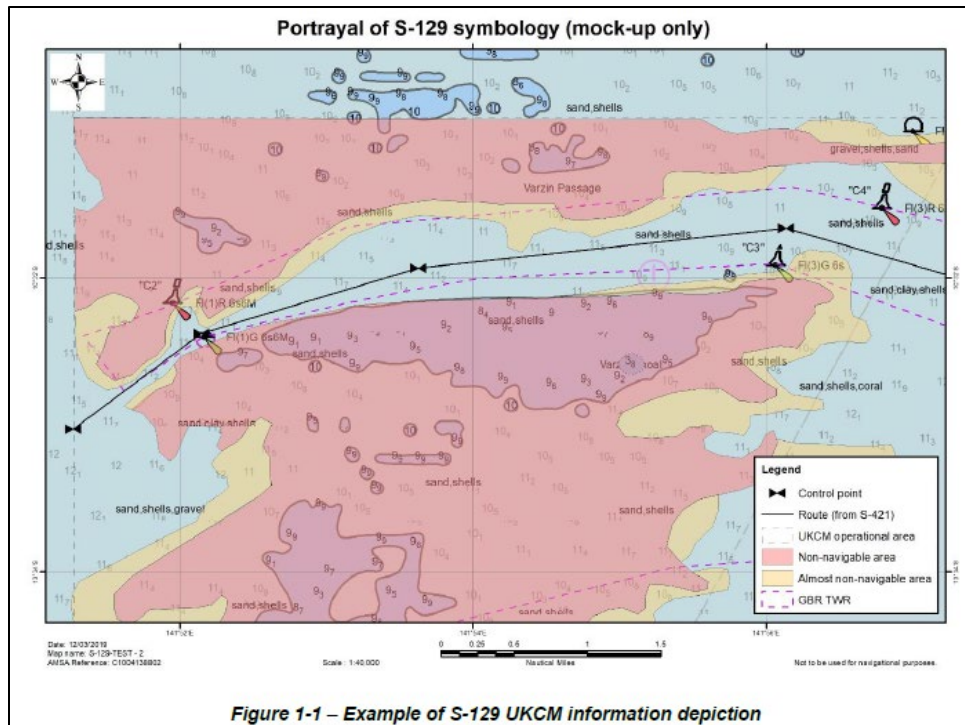


Figure 1-1 – Example of S-129 UKCM information depiction

Figure 1: Example depiction of S-129 UKCM information

(Figure 1-1, S-129 Product Specification Ed. 1.1.0)

As the S-129 Project Team works towards S-129, Edition 2.0.0, several areas of improvement have been identified in the S-129 Portrayal Catalogue to:

1. Enhance S-129's aid to navigational safety, and
2. Reduce the likelihood of conflict with the display of other products, while
3. Maintaining the intended visibility of S-129 features on end user systems

Suggestions were thus raised to modify the existing portrayal of, or add new portrayal method to, the applicable S-129 features. This paper outlines the proposed portrayal changes.

The S-129 PT seeks NCWG's feedback and guidance on the appropriateness of the proposed changes. Based on NCWG feedback, the S-129 PT aims to effect changes to the S-129 Portrayal Catalogue accordingly.

Analysis / Discussion

The S-129 Project Team proposes changes to the portrayal of the following S-129 features:

1. *UnderKeelClearancePlan*
(comprising the boundary of area corresponding to the *UnderKeelClearancePlan* calculation as represented by an S-129 dataset)
2. *UnderKeelClearanceNonNavigableArea*
3. *UnderKeelClearanceAlmostNonNavigableArea*
4. *UnderKeelClearanceControlPoint*

The proposed changes form part of the effort to update the S-129 Product Specification to the operational edition (Edition 2.0.0) under the S-100 roadmap. Proposed portrayal additions, such as colours, line styles, and symbols, have been drafted based on previous recommendations made to/within the S-129 PT, and based on reference to information in the Portrayal Register under the IHO Geospatial Information Registry.

The draft changes are detailed below.

1. *UnderKeelClearancePlan*

The S-129 Project Team has been drafting a new symbol and line style for the portrayal of the *UnderKeelClearancePlan* area boundary.

The purpose of this area boundary is to ensure navigational safety by distinguishing between:

- Navigable UKC areas (areas of under keel clearance above the calculated safe limit), and
- Areas outside the *UnderKeelClearancePlan* area (where UKC has not been calculated/assessed)

The proposed LineStyle XML for the *UnderKeelClearancePlan* area boundary consists of:

- Dashed line
- Embedded symbol “EMAREMG1”
- “UKCM” text symbol
- CHMGD (chart magenta dominant) colour token
- 0.32mm width

The resultant LineStyle, as loaded on the S-100 LinePatternEditor, is represented in Figure 2 below.

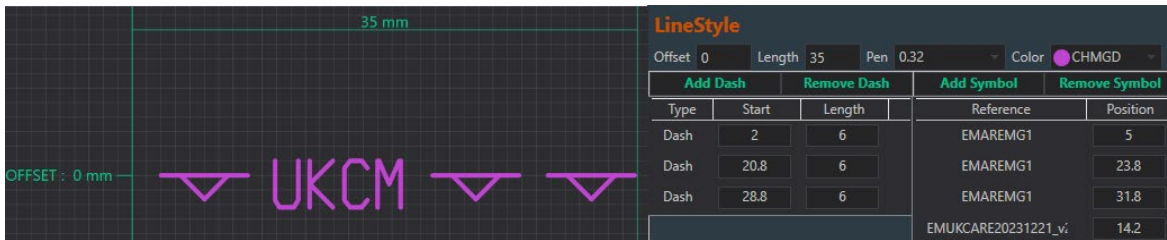


Figure 2: Proposed LineStyle for the *UnderKeelClearancePlan* area boundary, as loaded on S-100 LinePatternEditor

Additionally, 50% transparency is to be applied to the *UnderKeelClearancePlan* area boundary in the S-129 Portrayal Catalogue.

