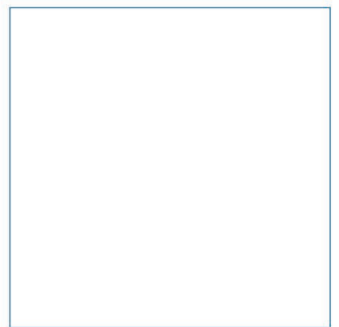
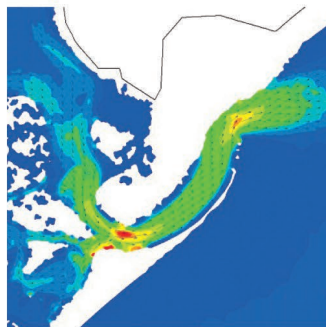
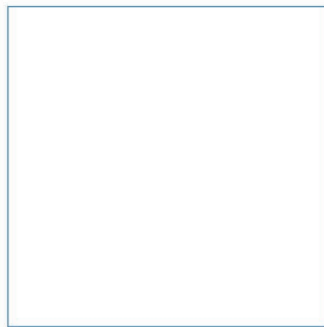


LanzaTech UK Ltd

P&C Project Dragon - Marine Ecology

Benthic survey report

December 2022



Innovative Thinking - Sustainable Solutions

Page intentionally left blank

P&C Project Dragon - Marine Ecology

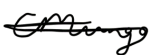
Benthic survey report

December 2022



Document Information

Document History and Authorisation		
Title	P&C Project Dragon - Marine Ecology	
	Benthic survey report	
Commissioned by	LanzaTech UK Ltd	
Issue date	December 2022	
Document ref	R.4037	
Project no	R/5191/1	
Date	Version	Revision Details
07/12/2022	1	Issued for client review

Prepared (PM)	Approved (QM)	Authorised (PD)
Emma Mungo	Elena San Martin	Natalie Frost
		

Suggested Citation

ABPmer, (2022). P&C Project Dragon - Marine Ecology, Benthic survey report, ABPmer Report No. R.4037.
A report produced by ABPmer for LanzaTech UK Ltd, December 2022.

Contributing Authors

Michael Cooper, Vicky West

Notice

ABP Marine Environmental Research Ltd ("ABPmer") has prepared this document in accordance with the client's instructions, for the client's sole purpose and use. No third party may rely upon this document without the prior and express written agreement of ABPmer. ABPmer does not accept liability to any person other than the client. If the client discloses this document to a third party, it shall make them aware that ABPmer shall not be liable to them in relation to this document. The client shall indemnify ABPmer in the event that ABPmer suffers any loss or damage as a result of the client's failure to comply with this requirement.

Sections of this document may rely on information supplied by or drawn from third party sources. Unless otherwise expressly stated in this document, ABPmer has not independently checked or verified such information. ABPmer does not accept liability for any loss or damage suffered by any person, including the client, as a result of any error or inaccuracy in any third-party information or for any conclusions drawn by ABPmer which are based on such information.

All content in this document should be considered provisional and should not be relied upon until a final version marked '*issued for client use*' is issued.

All images on front cover copyright ABPmer.

ABPmer

Quayside Suite, Medina Chambers, Town Quay, Southampton, Hampshire SO14 2AQ
T: +44 (0) 2380 711844 W: <http://www.abpmer.co.uk/>

Summary

In September 2022 ABPmer conducted a Drop-down Video (DDV) survey of the Phoenix Wharf area of Port Talbot's 'Old Dock'. The survey was conducted on behalf of LanzaTech UK Ltd, who are seeking to carry out development works within the Port as part of P&C project Dragon.

Land-based DDV surveys were conducted at eleven stations across the proposed development site and adjacent area. These surveys were intended to provide LanzaTech with a baseline description of the proposed development including information on the type of substrate present and the presence/absence of any associated fauna/flora. This was supplemented by secondary data sources and existing literature.

The substrate observed during the DDV survey comprised of fine muddy sediment at six of the stations, rocky substrate at four of the stations, and one station which consisted of mixed substrate with a combination of fine muddy sediment and loose rock.

