

PRELIMINARY ECOLOGICAL APPRAISAL

Project Dragon, Port Talbot

ECO02340
Preliminary Ecological
Appraisal
1
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REPORT

Quality Management

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1 INTRODUCTION

1.1 Purpose and scope of this report

- 1.1.1 RPS was commissioned by LanzaTech to prepare a Preliminary Ecological Appraisal of the EIA Study Area Boundary within the Port Talbot, referred to in this report as the site.
- 1.1.2 The preliminary ecological appraisal comprises a desk study, Phase 1 Habitat Survey, and a preliminary protected species assessment (CIEEM, 2017) and the results are presented in this Preliminary Ecological Appraisal Report (PEAR).
- 1.1.3 This assessment is considered 'preliminary'. For any planning application the findings of the PEA would be combined with relevant further surveys (such as protected species, supplemental habitat assessment or invasive species surveys) and incorporated into a final Ecological Appraisal or Ecological Impact Assessment (EclA) which would assess the effects of the development and present the mitigation measures that have been incorporated into the development proposal.
- 1.1.4 The PEA aims to:
- undertake a desk-based review of designated sites and records of protected species and other species that could present a constraint on development;
 - review aerial imagery to assess the site in relation to its context in the wider landscape.
 - map and assess the habitats present on site;
 - assess the site's potential to support legally protected species, species of conservation concern and species of principal importance.
 - review implications for future development proposals
- 1.1.5 All future development proposals within the EIA Study Area Boundary will be supported by a detailed Ecological Impact Assessment (EclA) and terrestrial ecology chapter of an Environmental Statement (ES). These assessments and mitigation design would be derived using the baseline habitat information presented in this report and the results of Phase 2 survey findings in the context of the detailed development proposals. These reports will assess the effects of the development and present the mitigation and compensation measures that have been incorporated into the development proposals.
- 1.1.6 Reference is made to the need for mitigation / compensation measures, where relevant, but no details are proposed in relation to these which falls outside the scope of this report.
- 1.1.7 Assessment of the marine habitats associated with the open water dock fall outside the scope of this report.

1.2 Study Area Location and Context

- 1.2.1 The Project Dragon site is located within the Port Talbot Docks landholding bounded by the Port Talbot Steelworks to the south and by the open water docks to the north.
- 1.2.2 For the purposes of the PEA, the survey area been subdivided into four sections based on their relationship to the development proposals. These comprise the main development site; hereafter referred to as the Production Development Zone, Temporary Construction Areas 1 and 2; and the Phoenix Wharf Ship Unloading/Loading Facility on the side of the open water dock (referred to in this report as Phoenix Wharf berth).
- 1.2.3 In addition, the disused Llanwern Iron Ore Branch Railway including the railway sidings south of the Production Development Zone have been surveyed separately by Wardell Armstrong and are subject to a separate Preliminary Ecological Appraisal.

- 1.2.4 The site location and extents of the sections of the survey area are defined on Figure 1.
- 1.2.5 An Unnamed Port Road adjoins the northern boundary of the Production Development Zone. The disused railway sidings at the western end of the Llanwern Iron Ore Branch Railway bounds the Production Development Zone to the south.
- 1.2.6 The estuarine section of the River Afan lies to the north of the where it flows into Swansea Bay beyond a harbour wall and breakwaters. An enclosed harbour with shallow sloping stony / rocky foreshore lies to the west of the site. The median high-water line is approximately 30m from the boundary at the closest point with a strip of open grassland between the foreshore and unnamed port road. This strip is typically 30 to 60m wide but narrows to 5m in one section.
- 1.2.7 Steelworks operational areas lie to the south and west of the Llanwern Iron Ore Branch Railway.

1.3 Legislation, policy and guidance

- 1.3.1 Relevant legislation, policy guidance and both Local and National Biodiversity Action Plans (BAPs) are referred to in this report where appropriate.
- 1.3.2 The relevant articles of legislation are:
 - Planning Policy Wales: Technical Advice 5: Nature Conservation and Planning;
 - The Conservation of Habitats and Species Regulations 2017;
 - The Environment (Wales) Act 2016;
 - The Wildlife and Countryside Act 1981 (as amended);
 - The Protection of Badgers Act 1992;
 - Well-being of Future Generations (Wales) Act 2015;
 - Natural Environment and Rural Communities Act 2006;
 - The Countryside and Rights of Way Act 2000;
 - The Action Plan for Pollinators in Wales; and
 - Neath Port Talbot Biodiversity Action Plan
- 1.3.3 A summary of legislation relevant to protected or other species identified as potential constraints in this report is provided in Appendix A.