The draft “UKCM” text symbol SVG underlying the LineStyle is depicted in Figure 3 below.

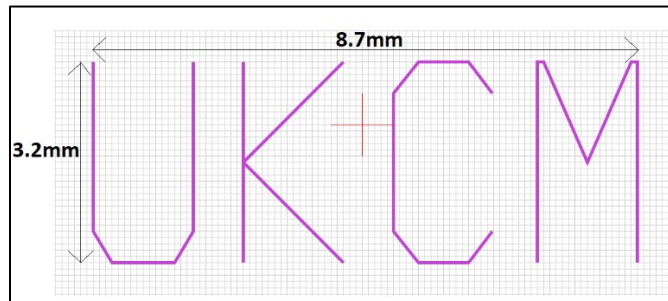


Figure 3: Proposed “UKCM” text label SVG included in the *UnderKeelClearancePlan* area boundary LineStyle

The XML and SVG files corresponding to the LineStyle and “UKCM” text label, respectively, are available as the following files under the S-129 Product Specification GitHub repository (https://github.com/iho-ohi/S-129-Product-Specification/tree/main/1.2.0/PC/S129_1_2_0_PC).

- **LineStyle XML:** *1.2.0/PC/S129_1_2_0_PC/LineStylees/UKCARE01_20240110.xml*
- **“UKCM symbol SVG:** *1.2.0/PC/S129_1_2_0_PC/Symbols/EMUKCARE_20231221_v2.svg*

A mock-up image depicting an example UKCM Plan area boundary is included in Figure 4 below.

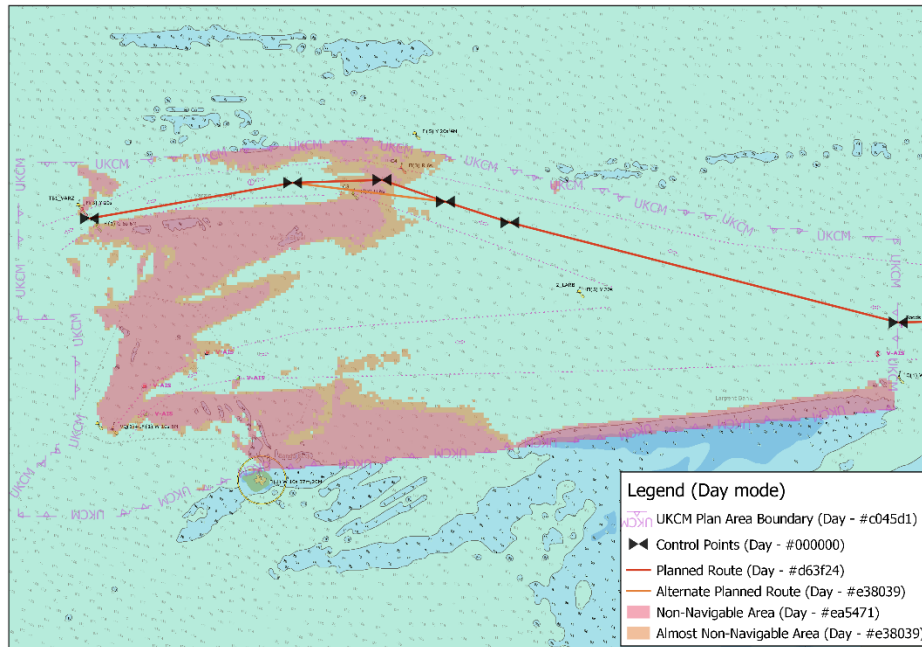


Figure 4: Mock-up illustration of *UnderKeelClearancePlan* area boundary, and other S-129 features

As shown in this mockup, the magenta (CHMGD - #c045d1) *UnderKeelClearancePlan* area boundary encompasses S-129 features including the *UnderKeelClearanceNonNavigableArea* (red - #ea5471), *UnderKeelClearanceAlmostNonNavigableArea* (orange - #e38039), and *UnderKeelClearanceControlPoint* (black “bow ties” - #000000). Also shown in the image are Planned Route (red - #d63f24) and Alternate Planned Route (orange - #e38039) lines, which are not S-129 features.

Non-coloured areas inside the boundary correspond to navigable UKC areas, while areas outside the boundary indicate areas where (*UnderKeelClearanceNonNavigableArea*) “non navigable areas” and *UnderKeelClearanceAlmostNonNavigableArea* (“almost non navigable areas”) are not calculated/assessed.

2. *UnderKeelClearanceNonNavigableArea*

The *UnderKeelClearanceNonNavigableArea* feature corresponds to areas of under keel clearance less than the calculated safe limit, as established for the waterway (i.e. the UKC “no go” areas).

In the current S-129 Portrayal Catalogue, *UnderKeelClearanceNonNavigableArea* is portrayed with solid colour fill in red (#ea5471). To mitigate the *UnderKeelClearanceNonNavigableArea* feature obscuring other features (including those from other products) on end-user systems, while maintaining visibility of the UKC “no go” areas of all spatial extents, the S-129 Project Team proposes that a 50% transparency be applied to the colour fill. The proposed portrayal of *UnderKeelClearanceNonNavigableArea* is illustrated in Figure 4 above.

The S-129 Portrayal Catalogue currently only includes Day colour palettes. Thus, the S-129 Project Team proposes that Dusk and Night colour palettes be included in the S-129 Portrayal Catalogue, as summarised in Table 1 below.

Table 1: Proposed colour and transparency of *UnderKeelClearanceNonNavigableArea* feature

Colour Palette	Colour (hex)	Colour (RGB)	Transparency
Day	#ea5471	(234, 84, 113)	50%
Dusk	#9b3549	(155, 53, 73)	50%
Night	#390e16	(57, 14, 22)	50%

3. *UnderKeelClearanceAlmostNonNavigableArea*

The *UnderKeelClearanceAlmostNonNavigableArea* feature corresponds to areas of under keel clearance almost less than the calculated safe limit, as established for the waterway (i.e. the UKC “almost no go” areas).

