ABP South Wales Marine Licence Monitoring: LU140

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Introduction

LU140 has been open since 1990 and is presently licensed for dredge disposal. Among other users, ABP South Wales utilise the site for material extracted from Newport Docks and approach channel.

As part of the ongoing site operation and monitoring, repeat bathymetric surveys of the LU140 (Newport) site are regularly carried out by (and on behalf of) ABP South Wales. These monitoring surveys include coverage of the disposal site itself, as well as two extended cross-section transect profiles, generally running across the site from southwest to northeast (Transect 1) and from west to east (Transect 2) (see Figure 1 for locations and extents).

To support the ongoing monitoring, the bathymetric monitoring survey data has been analysed and comparisons undertaken between successive survey datasets. This analysis includes a difference plot of the disposal site bathymetry between August 2022 and August 2025, as well as comparison of the two transect profiles since 2020.

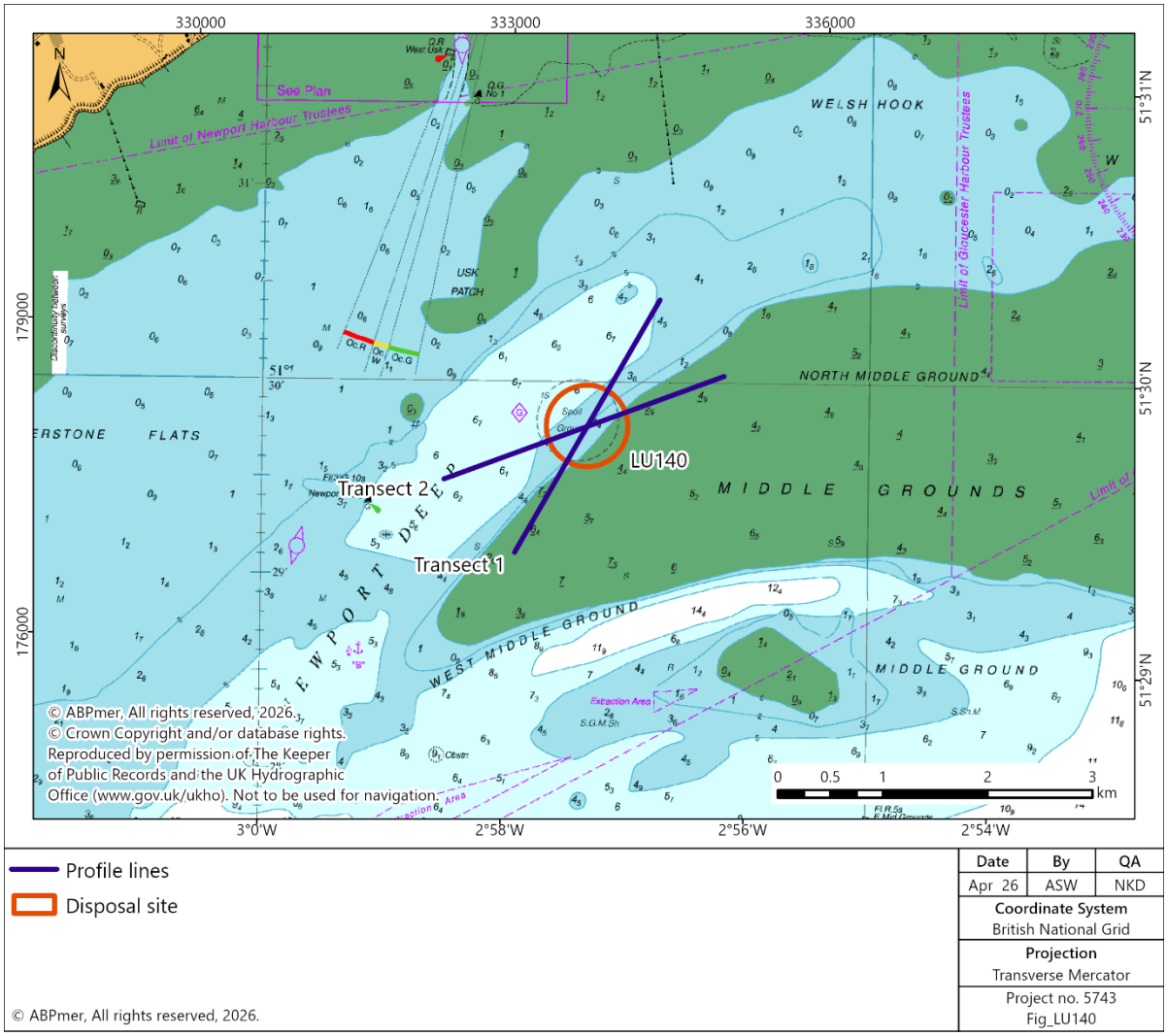

Figure 1. Location of LU140 area of interest

This Note provides the summary findings of the analysis of the monitoring data, which is discussed within the following sections.

Comparison of bathymetric data

To assess the range of variability in bed elevation across (and over the wider area of) the LU140 disposal site, repeat bathymetric survey data has been analysed. Table 1 provides a summary of the bathymetric data assessed as part of the present analysis, in support of the ongoing monitoring. These data are sourced from a combination of singlebeam echo-sounder (SBES) and multibeam echo-sounder (MBES) surveys of the site.

Table 1. Bathymetric datasets used in assessment

Date	Source and date