2 METHODS

2.1 Habitat Survey

- 2.1.1 The Phase 1 Habitat surveys of the survey area were carried out in June and July 2021 and in July and August 2022 by Tim Oliver, an experienced ecologist supported by Charles Jennings. The Phase 1 Habitat survey broadly followed the standard methodology (JNCC, 2016), and as described in the Guidelines for Preliminary Ecological Assessment (CIEEM, 2017).
- 2.1.2 During the survey visits, an assessment was made of each of the habitats within the survey area. The habitats mapped and described in terms of its botanical species composition. Habitats were classified according to their composition and structure. This broadly followed Phase 1 Habitat types but included non-standard classifications for grasslands to provide distinction between the different plant communities establishing on the post-industrial land.
- 2.1.3 The extent of habitats was defined using a combination of aerial photography and mapping during the walkover survey. The structure and composition of habitats with restricted access were assessed from the margins.
- 2.1.4 The site was assessed for its suitability to support protected species, in particular great crested newt *Triturus cristatus*, reptile species, birds, badger *Meles meles*, bats, and other species of conservation importance that could pose a constraint that would need to be addressed in the planning application.
- 2.1.5 During each of the walkover survey visits, searches were made for evidence of use of the different parts by faunal species. Any signs were noted including burrows, droppings, footprints, paths, hairs, and potential refugia. Areas of bare earth were inspected for mammal prints. Additional notes on habitats and features of value to fauna were made during Phase 2 species.
- 2.1.6 The areas of habitat considered suitable for protected species or those of conservation interest were recorded.

2.2 Botanical Survey

- 2.2.1 Botanical surveys were undertaken for grassland and species diverse ephemeral habitats in July 2022 in the Production Development Zone and Temporary Construction Area 1. Detailed plant species were compiled for the main habitat types and each species was assigned a frequency within the relevant habitat (dominant, abundant, frequent, occasional, rare and local).
- 2.2.2 In the Production Development Zone, plant species lists were compiled for the open regenerating grassland and more established areas of neutral grassland.
- 2.2.3 A plant species list was compiled for the extensive ephemeral and regenerating grassland in Temporary Construction Area 1.

Constraints

- 2.2.4 In the Production Development Zone there was very limited open access through the scrub woodland and extensive Japanese knotweed stands. In 2021 the surveyor avoided walking into stands of Japanese knotweed to minimise the potential for plant fragments to be moved on clothing or footwear. All surveyors followed biosecurity security measures ensuring no Japanese knotweed plant material or substrate was inadvertently transported outside the areas of infestation.
- 2.2.5 Following the cutting down on the dead stems of Japanese knotweed across the most extensive stands and bramble, all areas of grassland become accessible during the surveys in spring and summer 2022.

- 2.2.6 In Temporary Construction Area 2 the dense structure of the scrub woodland and extensive thickets of dense bramble, bracken and Japanese knotweed prevented access through some of the habitats within this area. The boundary of Temporary Construction Area 2 overlaps an extensive reedbed which was not accessed for health and safety. Access through the land at Phoenix Wharf Berth was restricted to localised areas of more open vegetation with dense stands of bramble and bracken and dense shrub willow growing on the side of the dock.

Survey Data

- 2.2.7 It should be noted that whilst every effort has been made to provide a comprehensive description of the site, no investigation can ensure the complete characterisation and prediction of the natural environment.
- 2.2.8 The protected/notable species assessment provides a preliminary view of the likelihood of these species occurring on the site, based on the suitability of the habitat, known distribution of the species in the local area provided in response to our enquiries and any direct evidence on the site. It should not be taken as providing a full and definitive survey of any protected/notable species group.

Accurate Lifespan of Ecological Data

- 2.2.9 The majority of ecological data remain valid for only short periods due to the inherently transient nature of the subject. The survey results contained in this report are considered accurate for two years, assuming no significant considerable changes to the site conditions.