In the current S-129 Portrayal Catalogue, *UnderKeelClearanceAlmostNonNavigableArea* is portrayed with solid colour fill in orange (#e38039). To mitigate the *UnderKeelClearanceAlmostNonNavigableArea* feature obscuring other features (including those from other products) on end-user systems, while maintaining visibility of the UKC “almost no go” areas of all spatial extents, the S-129 Project Team proposes that a 50% transparency be applied to the colour fill. The proposed portrayal of *UnderKeelClearanceAlmostNonNavigableArea* is illustrated in Figure 4 above.

The S-129 Portrayal Catalogue currently only includes Day colour palettes. Thus, the S-129 Project Team proposes that Dusk and Night colour palettes be included in the S-129 Portrayal Catalogue, as summarised in Table 2 below.

Table 2: Proposed colour and transparency of *UnderKeelClearanceAlmostNonNavigableArea* feature

Colour Palette	Colour (hex)	Colour (RGB)	Transparency
Day	#e38039	(227, 128, 57)	50%
Dusk	#86491e	(134, 73, 30)	50%
Night	#301705	(48, 23, 5)	50%

4. *UnderKeelClearanceControlPoint*

Currently in the S-129 Portrayal Catalogue, the *UnderKeelClearanceControlPoint* feature is currently portrayed as “bow ties”, as illustrated in Figure 5 below.

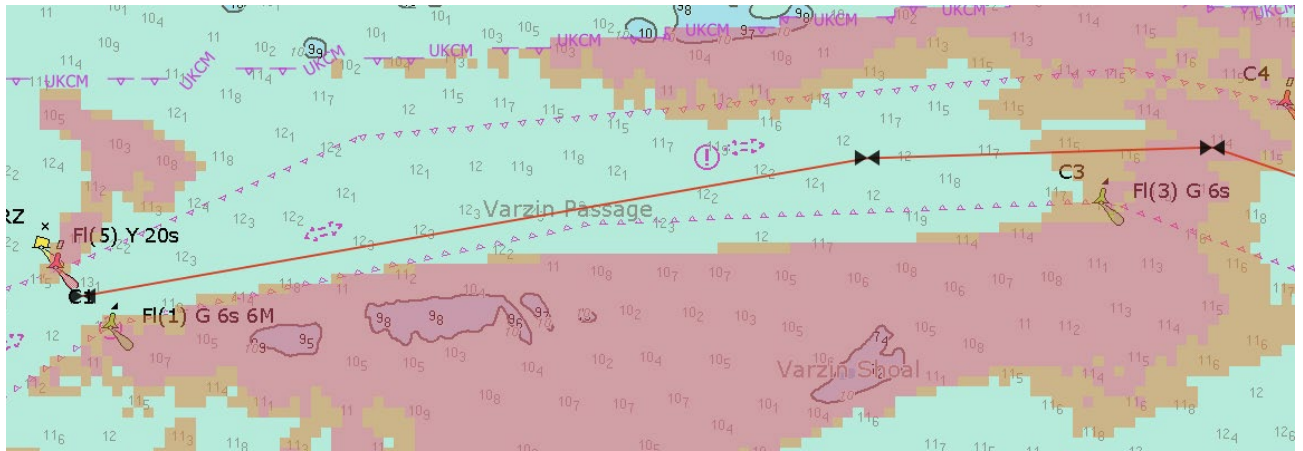


Figure 5: *UnderKeelClearanceControlPoint* portrayal as “bow ties” (as per current S-129 Portrayal Catalogue)

Recent feedback from the S-129 Project Team indicated that the Control Points could be obscured when overlapped by horizontal route lines (or other chart features). Thus, a suggestion was made to add a circle around the bow tie to mitigate potential visual conflict, as illustrated in Figure 6 below.

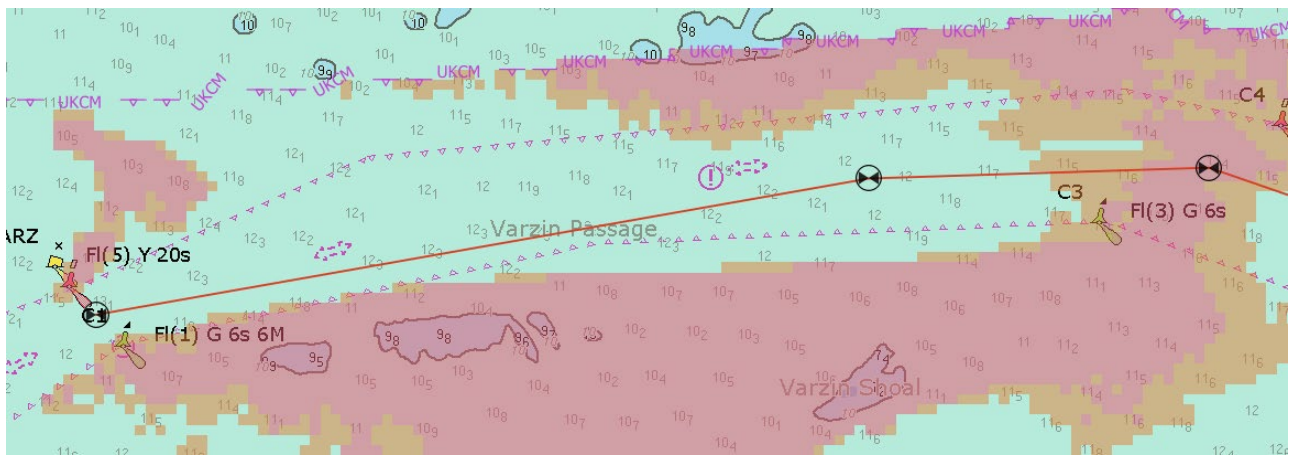


Figure 6: *UnderKeelClearanceControlPoint* portrayal as “bow ties” with circles (proposed changes)