2020	SBES bathymetric surveys collected on behalf of ABP South Wales August 2020
2022	MBES bathymetric surveys collected on behalf of ABP South Wales August 2022
2025	MBES bathymetric surveys collected on behalf of ABP South Wales August 2025

Each survey dataset covers the LU140 disposal site itself (repeat northeast-southwest survey lines at approximately 100 m line spacing and perpendicular cross-survey lines at lines spacing of around 1,000 m), as well as the two transect profiles shown in Figure 1 (both Transects are around 2,800 m in length).

The initial analysis considers the difference in bed elevation, between the August 2022 and August 2025 surveys, across the LU140 disposal site itself. The bed level change is shown in Figure 2, whereby a negative difference in elevation indicates that the bed is shallower in the 2025 survey than in the 2022 survey, whilst a positive difference indicates the bed has deepened between surveys.

As shown in Figure 2, the analysis of the successive bathymetric datasets indicates a variable pattern of deepening and shallowing across the LU140 disposal site in the three years between surveys. Broadly, the eastern half of the site has shallowed as the wider Middle Ground sandbank is migrating to the northwest (across LU140), whilst the western edge has deepened, as the Newport Deep channel is pushed slightly north and west in response. Areas of change to the extreme southern edge of the site are up to -6 m, as the sandbank shifts. Across the remainder of the LU140 site, the varying levels of change are typically from ±0 to 2 m. Taken across the whole site, the average magnitude of shallowing is 0.3 m (equating to around 0.1 m per year), with the majority of this change being driven by the slight shifting in the flank of the wider Middle Ground sandbank.