3 RESULTS

3.1 Designated Sites

Statutory Designated Sites

- 3.1.1 There are no international statutory designated sites within 5km of the site boundary and no national statutory designated sites within 2km of the site (excluding the Llanwern Iron Ore Branch Railway).
- 3.1.2 The closest internationally protected sites are Kenfig SSSI/NNR/SAC (5km to the south of the Production Development Zone) and Crymlyn Bog and Pant y Sais SSSI/NNR/SAC (6.6km to the north of Phoenix Wharf Berth).
- 3.1.3 The closest statutory designated sites to the Production Development Zone are Margam Moor SSSI (3.5km) and Eglwys Nunydd Reservoir (3.6km), both located to the south.
- 3.1.4 The statutory designated Sites are mapped on Figure 2.

Non-statutory Sites

- 3.1.5 Four non-statutory Sites of Interest to Nature Conservation (SINC) are located within 2km of the EIA Study Area (excluding the Llanwern Iron Ore Branch Railway).
- 3.1.6 The non-statutory designated Sites are mapped on Figure 3.
- 3.1.7 Harbourside Law Courts SINC is a 3.04ha brownfield site supporting Open Mosaic Habitats on Previously Developed Land located 800m to north-east of the production development Zone. The open habitat mosaic consists of large areas of stonecrop species *Sedum*, kidney vetch *Anthyllis vulneraria*, and bare ground. Plant species listed on the citation include common centaury *Centaureum erythraea*, yellow-wort *Blackstonia perfoliata* and other early pioneer species. Invertebrate populations include small blue butterfly *Cupido minimus*, shrill carder bee *Bombus sylvarum*, and brown-banded carder bee *Bombus humilis*. Slow worm *Anguis fragilis*, linnet *Carduelis cannabina* and starling *Sturnus vulgaris* have also been recorded.
- 3.1.8 The boundary of the Lower River Afan Estuary SINC is 6.63ha comprising coastal saltmarsh and intertidal mudflats located 1km west of production development Zone. These habitats and the population of sea stock *Matthiola sinuate* are the primary reasons for designation.
- 3.1.9 The Lower Estuary SINC is described as supporting an excellent mosaic of saltmarsh plants along a strip between mudflats and coastal grassland which includes pockets of dune habitat along the higher shore adjoining the Little Warren SINC.
- 3.1.10 Little Warren SINC lies on the opposite side of the mouth of the river 1.2km west of the production development Zone at the closest point. The SINC is 1.47ha and is designated for its coastal sand-dunes with associated slacks, seepages, grassland, and scrub habitat along with an important population of sea stock. The SINC lie adjacent to housing development with connectivity to Lower River Afan SINC and the Baglan Bay dune system SINC to the north.
- 3.1.11 NPT Watercourses SINC is an extensive designation covering watercourses and waterways across the county borough covering coastal, urban and industrial areas including those around the steelworks and docks. The River Afan forms part of this SINC site and the SINC boundary is approximately 700m to the west of production development Zone at the closest point.
- 3.1.12 Bryn Goytre Cycleway is a 2.5 mile linear section of disused railway line and currently a designated cycle track which follows the Cwm Dyffryn Valley between Bryn and Goytre. Near Bryn and Goytre there are verges of low diversity mesotrophic grassland (largely MG1), but much of the track is flanked by ancient Sessile-oak/Birch woodland with abundant ferns plus a suite of Ancient

Woodland Indicators. The cycleway is approximately 1.4km north-east of the Production Development Zone.

Other designations

B-Lines

- 3.1.13 The steelworks and associated docks form part of a regional 'B-Line' network which is a national initiative led by Buglife for pollinators and wider biodiversity.
- 3.1.14 The B-Lines in Neath Port Talbot and in and around Swansea have been identified by Buglife Cymru working in partnership with local organisations including both planning authorities. Around Port Talbot the B-Lines cover coastal, urban, and industrial land and form wide network of corridors with the objective of facilitating projects that restore, enhance and create wildflower-rich habitat for pollinators as stepping stones along the corridors.

Ancient woodland

- 3.1.15 A small block of ancient woodland lies 1.25km to east of the south-western side of the M4 motorway.

3.2 Species Records

- 3.2.1 A number of species of conservation importance or otherwise notable have been recorded within the 2 km search radius of the site in the past. A summary of these records are listed in Table 3.1. Species of local importance recorded within the site or wider docks are also included on the table. Records of seabirds have been omitted.