The dimensions of the proposed “circle” around the existing bowtie is depicted in Figure 7 below:

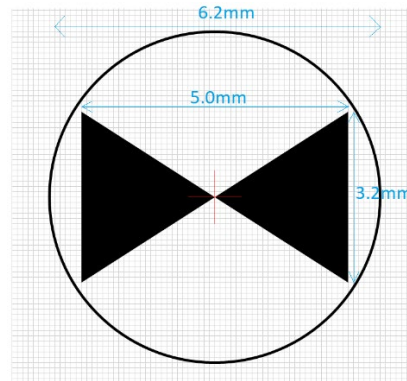


Figure 7: dimension of proposed circle for *UnderKeelClearanceControlPoint*

5. Addition of S-129 feature colours, in consideration of route portrayal (via S-421)

S-129 datasets are intended to be used alongside route information (through methods such as S-421) and it is therefore crucial that conflicts between S-129 and route information are mitigated. The S-129 PT noted that the “Planned Route” (PLRTE) and “Alternate Planned Route” (APLRT) colour tokens may have similar colour schemes to the S-129 “*UnderKeelClearanceNonNavigableArea*” and “*UnderKeelClearanceAlmostNonNavigableArea*” features.

While the route line widths, and the opacities of the different features, may provide enough contrast between route information and S-129 features, the S-129 PT nonetheless considers it prudent to seek NCWG guidance around the competing colour schemes.

Mock-ups of route information overlaid on S-129 features, based on test data, are included in Annex B. While Dusk and Night colour palettes are yet to be implemented in the S-129 Portrayal Catalogue, mock-ups have been produced for proposed Dusk and Night palettes as well, as per color tokens defined in the IHO Geospatial Information Registry.

Please note the following with regards to the mock-up images provided:

1. The width of route lines was assumed to be 0.64mm, based on S-421 Version 1.0 as available from <https://www.cirm.org/s-421/index.html>
2. These images are mock-ups only, and therefore the depicted features may not accurately reflect the exact portrayal on an ECDIS or other end-user systems.

The current and proposed colours for the S-129 features are tabulated in Annex C, for NCWG review.

Conclusions

The S-129 PT considers the draft changes to the S-129 feature portrayals as necessary for improving its usability and display on end user systems. However, the S-129 PT seeks review by the NCWG to ensure appropriate portrayals are implemented as part of progressing S-129 to the operational edition (Edition 2.0.0).

Recommendations

The S-129 PT recommends that the changes described in this paper are incorporated into the S-129 Portrayal Catalogue.

Justification and Impacts

The proposed changes to the S-129 Portrayal Catalogue are expected to add to S-129's capacity to improve navigational safety, while reducing the probability of portrayal conflicts between S-129 features and other products' features (e.g. route lines) on end user system displays. Pending NCWG feedback, updates to the S-129 Portrayal Catalogue will be of high priority for progressing S-129 to the operational (Edition 2.0.0). Therefore, the S-129 PT aims to complete the S-129 Portrayal Catalogue updates, along with any other updates to the S-129 Product Specification, by April 30th, 2024.

Following NCWG review and feedback, it is expected that the implementation and testing of changes to the S-129 Portrayal Catalogue will require ongoing collaboration between S-129 PT resources, including contributors such as AMSA, Bluemap, IIC Technologies, KHOA, Korea Maritime & Ocean University (KMOU), NIWC, and OMC International. Further recommendations or guidance from the NCWG, or other experts within the S-100 WG, may be necessary.

As these proposed actions targets the S-129 Portrayal Catalogue, they are not expected to incur changes to other standards, such as S-101.

Action required of NCWG

The NCWG is invited to note and review the proposed changes to the portrayal of S-129 features, as presented in this paper. The S-129 PT requests that the NCWG provides the S-129 PT with feedback on the suitability of the proposed changes, and any recommendations on how the S-129 product could be further improved.