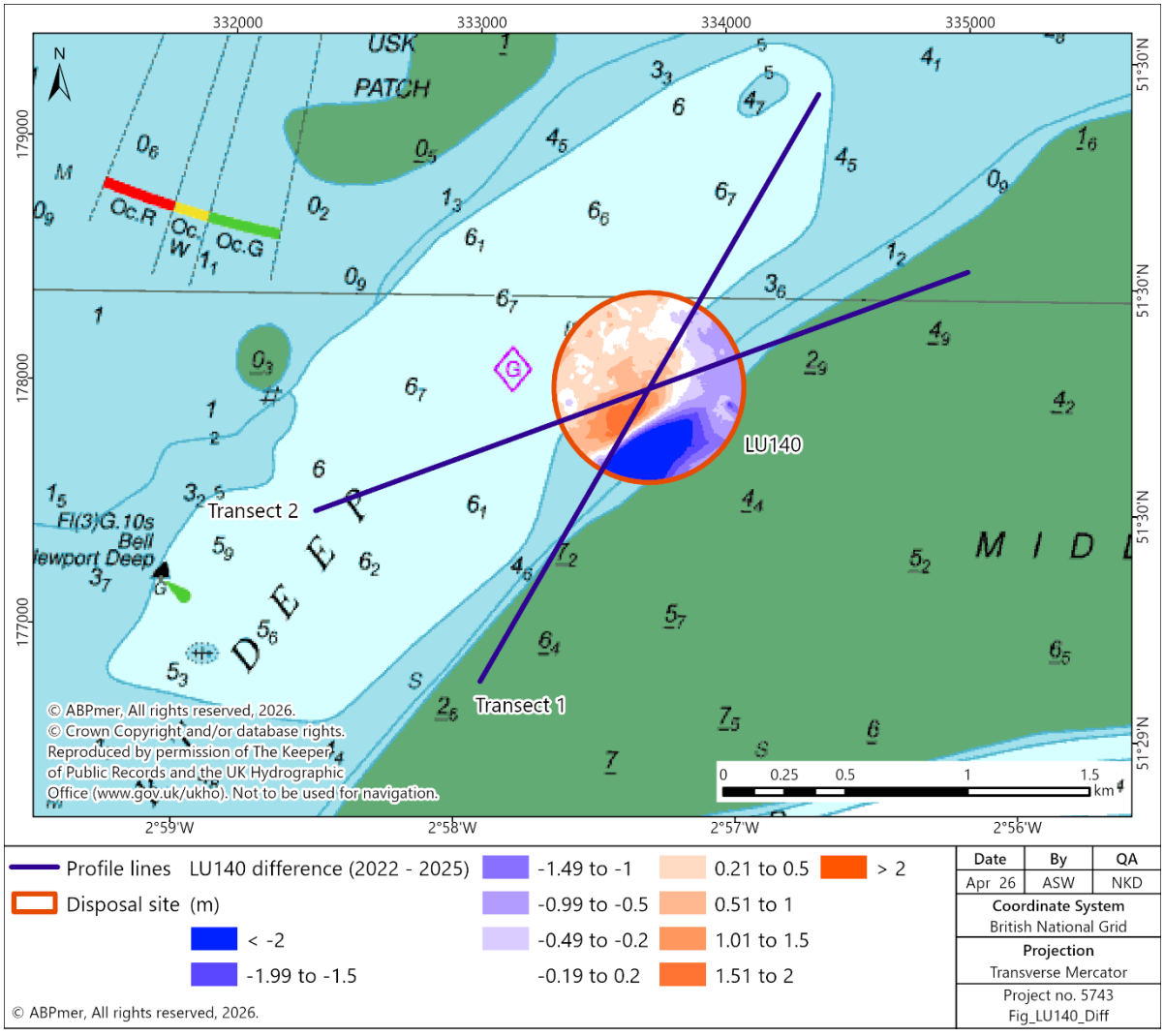

Figure 2. Difference in bed elevation across LU140 between August 2022 and August 2025

To further inform the ongoing monitoring, analysis of the repeat cross-section transect profile data has also been undertaken. The locations of these profiles are shown in Figure 1 and an example of the bathymetric bed elevations from the latest (August 2025) bathymetric survey is shown in Figure 3. This shows a variation in elevation along these transects, ranging from around -8 mCD to +4 mCD along Transect 1 and between around -8 mCD to +3 mCD along Transect 2.