Table 3.1: Species records from within 2 km of the site

Scientific Name	Common Name	Status*	Nearest distance from site (m)
Bats			
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	WCA5, S7, UKBAP	Recorded within wider docks
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	WCA5, S7, UKBAP	Recorded within wider docks
Greater horseshoe bat	<i>Rhinolophus ferrumequinum</i>	WCA5, S7, UKBAP	2.5km
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	WCA5, S7, UKBAP	2.7km
Myotis species	<i>Myotis sp.</i>	WCA5, S7, UKBAP	1.5km
Brown long eared bat	<i>Plecotus auratus</i>	WCA5, S7, UKBAP	874m
Noctule	<i>Nyctalus noctula</i>	WCA5, S7, UKBAP	200m
Other Mammals			
Otter	<i>Lutra lutra</i>	WCA5, S7, UKBAP	918m
Badger	<i>Meles meles</i>	PBA	625m
Hazel dormouse	<i>Muscardinus avellanarius</i>	WCA5, S7, UKBAP	1.9km
Brown hare	<i>Lepus europaeus</i>	S7, UKBAP	198m from site
Polecat	<i>Mustela putorius</i>	S7, UKBAP	1.4km from site
Western European hedgehog	<i>Erinaceus europaeus</i>	S7, UKBAP	320m from site
Birds			
Whitethroat	<i>Curruca communis</i>	WBR(RSPB), UKBAm (RSPB),	Recorded on site (PDZ)
Gadwall	<i>Anas strepera</i>	S7, UKBAm (RSPB),	Recorded within wider docks

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Skylark	<i>Alauda arvensis</i>	S7, WBAm (RSPB), UKBR (RSPB),	Recorded within wider docks
Little Ringed Plover	<i>Charadrius dubius</i>	WCA1.1	Recorded within wider docks
Ringed Plover	<i>Charadrius hiaticula</i>	WCA1.1, S7, WBAm (RSPB), UKBAm (RSPB),	Recorded within wider docks
Reed Bunting	<i>Emberiza schoeniclus</i>	S7, WBAm (RSPB), UKBAm (RSPB),	Recorded on site (PDZ)
Linnet	<i>Linaria cannabina</i>	S7, WBR (RSPB), UKBR(RSPB),	Recorded within wider docks
Hedge Accentor	<i>Prunella modularis</i>	S7, UKBAm (RSPB), UKBAP	Recorded on site (TCA2)
Song thrush	<i>Turdus philomelos</i>	S7, UKBAm (RSPB), UKBAm (RSPB)	Recorded within wider docks
House sparrow	<i>Passer domesticus</i>	S7, WBAm(RSPB), UKBR (RSPB), UKBAP	Recorded within wider docks
Northern Lapwing	<i>Vanellus vanellus</i>	S7, WBR(RSPB), UKBR(RSPB), UKBAP	Recorded within the docks
Woodcock	<i>Scolopax rusticola</i>	WBR(RSPB), UKBR(RSPB),	Recorded within the docks
Yellow wagtail	<i>Motacilla flava</i>	S7, WBR(RSPB), UKBR(RSPB),	Recorded within the docks
Meadow pipit	<i>Anthus pratensis</i>	WBAm (RSPB), UKBAm (RSPB),	Recorded within the docks
Grey wagtail	<i>Motacilla cinerea</i>	WBAm (RSPB), UKBAm (RSPB),	Recorded within the docks
Grey heron	<i>Ardea cinerea</i>	WBAm (RSPB)	Recorded within the docks
Sand martin	<i>Riparia riparia</i>		Recorded within the docks
Starling	<i>Sturnus vulgaris</i>	S7, WBR(RSPB), UKBR (RSPB),	Recorded within the docks
Kestrel	<i>Falco tinnunculus</i>	S7, WBR(RSPB), UKBAM (RSPB),	Recorded on-site (TCA1)
Cetti's warbler	<i>Cettia cetti</i>	WCA1.1	Recorded on site (TCA2)
Mallard	<i>Anas platyrhynchos</i>	WBAM(RSPB), UKBAM (RSPB),	Recorded in open water dock
Wigeon	<i>Anas penelope</i>	WBAM(RSPB), UKBAM (RSPB),	Recorded in open water dock
Common gull	<i>Larus canus</i>	WBR(RSPB), UKBAM (RSPB),	Recorded in open water dock
Black-headed gull	<i>Chroicocephalus ridibundus</i>	S7, WBR(RSPB), UKBAM (RSPB),	Recorded in open water dock
Herring gull	<i>Larus argentatus</i>	S7, WBR(RSPB), UKBR(RSPB),	Recorded in open water dock
Lesser black backed gull	<i>Larus fuscus</i>	WBAm (RSPB), UKBAm (RSPB)	Recorded in open water dock
Great black backed gull	<i>Larus marinus</i>	WBR(RSPB), UKBAM (RSPB),	Recorded in open water dock
Oystercatcher	<i>Haematopus ostralegus</i>	WBAm (RSPB), UKBAm (RSPB)	Recorded in open water dock
Coot	<i>Fulica atra</i>	WBAM (RSPB)	Recorded in open water dock
Pochard	<i>Aythya ferina</i>	WBR(RSPB), UKBR(RSPB),	Recorded in open water dock
Teal	<i>Anas crecca</i>	WBAm (RSPB), UKBAm (RSPB)	Recorded in open water dock
Tufted dock,	<i>Aythya fuligula</i>		Recorded in open water dock
Cormorant	<i>Phalacrocorax carbo</i>	WBAM (RSPB)	Recorded in open water dock
Little gull	<i>Larus minutus</i>	WBAM (RSPB)	Recorded in open water dock
Kingfisher	<i>Alcedo atthis</i>	WCA1.1, WBAm (RSPB), UKBAm (RSPB)	Recorded in lower River Afan
Turnstone	<i>Arenaria interpres</i>	WBAM (RSPB),	Recorded in lower River Afan
Redshank	<i>Tringa totanus</i>	WBAM (RSPB), UKBR (RSPB),	Recorded in lower River Afan
Curlew	<i>Numenius arquata</i>	S7, WBR(RSPB), UKBR(RSPB),	Recorded in lower River Afan
Mediterranean gull	<i>Larus melanocephalus</i>	UKBAm (RSPB),	Recorded in lower River Afan
Common sandpiper	<i>Arctitis hypoleucos</i>	WBR (RSPB), UKBAm (RSPB),	Recorded in lower River Afan
Reptiles			
Grass Snake	<i>Natrix natrix</i>	WCA5, S7, UKBAP,	Recorded within wider docks
Slow worm	<i>Anguis fragilis</i>	WCA5, S7, UKBAP,	684m