Annex B. Mock-up Portrayal of S-129 Features and Route Information

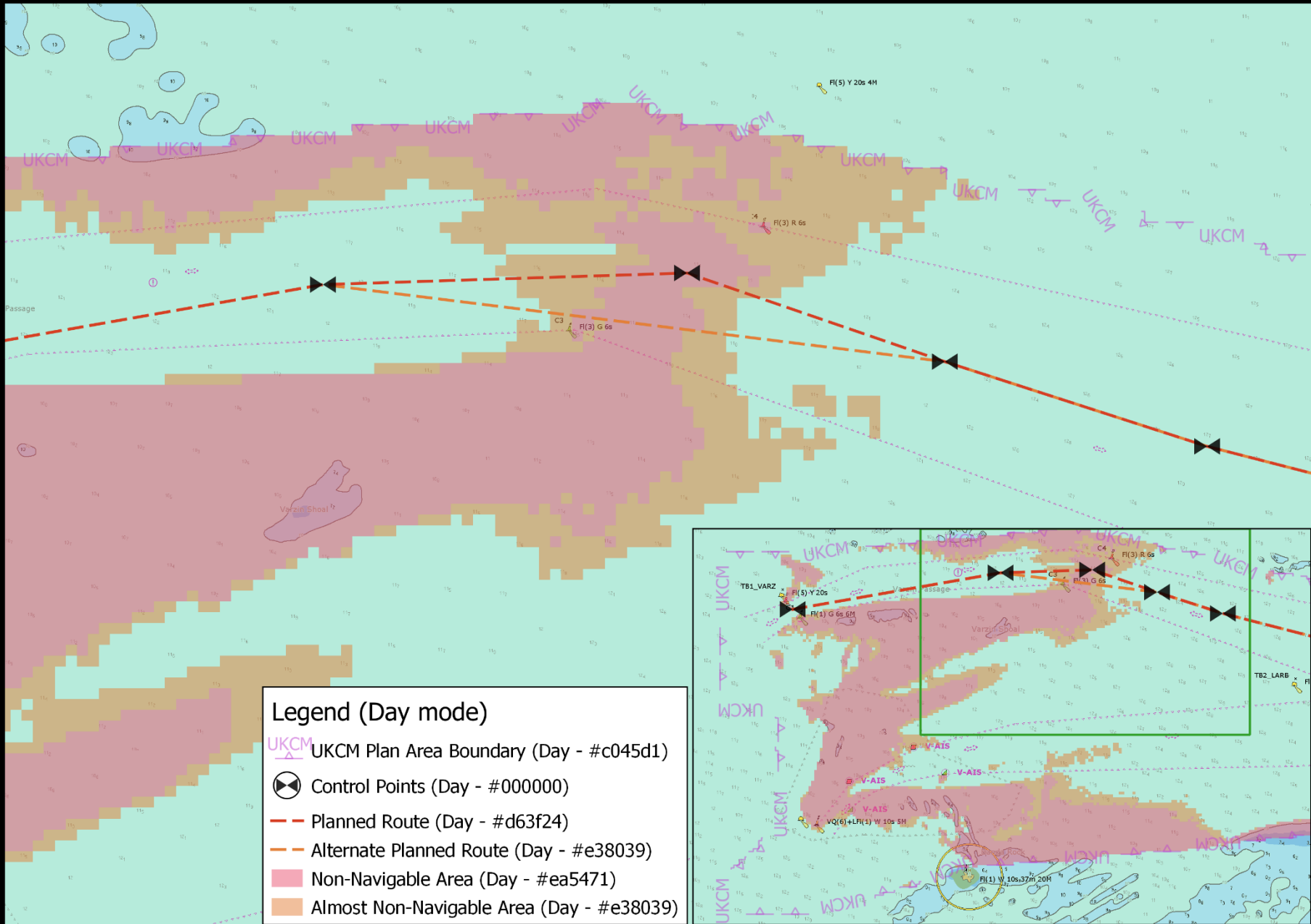


Figure A-1: S-129 features & routes - "Day mode"; Control Points portrayed without circles

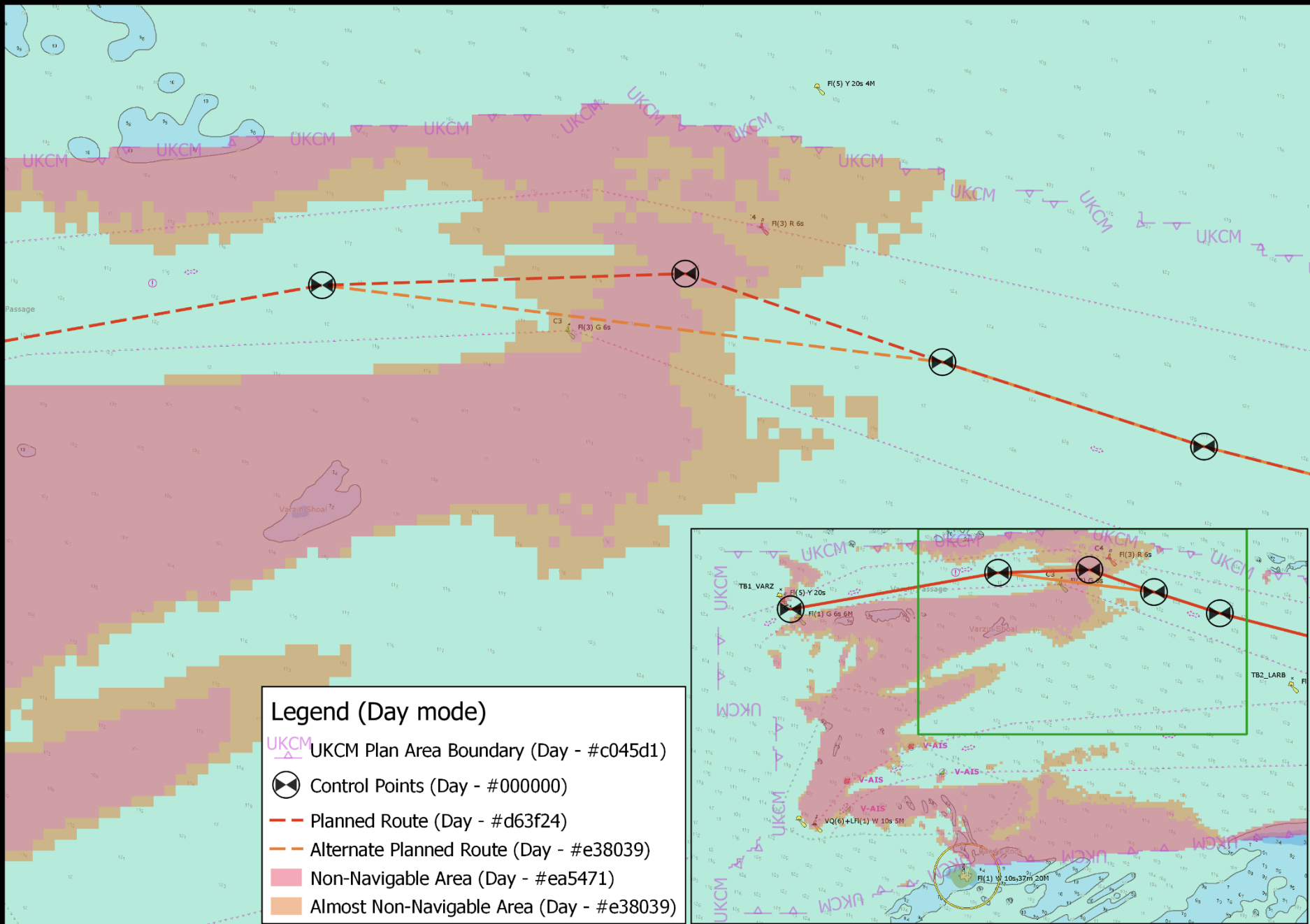


Figure A-2: S-129 features & routes - "Day mode"; Control Points portrayed with circles

