Note

Ref: R/1517/ML_Renewal/amf/1

## Subject: ABP South Wales Marine Licence Renewal: LU130 Maintenance Dredge Disposal

ABP South Wales is seeking a renewal of their existing Marine Licence to allow continued disposal of maintenance dredge material at the LU130 spoil ground (Outer Swansea Bay). LU130 has been open since 1974 and is presently licenced for dredge disposal. Among other users, ABP South Wales utilise the site for material extracted from Swansea Docks and approach channel and Port Talbot approach channel and harbour.

## Introduction

During the planning process for the Tidal Lagoon Swansea Bay (TLSB) development during 2012, Natural Resources Wales (NRW) raised concerns over the potential effect of capital dredge disposal for the lagoon works, at the LU130 site, on the Kenfig SAC located along the coastline to the east of the spoil ground (Figure 1). Analysis of available data in support of the application revealed no evidence to suggest a link between disposal activity at the LU130 site, and any impact on sand transport pathways affecting the adjacent Kenfig SAC.

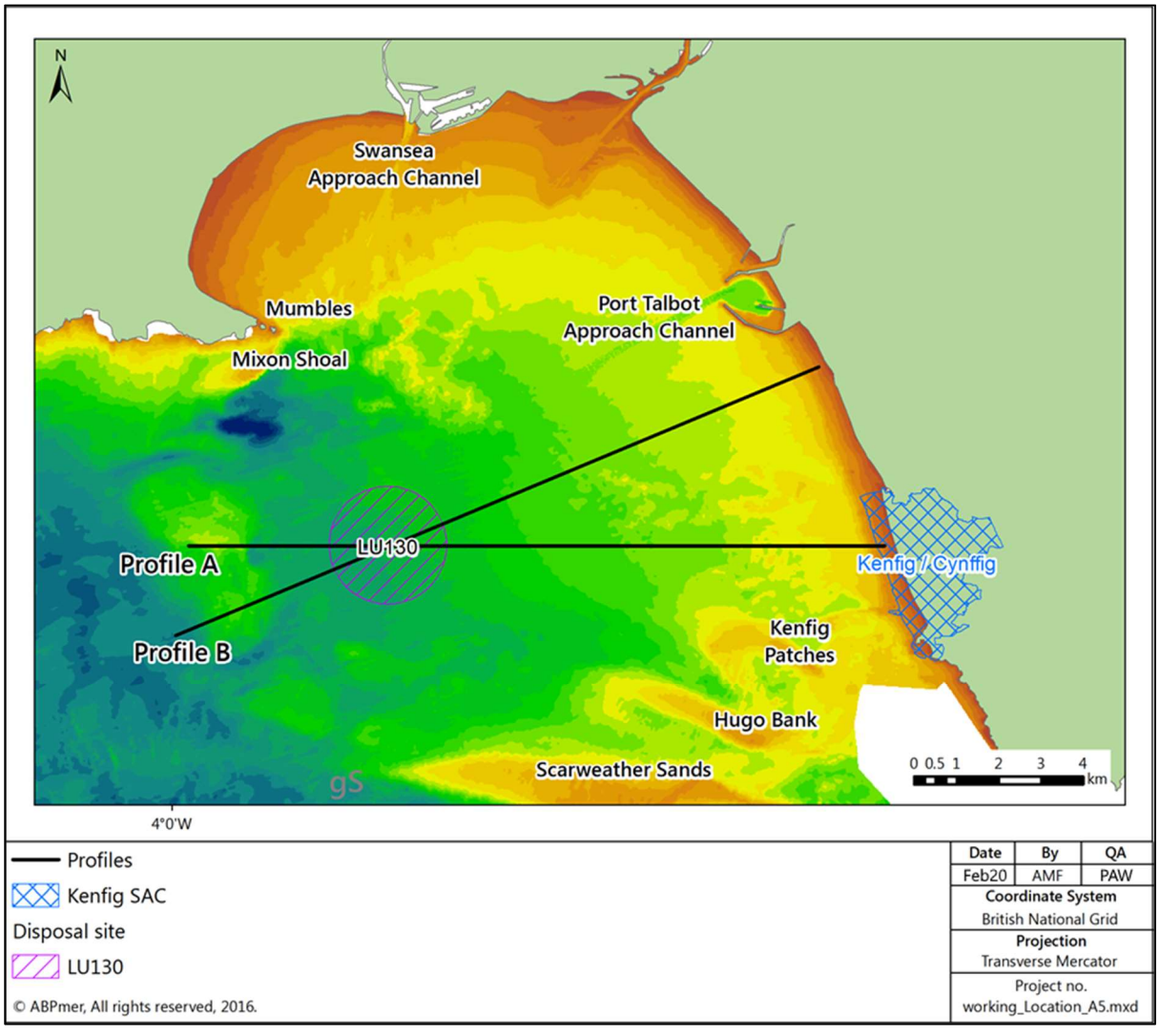


**Figure 1. Location of area of interest**

Subsequent to the 2012 tidal lagoon planning application, ABP South Wales submitted a renewal application for their disposal licence in 2016, for continued use of the site for placing maintenance dredge spoil. During this renewal application, NRW raised similar concerns, and requested further evidence to support their consideration of the licence renewal.

The concerns of NRW are related to the potential for material deposited at the LU130 site to be dispersed and subsequently depositing on the bed in the area between the spoil ground and the Kenfig frontage; with the potential for it to then impede the transport of sand from offshore areas to supply the Kenfig foreshore (and dune system along the hinterland). Whilst there is no definitive evidence that such a process existed, NRW requested the collection and analysis of further baseline data to help inform their considerations. Consequently, it was agreed that a set of single-beam (SBES) bathymetric transects, passing through the LU130 site, approaching the coastline south of Port Talbot should be undertaken (see Figure 1), and the results of the bathymetric profiles compared against historic data. The purpose of the survey was to provide further baseline evidence to NRW MLT to support the licence renewal application.

To support the 2016 renewal application, the SBES survey data was compared against similar profile data put forward (by Ken Pye Associates Ltd (KPAL), on behalf of NRW) during the planning application process for the previously consented TLSB development[1]. Following the granting of the renewal licence in 2016, advice provided with the resultant Marine Licence included the recommendation that further monitoring data be collected and analysed prior to the submission of the next licence renewal. The existing Marine Licence is now due for renewal, and an additional set of SBES bathymetric transects have been collected in support of the present renewal application.