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Adder	<i>Vipera vipera</i>	WCA5, S7, UKBAP	1.6km
Common Lizard	<i>Zootoca vivipara</i>	WCA5, S7, UKBAP	Recorded on site (PDZ)
Amphibians			
Great crested newt	<i>Triturus cristatus</i>	WCA5, S7, UKBAP	1.2km from site boundary (within steelworks)
Common Toad	<i>Bufo bufo</i>	S7, UKBAP	Recorded within wider docks
Invertebrates			
Brown banded carder bee	<i>Bombus humilis</i>	S7, UKBAP	Recorded on site (PDZ)
Shrill Carder Bee	<i>Bombus sylvarum</i>	S7, UKBAP	Over 1km
Small Blue	<i>Cupido minimus</i>	S7, UKBAP	Recorded on site (PDZ)
Dingy Skipper	<i>Erynnis tages</i>	S7, UKBAP	490m from site
Wall	<i>Lasiommata megera</i>	S7, UKBAP	Recorded on site (PDZ)
Cinnabar moth	<i>Tyria jacobaeae</i>	S7, UKBAP	Recorded on site (PDZ)
Red tailed bumblebee	<i>Bombus lapidarius</i>		Recorded on site (PDZ)
Common carder bee	<i>Bombus pascuorum</i>		Disused railway line
Latticed heath	<i>Chiasmia clathrata</i>	S7, UKBAP	Disused railway line
Small heath	<i>Coenonympha pamphilus</i>	S7, UKBAP	Recorded within wider docks
Flora			
Oxtongue broomrape	<i>Orbanche picridis</i>	WCA8	Recorded within wider docks
Sea Stock	<i>Matthiola sinuata</i>	S7, UKBAP, RD (UK)	230m from site
Basil thyme	<i>Clinopodium acinos</i>	S7, UKBAP,	Recorded within wider docks
Pink water speedwell	<i>Veronica catenata</i>	Locally important	Recorded on site (PDZ)
Hawkweed oxtongue	<i>Picris hieracioides</i>	Locally important	Recorded on site (PDZ)
Yellow wort	<i>Blackstonia perfoliata</i>	Locally important	Recorded on site (PDZ)
Common broomrape	<i>Orobanche minor</i>	Locally important	Recorded on site (PDZ)
Eyebright species	<i>Euphrasia sp</i>	Locally important	Recorded on site (PDZ)
Basil thyme	<i>Clinopodium acinos</i>	Locally important	Recorded within wider docks
Pyramidal orchid	<i>Anacamptis pyramidalis</i>	Locally important	Recorded within wider docks
Viper's bugloss	<i>Echium vulgare</i>	Locally important	Recorded within wider docks
Perennial wall rocket	<i>Diplotaxis tenuifolia</i>	Locally important	Recorded within wider docks
Pale toadflax	<i>Linaria repens</i>	Locally important	Recorded within wider docks
Common broomrape	<i>Orobanche minor</i>	Locally important	Recorded within wider docks
Bee orchid	<i>Ophrys apifera</i>	Locally important	Recorded within wider docks
Sand cat's-tail	<i>Phleum arenarium</i>	Locally important	Recorded within wider docks
Wild mignonette	<i>Reseda lutea</i>	Locally important	Recorded within wider docks
Grey club-rush	<i>Schoenoplectus tabernaemontani</i>	Locally important	Recorded within wider docks
Rough clover	<i>Trifolium scabrum</i>	Locally important	Recorded within wider docks
Frog rush	<i>Juncus ranarius,</i>	Locally important	Recorded within wider docks
Knotted pearlwort	<i>Sagina nodosa,</i>	Locally important	Recorded within wider docks
Long-bracted sedge	<i>Carex extensa</i>	Locally important	Recorded within wider docks
Sea holly	<i>Eryngium maritimum.</i>	Locally important	Recorded within wider docks
Sand couch	<i>Elytrigia juncea,</i>	Locally important	Recorded within wider docks
Sea rocket	<i>Cakile maritima</i>	Locally important	Recorded within wider docks
Sea bindweed	<i>Calystegia soldanella.</i>	Locally important	Recorded within wider docks
Hoary ragwort	<i>Jacobaea erucifolia</i>	Locally important	Recorded on disused railway line