The DDV survey showed that the site was largely absent of aquatic life above the bed with only two of the eleven stations showing presence of fauna; the same was observed when considering flora. No species or habitats that are recognised as at risk or protected were observed in the survey. However, supplementary evidence suggests that the wider Old Dock area supports a range of aquatic life including a number of freshwater species of fish and the critically endangered European Eel.

Contents

1	Introduction	1
2	Methodology	2
3	Results	4
3.1	Substrate	4
3.2	Ecology	6
4	Conclusions	8
5	References	9
6	Abbreviations/ Acronyms	10

Tables

Table 1.	A summary of the DDV survey results	4
Table 2.	Substrate observed at Phoenix Wharf during the September 2022 DDV survey	5
Table 3.	A list of known species to inhabit the Old Dock at Port Talbot. Salinity tolerance is defined as marine (M), brackish (B) and freshwater (F)	7

Figures

Figure 1.	The Old dock area within the Port of Port Talbot, and the proposed development area at Phoenix Wharf	1
Figure 2.	Location of the stations monitored during the survey	2
Figure 3.	The Drop-down video (DDV) system used during the subtidal survey	3
Figure 4.	Biofilm growth on the concrete quay wall at Station 9 (left) and Station 10 (right)	6

1 Introduction

LanzaTech UK Ltd, are proposing to apply for a marine licence to carry out development works at Port Talbot as part of P&C project Dragon. The proposed development will see the construction of a new jetty and associated infrastructure and handling facilities within Port Talbot's enclosed 'Old Dock' at Phoenix Wharf (Figure 1). The development is likely to involve piling to secure the jetty with the inclusion of breasting and/or mooring dolphins to allow safe berthing for vessels.

The dock is classified as freshwater with water levels being maintained by a dock feeder in the non-tidal section of the River Afan (Holmes and Calloway, 2021). This is recognised by Associated British Ports (ABP) (the port operator) who have confirmed that the water density is on average 1,000 kg/m³ (ABP, 2021). Saltwater intrusion may occur when the lock gates are open, however, this occurs infrequently with an average of eight vessels per month transiting through the seaward lock gates (Holmes and Calloway, 2021).

Additionally, the water within the dock is used by the neighbouring steel works (Tata Steel, 2021), who use it as a coolant. The water, when recycled back into the dock, is typically at least 3°C warmer, than neighbouring bodies of water (Holmes and Calloway, 2021).

ABPmer was commissioned to undertake a benthic survey of the enclosed dock to provide a baseline description of the proposed development area. The results of the survey are presented within this report.



Figure 1. The Old dock area within the Port of Port Talbot, and the proposed development area at Phoenix Wharf

2 Methodology

The site was visited on 14 September 2022, to provide a baseline description of the species and habitats present at Phoenix wharf and the neighbouring areas. A drop-down video (DDV) survey was conducted at 11 stations distributed across the wharf and adjacent bank; the position of each station is presented in Figure 2. In some cases, access to the wharf edge was restricted either due to excessive vegetation or due to unsafe/dilapidated structures; these areas are presented in Figure 2.

The DDV system consisted of two frame mounted high-definition GoPro cameras (forward and rear facing) with external lighting, Figure 3 shows the DDV system and its configuration. When deploying the DDV system the surveyor slowly lowered the frame through the water column until reaching the seabed. Once this had been achieved the frame was then pulled back up through the water column. The camera system recorded footage on both the descent and ascent of the equipment.

Retrospective video analysis was conducted to identify the sediment types and the presence/absence of flora and fauna at each respective station.