This Note provides assessment of this newly collected monitoring data, which is discussed within the following sections.

## Comparison of bathymetric data

NRW's advisors for the TLSB planning process (KPAL) previously completed an initial preliminary assessment of bathymetric data, digitised from charts from 1883-1884 and from 1980-1998. Up until the 2016 ABP renewal application, this latter survey was the most recent available covering the LU130 site. The findings of the initial preliminary KPAL study postulated that the continued disposal of material at LU130 was resulting in a build-up of material on the bed (rather than the spoil being dispersed). Furthermore, through consideration of the regional seabed sediment mapping from British Geological Survey (BGS) (and based primarily on grab samples collected at around the time that the LU130 site was opened in the mid-1970's), KPAL further postulated that the seabed between the LU130 site and the Kenfig frontage was made up of substantial areas of 'muddy Sand' and 'sandy Mud'. The inference being that this apparent prevalence of fine sediment could be a result of the disposal activity at LU130 and that the bed material could be inhibiting the bedload transport of sands across the area (from offshore to the Kenfig frontage).

During the TLSB planning process, a number of additional sources of baseline evidence were referenced that supported the alternative view that the bed material in these areas, rather than resulting from contemporary deposits related to disposal at LU130 are, in fact, primarily Holocene deposits exposed by the dispersion of surficial sediments. Further evidence of changes to foreshore profiles along the Kenfig frontage were also referenced to support the understanding that there remains a supply of sand to the system, in spite of the disposal activity that has been underway at LU130 since the mid-1970's.

To further inform the previous licence renewal application, NRW requested the collection of further baseline bathymetry data to update the earlier 1980-1998 survey, along with an extended analysis of

[1] KPAL Report No.: 160915 (dated 29 September 2014), prepared on behalf of Natural Resources Wales

the transect profiles A and B (Figure 1), defined in the preliminary KPAL study. To address this request, ABP South Wales commissioned a SBES bathymetry survey of the LU130 site and the transect profiles A and B, which was carried out 20-21 October 2016. Additional monitoring data has now been collected in support of the present renewal application, with a re-survey of the SBES bathymetry survey along the transect profiles A and B, which was carried out 21 January 2020. (Figure 2).