Great plait moss	<i>Hypnum cupressiforme</i> <i>var. lacunosum</i>	Locally important	Recorded on disused railway line
Nicholsons beard-moss	<i>Didymodon nicholsonii</i>	Locally important	Recorded on disused railway line

*Abbreviations used: WCA1: Wildlife and Countryside Act Schedule; WCA1.1: Wildlife and Countryside Act Schedule 1, part 1; WCA5: Wildlife and Countryside Act Schedule 5; WCA8: Wildlife and Countryside Act Schedule 5; S7: Environment (Wales) Act 2016, Section 7 species; WBR (RSPB): RSPB – Wales' Red Bird List; WBAm (RSPB): RSPB – Wales' Amber Bird List; UKBR(RSPB): RSPB – UK Red Bird List; UKBAm (RSPB): RSPB – UK Amber Bird List; UKBAP: UK Biodiversity Action Plan, listed species; The Vascular Plant Red Data List (UK), listed species.

3.3 Habitats - Overview

3.3.1 Across the survey area as a whole the principal habitat types are listed below with the different habitats present in each part of the survey area are described below.

- Scrub woodland dominated by shrub willow
- Japanese knotweed stands
- Naturally regenerated grassland (open and more established)
- Ephemeral vegetation – mixed species*
- Sparsely vegetated ephemeral vegetation / bare ground
- Scrub woodland dominated by shrub willow
- Bracken
- Bramble (thicket)
- Dense scrub
- Non-native scrub (primarily butterfly bush and sea buckthorn)
- Bare ground (unsealed and sealed surface)
- Reedbed (seasonally dry)

3.3.2 Photographs of the habitat types and areas are presented in Appendix C for the Production Development Zone and Appendix D for the Temporary Construction Areas.