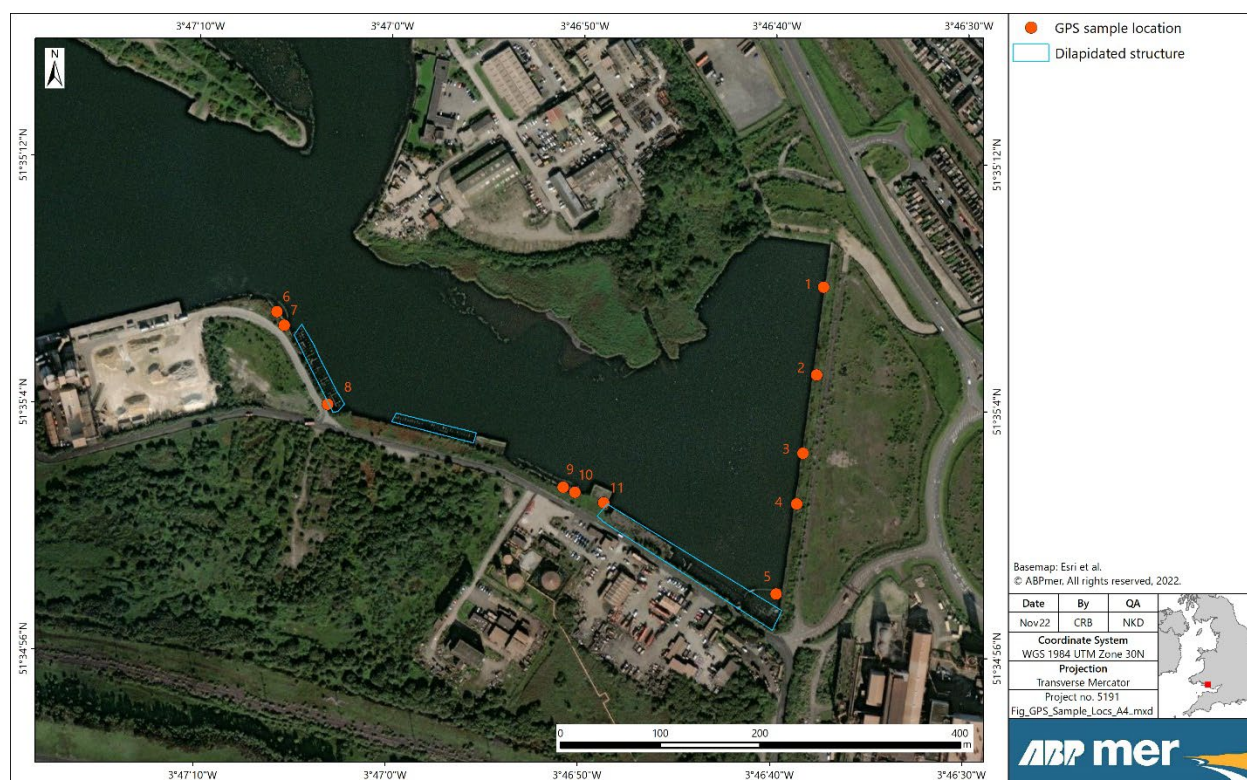


Figure 2. Location of the stations monitored during the survey



Figure 3. The Drop-down video (DDV) system used during the subtidal survey

3 Results

This section summarises the results of the September 2022 DDV survey at Phoenix Wharf, with the overarching results presented in Table 1.

Table 1. A summary of the DDV survey results

Station	Location (WGS 84)	Sediment Type	Fauna Present (Y/N)	Flora Present (Y/N)
1	51°35'08"N, 003°46'37"W	Fine muddy sediment	N	N
2	51°35'05"N, 003°46'38"W	Fine muddy sediment	N	N
3	51°35'03"N, 003°46'38"W	Fine muddy sediment	N	N
4	51°35'01"N, 003°46'39"W	Fine muddy sediment	N	N
5	51°34'58"N, 003°46'40"W	Fine muddy sediment	N	N
6	51°35'07"N, 003°47'06"W	Rock	N	N
7	51°35'07"N, 003°47'05"W	Rock	N	Y
8	51°35'04"N, 003°47'03"W	Rock	Y	Y
9	51°35'01"N, 003°46'51"W	Rock	N	N
10	51°35'01"N, 003°46'50"W	Mixed	N	N
11	51°35'01"N, 003°46'49"W	Fine muddy sediment	Y	N