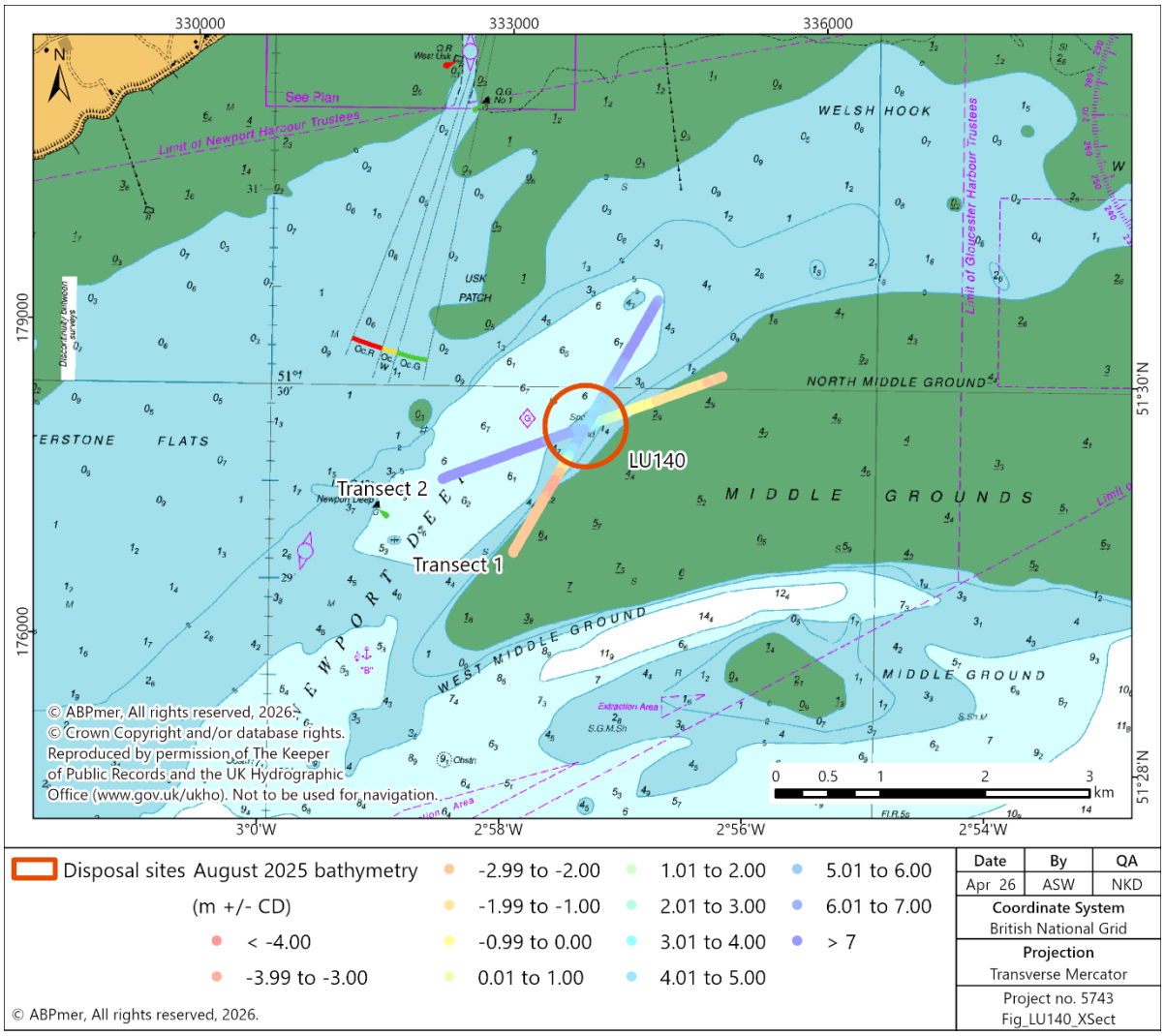

Figure 3. August 2025 bathymetric transect profiles across LU140

Comparison of the 2022 and 2025 bathymetry survey data has been carried out to assess the changes to bathymetry along the two surveyed profiles. The differences in bed elevation along Transects 1 and 2 are shown in Figure 4 and Figure 5, respectively. Generally, the profile comparison shows a variable pattern of change, with some parts of the profiles being shallower in 2025 than in 2022 and other parts being deeper. Overall, the two surveys show very little variation in bed level across Transect 2 and across the north-eastern end of Transect 1, which indicate the same bed features at some locations and levels (e.g. bed slopes etc.). Across the southwest end of Transect 1, the profile comparison shows the continued migration of the Middle Ground sandbank feature, the rate of which has slowed considerably between 2022 and 2025 when compared against the trend observed between 2020 and 2022.

In order to provide a more comparable set of metrics for assessing change along each profile, a statistical average of the profile elevation (along the comparable sections of each profile that have been covered in each of the two survey periods) has been calculated. Table 2 summarises the average elevation of each profile, and from each survey period.