3.4 Production Development Zone

Overview

- 3.4.1 The Production Development Zone is an extensive area of previously developed/disturbed ground that has naturally regenerated over the last 20 years to form a mosaic of regenerating scrub woodland (dominated by shrub willows), with very extensive stands of Japanese knotweed *Reynoutria japonica*. Naturally regenerated grassland, along with bracken *Pteridium aquilinum*, gorse *Ulex europaeus* scrub and bramble *Rubus fruticosus* agg., are more localised in extent. Three small low-lying areas supporting stands of common reed *Phragmites australis* are partially enclosed by scrub and Japanese knotweed.
- 3.4.2 The unnamed port road runs along the northern boundary. A steep bank up to the disused railway line/sidings lies beyond the southern boundary.
- 3.4.3 Operational industrial sites comprising buildings and hardstanding and the access roads are located to the east. An extensive reedbed (>1ha in extent) lies between the industrial operations. The railway embankment up to the disused railway sidings forms the southern boundary.
- 3.4.4 Photographs of the range of habitats present in the Production Development Zone are presented in Appendix B.

Scrub Woodland

- 3.4.5 Regenerating scrub woodland dominated by shrub willows is the most extensive habitat within the Production Development Zone and is now approximately 30% of the vegetation cover. The shrub willows are all multi-stemmed and form a continuous 8-10m high canopy across the habitat (Plate 1). Other shrub species occur rarely, most notably silver birch *Betula pendula*. Goat willow *Salix caprea* is occasional and downy birch *Betula pubescens* occurs rarely. The non-native butterfly bush *Buddleija davidii* is present in the edge habitat but largely absent from within the scrub.
- 3.4.6 The ground flora below the young woodland is patchy has low species diversity. Dewberry *Rubus caesius* is abundant throughout (Plates 2 and 3), sometimes dominant and only locally replaced by bramble.
- 3.4.7 Other ground flora species occur a low frequency reflecting the adjacent habitats. A range of grasses and sedges were noted including Yorkshire fog *Holcus lanatus*, creeping bent *Agrostis stolonifera*, rough meadow-grass *Poa trivialis*, false oat-grass *Arrhenatherum elatius*, hairy sedge *Carex hirta*, spiked sedge *Carex spicata*, sand sedge *Carex arenaria* and common reed *Phragmites australis* were all recorded.
- 3.4.8 A few shade tolerant ruderals (willowherb species, field horsetail *Equisetum arvense* and cleavers *Galium aparine*) occur alongside woodland species (male fern *Dryopteris filix-mas*, herb Robert *Geranium robertianum*). In places the ground flora is very sparse where there is negligible soil cover on the underlying made ground.
- 3.4.9 Much of the willow habitat has established over the last 20 years. In 2008, the aerial photography indicates that young scrub was scattered scrub with only small areas of more mature larger shrub willows. At this time shrubs covered less than 5% of the Production Development Zone area.

Invasive Non-native Species

- 3.4.10 Stands of Japanese knotweed currently cover approximately 40% of the Production Development Zone, with many being long established. The largest expanses are in the south-western quarter, but areas with dense old growth are distributed widely throughout (Plates 4 and 5). In many places, dense Japanese knotweed also grows within willow scrub woodland (Plate 6). Young growth was noted around the edges of most stands of Japanese knotweed and individual young plants were noted growing in the woodland and grassland a significant distance from other growth.
- 3.4.11 Montbretia *Montbretia Crocosmia x crocosmiiflora* occurs in a few locations in the central part of the Production Development Zone. Wall cotoneaster *Cotoneaster horizontalis* was recorded on the railway embankment on the southern boundary.

Naturally Regenerated Grassland

- 3.4.12 There are several areas of naturally regenerated grassland in Production Development Zone, the largest of which is a linear east-west strip in the south-eastern section half of site which extends north-south parallel to the eastern boundary. A further linear area of grassland adjoins the unnamed port road on the northern boundary.
- 3.4.13 Further areas of grassland enclosed by scrub woodland in the western half of the site and at the base of the railway embankment on the southern boundary. These areas vary in size but typically form 'glades' bounded by dense scrub willow, continuous stands of Japanese knotweed and thickets of bramble.
- 3.4.14 The composition and structure of the different areas of grassland are described below. The botanical species assemblage for grassland habitat is presented in Appendix B.