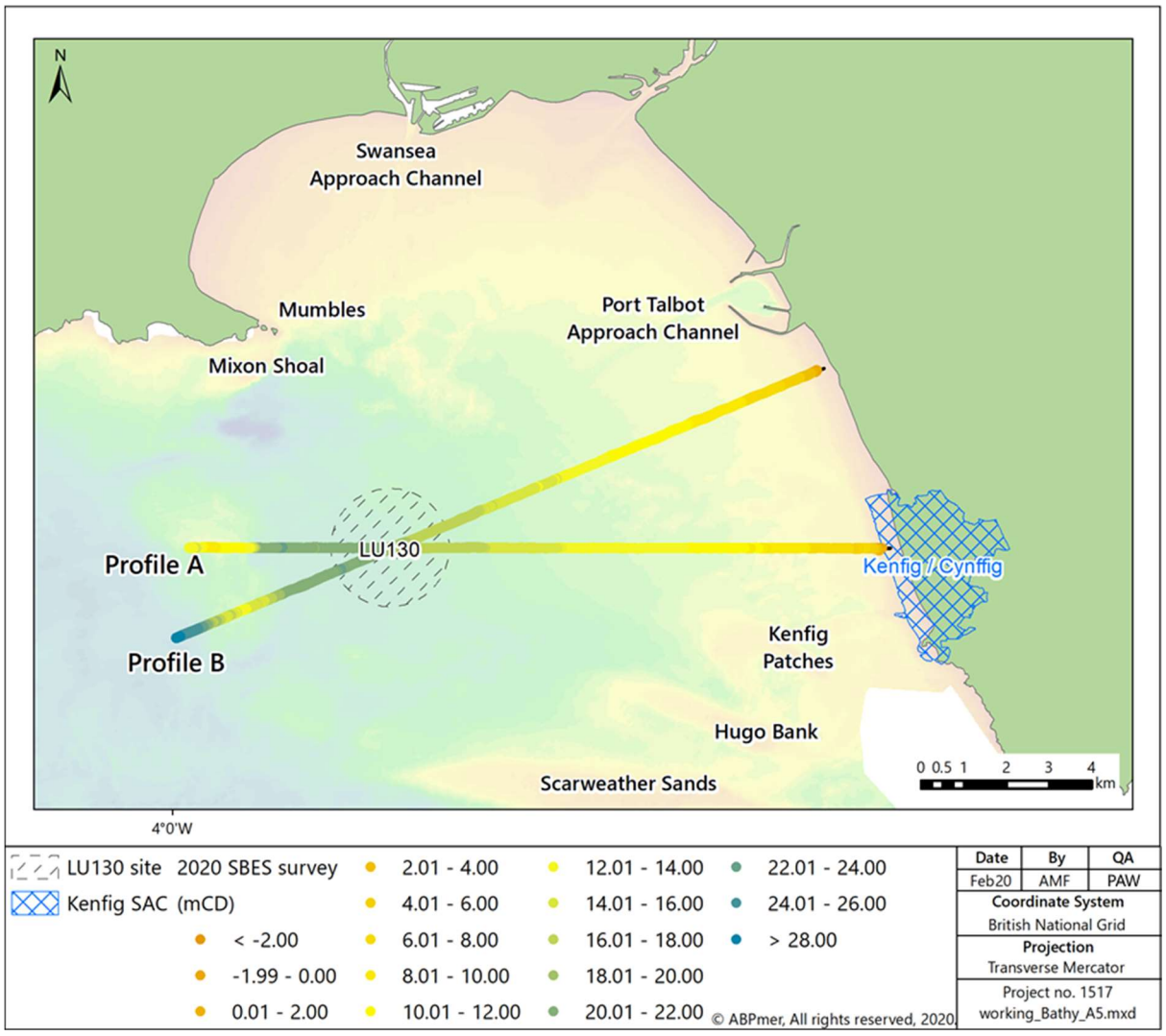


**Figure 2. 2020 SBES bathymetry survey**

Table 1 provides a summary of the bathymetric data assessed as part of the present analysis, in support of the ABP licence renewal application.