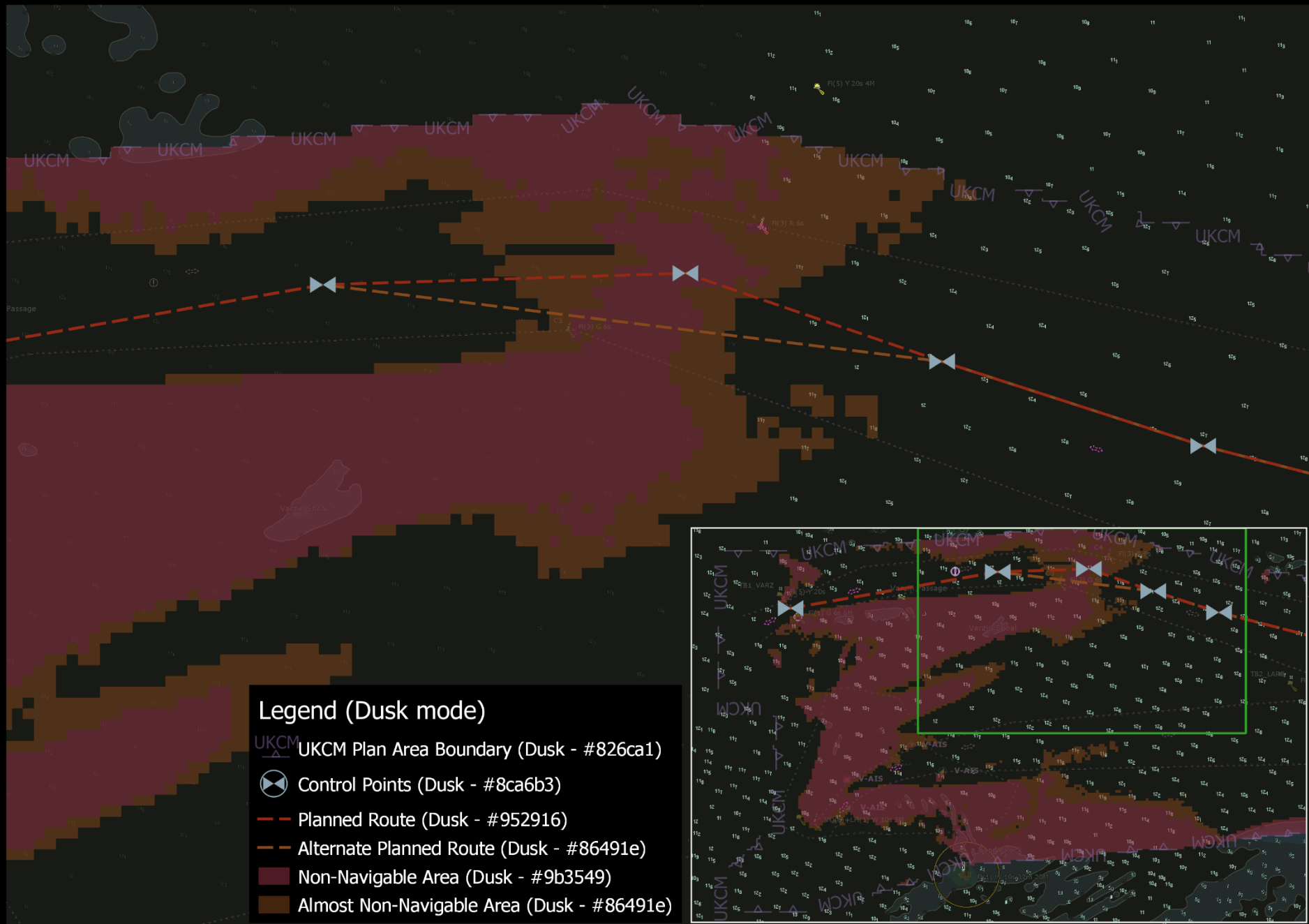


Figure A-3: S-129 features & routes - "Dusk mode"; Control Points portrayed without circles