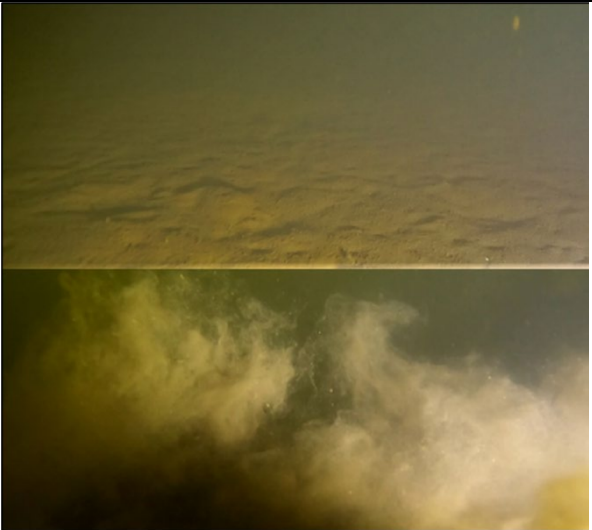
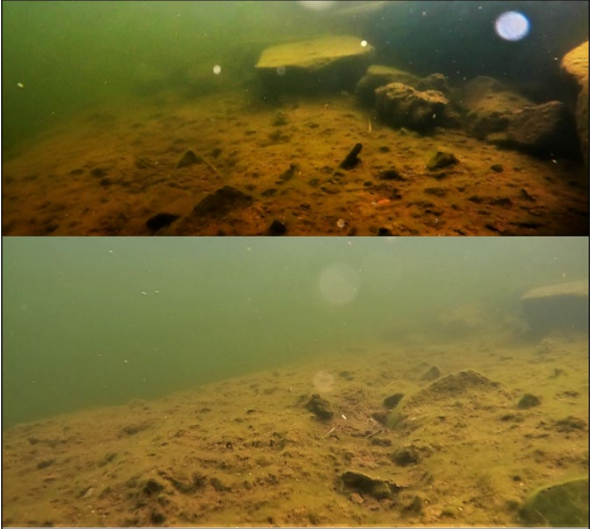
3.1 Substrate

The substratum across Stations 1-5 and at Station 11 consisted of fine muddy sediment whilst Stations 6-9 consisted of rocky substrate with interspersed loose cobbles and pebbles of assorted sizes. Station 8 also contained debris from the neighbouring timber structure. Station 10 consisted of a combination of rock and fine muddy sediment. Example images of the sediment types described are presented in Table 2.

During the deployment of the DDV system resuspension occurred frequently in areas where the fine muddy sediment was present, as shown in Table 2.

It should be noted that this is only a visual observation of the surface layer of the seabed, and it should not be assumed that the substrate is homogenous with depth.

Table 2. Substrate observed at Phoenix Wharf during the September 2022 DDV survey

Sediment Type	Station No's.	Description	Image
Fine muddy sediment	1-5	Fine muddy sediment (top) and the associated resuspension (bottom). Images show Station 1 (top) and Station 3 (bottom).	
Mixed sediment	10	Mixed substrate consisting of fine muddy sediment and loose rock of various sizes. Observed at Station 10 only.	
Rock	6-9	Rock substrate. Images show Stations 7 (top) and 8 (Bottom).	

3.2 Ecology

3.2.1 DDV survey

The presence of fauna or flora across the site was only evident within the footage for Stations 7, 8 and 11. Station 7 showed a dense aggregation of flora, unfortunately, due to poor water clarity in this area identification was not possible. A small shoal of fish was observed at Station 8, which were schooling around the nearby dilapidated timber structure. The species were similar in appearance to Rudd (*Scardinius erythrophthalmus*) although this cannot be confirmed with certainty. Bivalves are known to occur in the Old Dock area (Oliver, 2015), with one individual observed at Station 11. Additionally, biofilm was observed on many of the submerged structures and may provide food/habitat for invertebrates (Figure 4).

The absence of fauna at the other stations could be an artifact of the survey method. The DDV system is not designed to observe infaunal communities which could be present in the fine muddy sediment observed at Stations 1-5 and Station 11.