**Table 1. Bathymetric datasets used in assessment**

| Date | Source and date |
|---|---|
| 1883-84 | KPAL (2014) – digitised from charts drawn from surveys collected between 1883 and 1884 |
| 1980-98 | KPAL (2014) – digitised from charts drawn from surveys collected between 1980 and 1998 |
| 2016 | SBES bathymetric surveys collected on behalf of ABP South Wales 20-21 October 2016 |
| 2020 | SBES bathymetric surveys collected on behalf of ABP South Wales 21 January 2020 |

Comparison of the 2016 and 2020 SBES bathymetry survey data against the earlier survey data (collected between 1883-84 and 1980-1998) has been carried out to assess the changes to bathymetry along the two surveyed profiles. The difference in bed elevation along profiles A and B is shown in Figures 3 and 4, respectively. Generally, the profile comparison shows a variable pattern of change, with some parts of the profiles being shallower now than in historic surveys and other parts being deeper. The two recent surveys (2016 and 2020) show very little variation in bed level and indicate the same bed features at some locations and levels (e.g. the offshore bank feature, between 0 m and 2,000 m chainage on each profile, which remains consistent in elevation and width across the four survey periods).

For both profiles, over much of the seabed between the LU130 site and the adjacent coastline to the east, the bed elevation in 2020 is effectively no different to that observed from 2016 survey data. Levels from both datasets are generally similar to those extracted from the earlier surveys from 1883-84 and 1980-1998. Within the LU130 site, the western extent of each profile remains at or below the bed elevation from the earlier survey periods. Across the remainder of the spoil ground, the bed elevations in 2020 and 2016 tend to be slightly higher (shallower water depths) than from the previous two survey periods. Across Profile A (and within LU130), the 2020 bed elevation is up to 0.6 m higher than the 1980-1998 survey, whilst for Profile B, the bed elevation is up to 0.4 m higher over the same period.