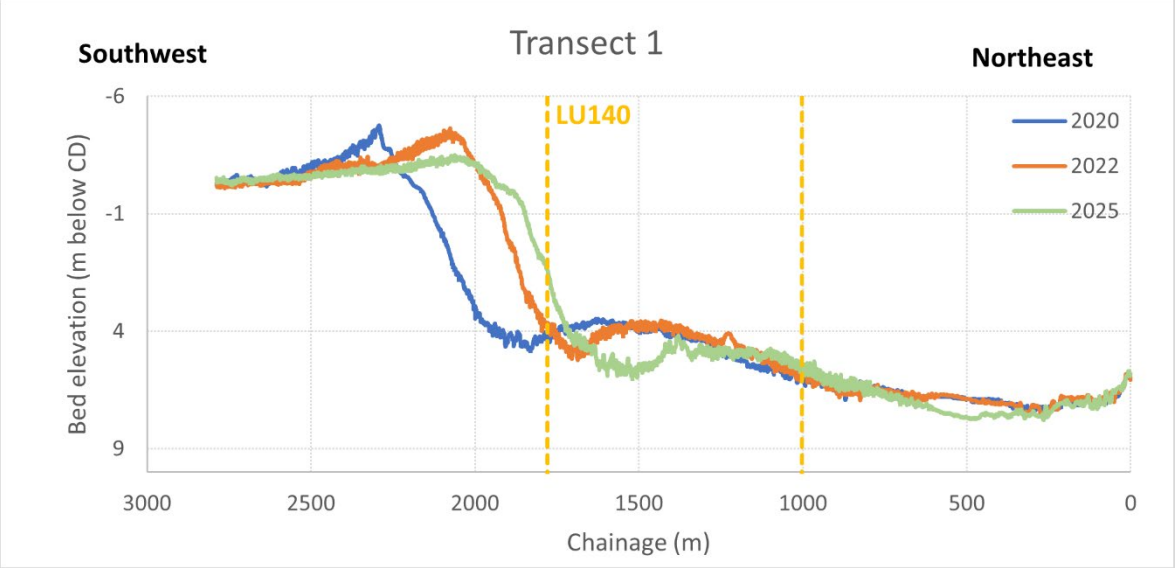

Figure 4. Comparison of bed elevation along Transect 1 between 2022 and 2025

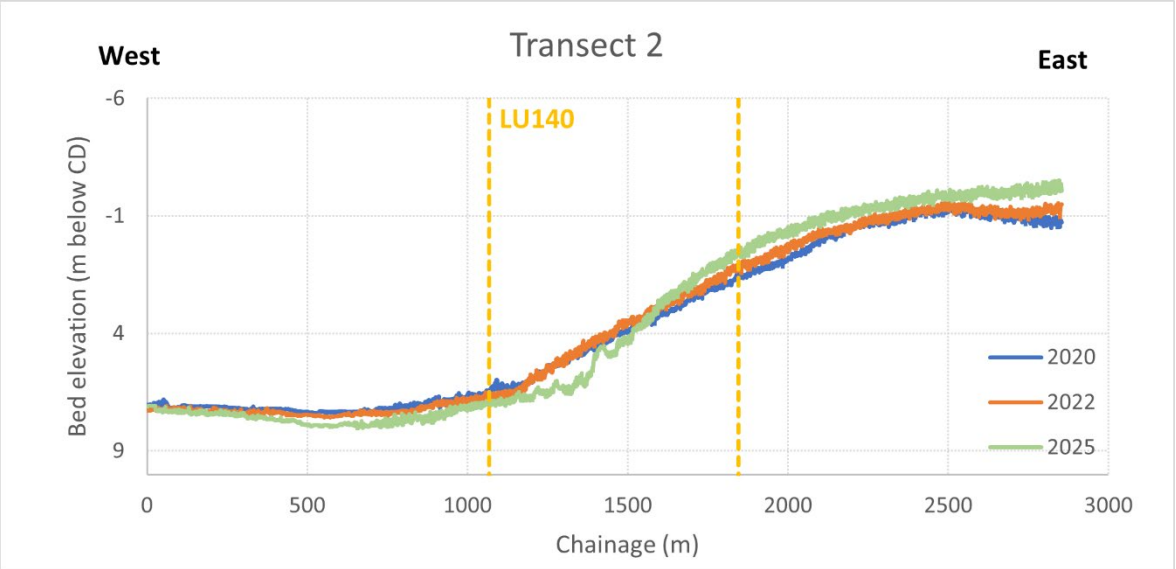

Figure 5. Comparison of bed elevation along Transect 2 between 2022 and 2025

Table 2. Average bed elevation along LU140 Transects 1 and 2

Survey period	Average bed elevation (mCD)	
	Transect 1	Transect 2
2020	-3.32	-3.68
2022	-2.79	-3.35
2025	-2.91	-3.39