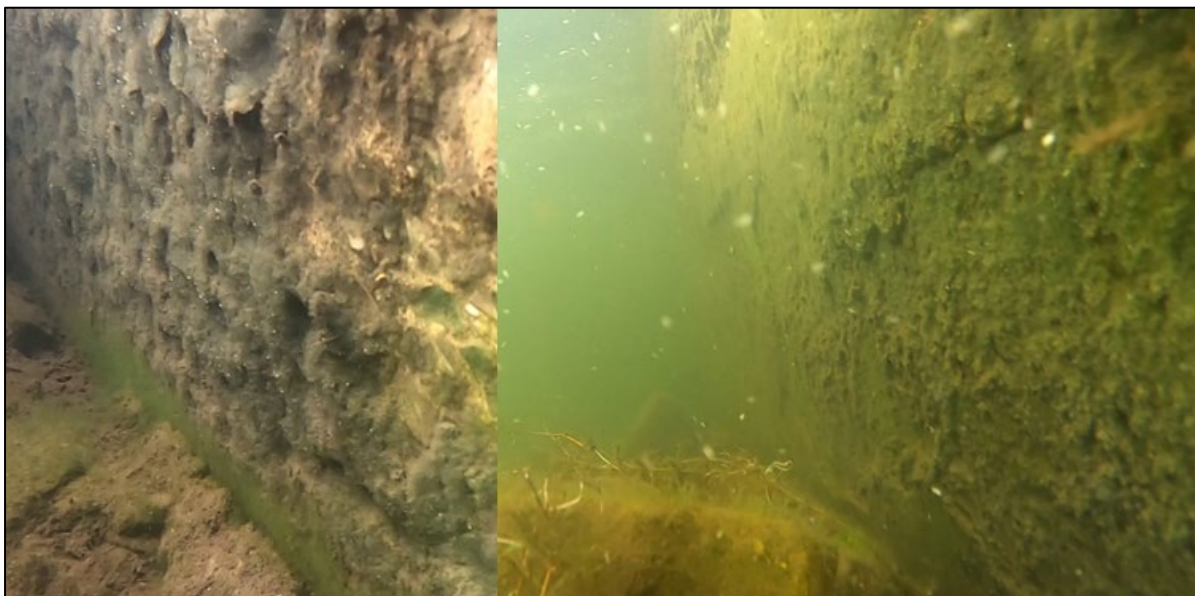


Figure 4. Biofilm growth on the concrete quay wall at Station 9 (left) and Station 10 (right)

3.2.2 Secondary evidence

Additional species that have been recorded within the wider Old Dock area are presented in Table 3.

Whilst the survey did not observe any species or habitats that are recognised as at risk or protected, the Angling Trust (2020) and National Biodiversity Network (NBN) (2022) have specified that the critically endangered European Eel (*Anguilla anguilla*) has been recorded within the Old Dock area. Additionally, studies conducted by Oliver (2015), and Holmes and Calloway (2021) have identified the presence of invasive non-native species (INNS) across the Old Dock including the Dark false mussel (*Mytilopsis leucophaeata*) and the hydroid *Cordylophora caspia*.

Table 3. A list of known species to inhabit the Old Dock at Port Talbot. Salinity tolerance is defined as marine (M), brackish (B) and freshwater (F)

Common Name	Scientific Name	Salinity Tolerance M/B/F (WoRMS, 2022)
Bass ¹	<i>Dicentrarchus labrax</i>	M/B/F
Mullet ¹	<i>Chelon sp.</i>	M/B/F
Sea/Brown Trout ¹	<i>Salmo trutta</i>	M/B/F
Bream ¹	<i>Abramis brama</i>	F/B
Pike ¹	<i>Esox lucius</i>	F/B
Perch ¹	<i>Perca fluviatilis</i>	F/B
Roach ¹	<i>Rutilus</i>	F/B
Rudd ¹	<i>Scardinius erythrophthalmus</i>	F/B
Tench ¹	<i>Tinca tinca</i>	F/B
European eel ^{1,2}	<i>Anguilla anguilla</i>	M/B/F
Dark false mussel ^{3,4}	<i>Mytilopsis leucophaeata</i>	F/B
A hydroid ^{3,4}	<i>Cordylophora caspia</i>	F/B
Key:		
Species salinity tolerance is dependent on life stage.		
Species are known invasive species to the UK.		

Source: 1) Angling Trust, 2020, 2) NBN, 2022, 3) Holmes and Calloway, 2021, 4) Oliver, 2015

4 Conclusions

A DDV survey was successfully completed at Port Talbot's enclosed 'Old Dock' at Phoenix Wharf. DDV footage was obtained from 11 stations, the results from which provide an insight into the current ecological status of species and habitats at Phoenix Wharf.

Phoenix Wharf (as part of the Old Dock complex) is classified as freshwater with only infrequent saltwater intrusion when lock gates are open, approximately 8 times per month (Holmes and Callaway, 2021). As such the habitats and species present within the dock are largely considered to be freshwater or brackish.