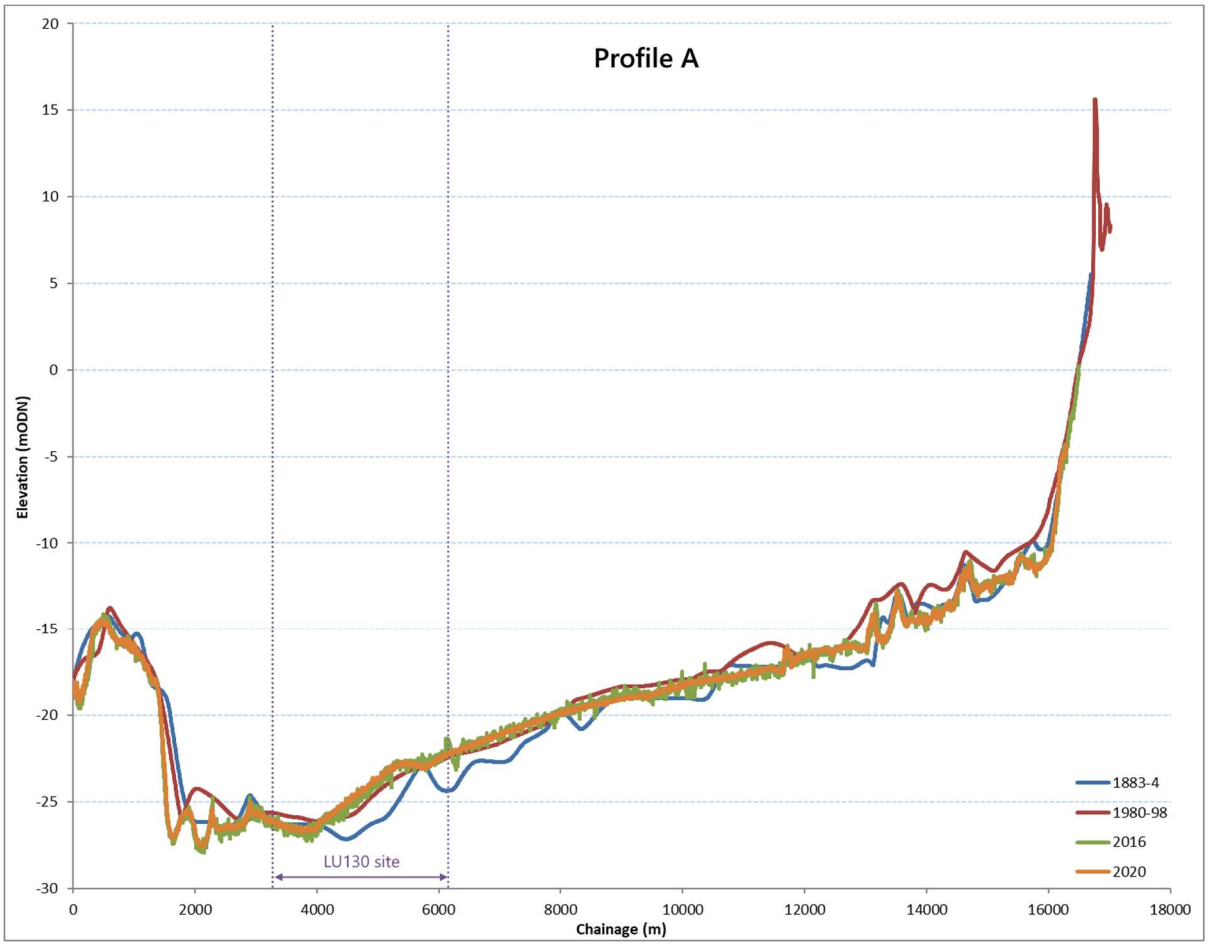


**Figure 3. Comparison of bed elevation along Profile A between 1883-84 and 2020**

It should be noted here that the profiles extracted from the earlier 1883-84 and 1980-1998 surveys are based upon an interpolated bathymetry dataset which has been obtained from digitising charts. This will introduce an element of smoothing to the data as the digitised elevations are at a considerably lower sample density than the collected (raw) survey data. By contrast, the recent 2020 and 2016 SBES survey data is raw data collected along each of the pre-defined profile lines and is plotted on Figures 3 and 4 without any interpolation. As such, direct comparison of plotted elevations will not necessarily

provide an accurate quantification of changes in bed level between survey periods. The plots are, however, considered suitable to assess the general trends in direction of change along each profile, between time periods.