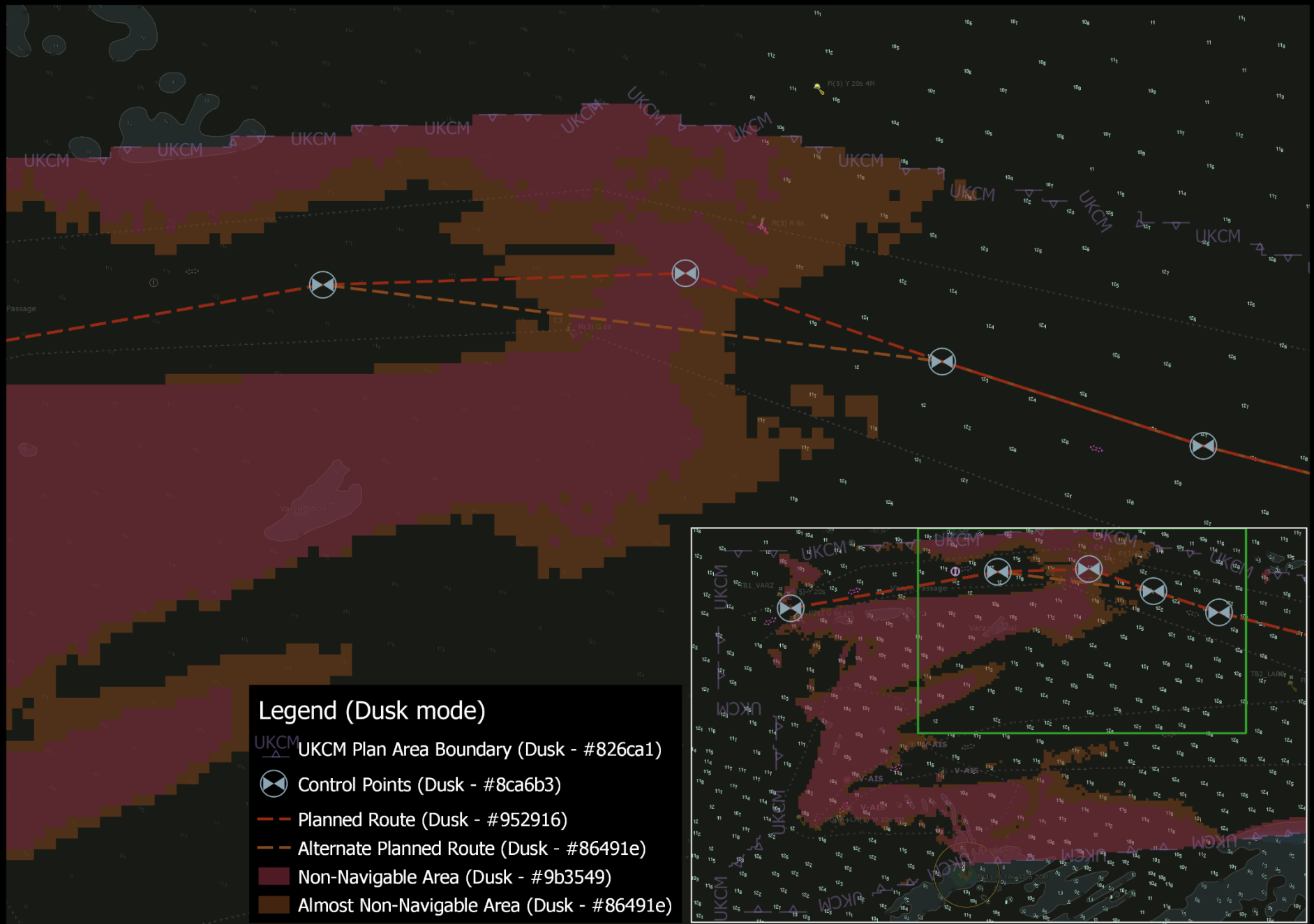


Figure A-4: S-129 features & routes - "Dusk mode"; Control Points portrayed with circles

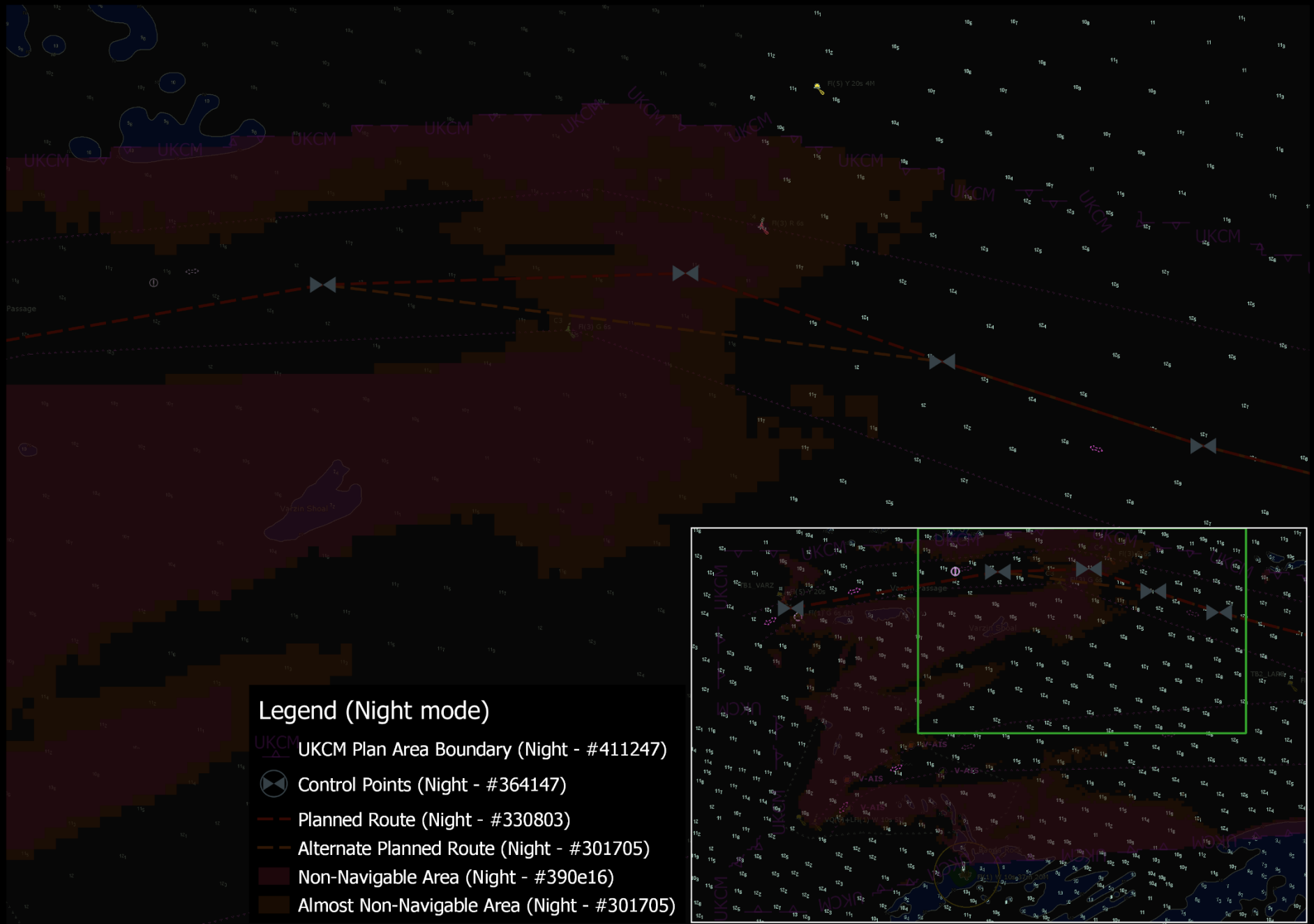


Figure A-5: S-129 features & routes - "Night mode"; Control Points portrayed without circles