The results of the DDV survey showed that fine muddy sediments were present across much of the survey area, which were readily resuspended by DDV operations. The remaining sites, along the nearshore embankment to the west of the site, were predominantly rocky substrate.

There was limited evidence of the presence of fauna or flora across the site, from the DDV imagery, with the majority of stations classified as afaunal. Species were only observed at Stations 7, 8 and 11. Station 7 showed a dense aggregation of flora, however, due to poor water clarity in this area identification was not possible. A small shoal of fish was observed at Station 8, which were schooling around the nearby dilapidated timber structure, and a single bivalve was observed at Station 11. No INNS were observed during the current survey; however, their presence has been confirmed in the wider Old Dock area (Oliver, 2015; Holmes and Calloway, 2021).

The absence of fauna at the other stations may also be an artifact of the survey method with the DDV system not designed to observe infaunal communities, noting that any such species would be expected to be freshwater (as opposed to marine). No species or habitats that are recognised as at risk or protected were observed in the survey. Wider review has identified that a variety of fish occupy the Old Dock area, of which many are considered freshwater (Angling Trust, 2020; WoRMS, 2022).

5 References

- Angling Trust (2020) *Port Talbot Docks*. [Online]. Available from: <https://fishingwales.net/fishing-locations/port-talbot-docks>. [Accessed: 01 November 2022]
- ABP (2021). *Acceptance Table - Port Talbot Old Dock - January 2021*. [Online] January 2021. Available from: <https://www.southwalesports.co.uk/admin/content/files/Port%20Talbot%20Old%20Dock%20%20Acceptance%20Table%20-January%202021.pdf>. [Accessed: 03 November 2022]
- Clarke, R.T., Wright, J.F. and Furse, M.T. (2003). RIVPACS models for predicting the expected macroinvertebrate fauna and assessing the ecological quality of rivers. *Ecological Modelling* [Online] 160(3). Available from: <https://www.sciencedirect.com/science/article/pii/S0304380002002557>. [Accessed: 04 November 2022].6
- Hawkes, H. A., (1998). Origin and development of the biological monitoring working party score system. *Water Research*, 32(3), pp. 964-968.
- Holmes, S. Callaway, R. (2021). Fouling communities and non-native species within five ports along the Bristol Channel, South Wales, UK. *Estuarine, Coastal and Shelf Science*. [Online] 452. Available from: <https://www.sciencedirect.com/science/article/pii/S0272771421001487>. [Accessed: 31 October 2022]
- NBN (2022). *National Biodiversity atlas: Anguilla anguilla*. [Online]. Available from: <https://species.nbnatlas.org/species/NBNSYS0000188599>. [Accessed: 03 November 2022]
- Oliver, P.G. (2015). Old shell collection casts new light on an alien species. The dark false mussel (*Mytilopsis leucophaeata*) may have been in Britain as early as 1800. *Journal of Conchology*, 42(1), pp.63-66.
- Tata Steel (2021). *Sustainable performance at our sites: Port Talbot*. [Online]. Available from: <https://www.tatasteeleurope.com/construction/sustainability/performance-at-our-sites/port-talbot>. [Accessed: 04 November 2022].
- WoRMS (2022). *World Register of Marine Species*. [online]. Available from: <http://www.marinespecies.org>. [Accessed: 02 November 2022]

6 Abbreviations/ Acronyms

ABP	Associated British Ports
B	Brackish
DDV	Drop-down Video
F	Freshwater
GPS	Global Positioning System
INNS	Invasive Non-Native Species
M	Marine
N	No
NBN	National Biodiversity Network
RIVPACS	River Invertebrate Prediction and Classification System
UK	United Kingdom
UTM	Universal Transverse Mercator
WGS	World Geodetic System
WoRMS	World Register of Marine Species
Y	Yes

Cardinal points/directions are used unless otherwise stated.
SI units are used unless otherwise stated.

Contact Us

ABPmer

Quayside Suite,
Medina Chambers
Town Quay, Southampton
SO14 2AQ

T +44 (0) 23 8071 1840

F +44 (0) 23 8071 1841

E enquiries@abpmer.co.uk

www.abpmer.co.uk