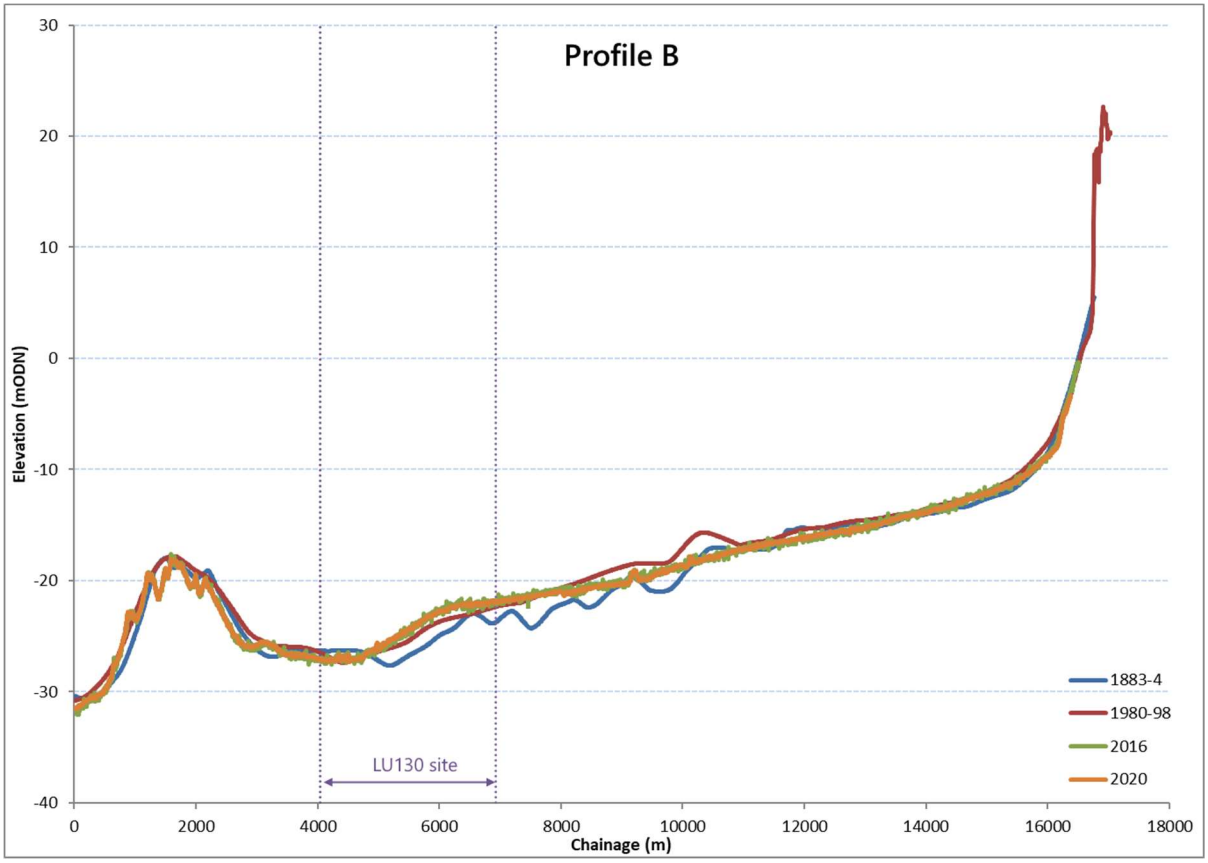


**Figure 4. Comparison of bed elevation along Profile B between 1883-84 and 2020**

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 four survey periods) has been calculated. Table 2 summarises the average elevation of each profile, and from each survey period.

**Table 2. Average bed elevation along profiles A and B**

| Survey period | Average bed elevation (mODN) | |
|---|---|---|
| | Profile A | Profile B |
| 1883-84 | -18.66 | -19.53 |
| 1980-98 | -18.38 | -19.17 |
| 2016 | -18.52 | -19.39 |
| 2020 | -18.91 | -19.57 |

From the values in Table 2, it is apparent that the average profile elevation (for both A and B) remains generally similar across each of the four survey periods. Along Profile A, the average elevation varies by 0.53 m across all survey periods, whilst the equivalent value for Profile B is 0.40 m. When comparing the most recent data, it is shown that the average bed elevation in 2020 (for both A and B) is slightly lower (deeper) than that for the profile data extracted from the previous datasets.

## Discussion and summary conclusions

The initial analysis of bed profiles (as reported within 2016 ABP renewal application) has been updated with analysis of a more recent (2020) bathymetric monitoring survey, comparing the contemporary bed elevations with those interpolated from surveys dating from 1883-83 and 1980-1998 and from SBES survey data collected in 2016.

The results of this analysis are summarised below:

- There is little overall variation in seabed elevation, along the defined profiles, between 1883-84, 1980-1998, 2016 and 2020.
- Particularly when comparing results from the two most recent surveys, bed elevations between 2016 and 2020 exhibit very little variation across both offshore and nearshore regions.
- Comparison of the bed elevation within the LU130 disposal site between 2016 and 2020 reveals very little variation, despite the collective volume of material (from multiple licences) that has been places there over the intervening period.
- In areas where differences in elevation are apparent, variations from the 2020 survey tend to be small, indicating that the LU130 disposal site (and the surrounding area) remains dispersive for the spoil material disposed there.
- The shallow subtidal, and intertidal foreshore fronting the coastline between Kenfig and Port Talbot shows no notable change between 2016 and 2020 surveys, supporting the consideration that the underlying sand transport pathways remain unchanged.
- Consequently, it is considered that the continued use of the LU130 site (at its presently licenced disposal rate) will not result in sand transport to Kenfig being inhibited by muddy sediment deposits.

Overall, analysis of the most recent 2020 bathymetric survey data indicates that there remains no evidence (either historic or contemporary) to suggest a link between muddy material (from maintenance dredging) deposited at the LU130 spoil ground and sand transport pathways to the Kenfig frontage.

**Prepared by** **ABPmer**
20 February 2020