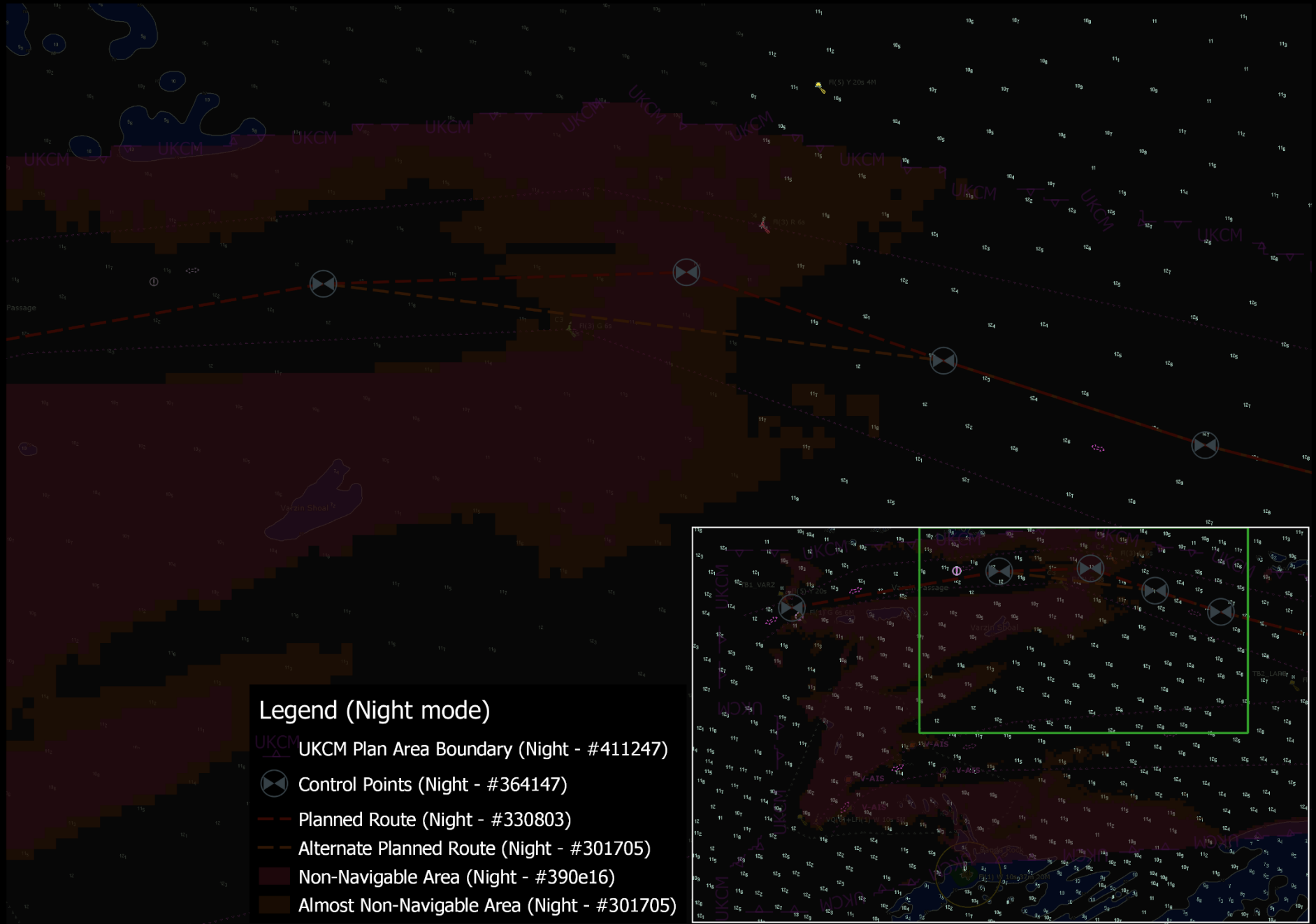


Figure A-6: S-129 features & routes - "Night mode"; Control Points portrayed with circles

Annex C. Current and Proposed Colours for S-129 Features and Route Information

Table C-1: Route line colours

Feature	S-100 Colour Token	Hex Code		
		Day	Dusk	Night
Planned route (e.g. S-421)	PLRTE	#d63f24	#952916	#330803
Alternate Planned route (e.g. S-421)	APLRT	#e38039	#86491e	#301705

Table C-2: Current (Day) and proposed (Dusk, Night) colours for S-129 *UnderKeelClearancePlan* and *UnderKeelClearanceControlPoint* features

Feature	S-100 Colour Token	Hex Code	Proposed Hex Code	
		Day	Dusk	Night
<i>UnderKeelClearancePlan</i>	CHMGD	#c045d1	#826ca1	#411247
<i>UnderKeelClearanceControlPoint</i>	SNDG2	#000000	#8ca6b3	#364147

Table C-3: Current (Day) and proposed (Dusk, Night) colours for S-129 *UnderKeelClearanceNonNavigableArea* and *UnderKeelClearanceAlmostNonNavigableArea* features

Feature	Equivalent S-100 Colour Tokens	Hex Code	Proposed Hex Code	
		Day	Dusk	Night
<i>UnderKeelClearanceNonNavigableArea</i>	CHRED (chart red) LITRD (red light) DNGHL (danger highlight) UINFR (user interface red)	#ea5471	#9b3549	#390e16
<i>UnderKeelClearanceAlmostNonNavigableArea</i>	CURSR (cursor orange) SCLBR (scale bar) CHCOR (chart correction) NINFO (navigator notes) APLRT (alternate planned route) UINFO (user interface orange)	#e38039	#86491e	#301705