From the values in Table 2, it is apparent that the average profile elevation (for the majority of Transects 1 and 2) remains generally similar between each of the survey periods. Along Transect 1, the average elevation varies by 0.12 m between the two survey periods, whilst the equivalent value for Transect 2 is 0.04 m. As discussed further below, a large part of the observed variation is likely a result of the movement of the wider Middle Ground sandbank system, which is shown to be migrating across the southwest end of Transect 1 and the eastern end of Transect 2 (Figure 4 and Figure 5).

When comparing the most recent data, it is shown that the average bed elevation in 2025 (for both Transects 1 and 2) is slightly lower (deeper) than that for the profile data extracted from the previous (2022) dataset, and closer to the equivalent set of metrics calculated for the 2020 dataset.

Further analysis, considering the change in average elevation just within the disposal site and along the remainder of each Transect reveals similar findings. For Transect 1, the section within the LU140 site has deepened by an average of 0.4 m between 2022 and 2025; however the remainder of Transect 1 (outside of the disposal site) shows little change. This larger change inside of the LU140 site is driven by the migration of the West Middle Ground sandbank northwest across the site (as shown in Figure 4).

For Transect 2, the section within the LU140 site has deepened by an average of 0.33 m; whilst the remainder of the profile has shallowed by an average of 0.19 m. Some of this change is also likely to be driven by the movement of the wider Middle Ground sandbank system, particularly along the eastern end of the Transect (as shown in Figure 5).

The bathymetric comparisons detailed above indicate that the magnitude of variation within the LU140 site (and across the wider region) is generally small between the two survey periods. Bathymetric change across the site is variable with areas of deepening and shallowing, whilst the relative magnitude of change along the Transect profiles (around 0.1 m, on average) is similar both within the LU140 site and along the extents of the profile outside of the disposal site (each extending around 1 km up- and down-estuary of the site).

Discussion and summary conclusions

The repeat bathymetric surveys of LU140 (and cross-section transect profiles covering the wider region) have been analysed to assess the changes in bed elevation between 2022 and 2025.

The results of these analyses are summarised below:

- SBES and MBES bathymetric data across the LU140 disposal site reveals that the majority of bed elevation changes are related to the shifting flank of the wider Middle Ground sandbank system, which is migrating northwest across the site from the southeast.
- Across the rest of the LU140 disposal site, less variation in bed elevation is observed between the surveys, despite the collective volume of material (from multiple licences) that has been placed there over the intervening period.
- Within LU140, the largest changes in bed level elevation are observed along the southern edge of the site, associated with the continued movement of the wider Middle Grounds bank. Across the majority of the disposal site, varying levels of change are typically within ±0 to 2 m. Across the whole site, there is an average shallowing of 0.3 m between the two survey periods, which is a combination of shallowing over the southeast side of the site and a deepening over the northwest side.
- When comparing results from the two surveys across the wider region, bed elevations along the Transects (between 2022 and 2025) exhibit very little variation across both offshore and nearshore areas, other than changes in the location of the sandbank slope.

- Average bed level change across the two Transect profiles is less than ±0.15 m overall, with an average deepening within the LU140 disposal site of nearly 0.4 m for Transect 1 and approximately 0.3 m along Transect 2. While the remainder of the profiles show only minor change of less than 0.2 m extending around 1 km up- and down-estuary.
- The small magnitude of variation between surveys (outside of the changes as a result of the Middle Grounds sandbank system) indicates that the LU140 disposal site (and the surrounding area) remains dispersive for the spoil material disposed there.

Overall, analysis of the repeat bathymetric survey data indicates that changes to bed elevation are dominated by the movement of the Middle Grounds sandbank system. Away from this area, very little variation in bed elevation is observed, either within the LU140 disposal site, or across the wider transect profiles extending west-east and southwest-northeast of the site.

Prepared by **ABPmer**
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