Eastern Grassland

- 3.4.15 In the eastern part of Production Development Zone, a linear area of grassland approximately 15m across and 180m in length is bounded on both sides by areas of dense willow scrub and Japanese knotweed and gorse (Plate 7).
- 3.4.16 The grassland has over 80% cover of herbs and grasses with minimal bare ground. The sward height is generally low due to rabbit grazing. The grassland structure is relatively open with coarse grasses only occurring occasionally.
- 3.4.17 The overall species assemblage is moderately diverse with some variation. Dewberry is locally abundant with the constant associate species of hairy sedge, Yorkshire fog, common restharrow *Ononis repens* and ribwort plantain *Plantago lanceolata*. Locally frequent species include bird's-foot trefoil *Lotus corniculatus*, thyme-leaved sandwort *Arenaria serpyllifolia*, Canadian fleabane *Erigeron canadensis*, red fescue *Festua rubra*, black medick *Medicago lupulina* and ribbed melilot *Melilotus officinalis*. In places the substrate is sandy which is reflected in the species composition. With sand sedge *Carex arenaria*, creeping willow *Salix repens* var. *argentea*, and tufted vetch *Vicia cracca* frequent in these areas.
- 3.4.18 Species that are widespread but occur at lower frequency include perforate St Johns wort *Hypericum perforatum*, yarrow *Achillea millefolium*, agrimony *Agrimonia eupatoria*, evening primrose *Oenanthë* sp., meadow vetchling *Lathyrus pratensis*, heath bedstraw *Galium saxatile*, common storks-bill *Erodium cicutarium*, wild strawberry *Fragaria vesca*, and common knapweed *Centaurea nigra*.
- 3.4.19 On the margins, adjoining the dense scrub, the grassland is more coarse with false oat-grass locally frequent along with common tall ruderal species. Montbretia, an invasive non-native plant has also established in the scrub-edge grassland.
- 3.4.20 The grassland on the north-eastern boundary of the Production Development Zone supports a species composition (Plates 8 and 9). Additional species including creeping cinquefoil *Potentilla reptans*, red bartsia *Odontites vernus*, yellow-wort *Blackstonia perfoliata*, selfheal *Prunella vulgaris*, pyramidal orchid *Anacamptis pyramidalis*, marsh orchid *Dactylorhiza* sp, common broomrape *Orbanche minor*, fern grass *Catapodium rigidum*, sheep's sorrel *Rumex acetosella*, white clover *Trifolium repens*, thistles *Cirsium* sp., hard rush *Juncus inflexus*, common fleabane *Pulicaria dysentrica*, an eyebright *Euphrasia* species, vervain *Verbena officinalis*, common centaury *Centaureum erythraea*, and wild parsnip *Pastinacea sativa*. Hawkweed oxtongue *Picris hieracioides* is occasional and a single spike of oxtongue broomrape was recorded in late June 2022.
- 3.4.21 Several ruderal species were present: spear thistle *Cirsium vulgare*, creeping thistle *Cirsium arvense*, hoary mustard *Hirschfeldia incana* and hogweed *Heracleum sphondylium*. Willow and butterfly bush saplings are also colonising into the grassland with the area adjoining woodland and scrub.

Northern boundary grassland

- 3.4.22 The grassland habitat on the north-western boundary of the Production Development Zone, adjoins the unnamed port road. It has a taller sward and a higher proportion of coarse grasses and bramble patches are establishing. Overall the habitat retains a diversity of wildflowers but with most species only occurring occasionally or rarely (Plate 10).
- 3.4.23 At the eastern end, the substrate is sandier and the shorter sward is heavily grazed by rabbits. The most frequent species were common restharrow, creeping cinquefoil, and Canadian fleabane (Plate 11).

Grassland 'Glades'

- 3.4.24 Grassland areas in the centre of the Production Development Zone are enclosed by the scrub woodland and bramble. They are characterised by frequent / locally abundant dewberry which forms a low sprawling growth habitat and creates a more closed grassland structure with patches of reed (Plate 12).
- 3.4.25 Yorkshire fog and creeping bent were the most abundant grass species with false oat-grass and cock's-foot *Dactylis glomerata*. There is variation in the structure across this grassland type with some areas having low species diversity. Creeping cinquefoil is frequent throughout with both greater bird's-foot trefoil *Lotus pedunculatus* and hedge bedstraw locally abundant (Plate 13). The more diverse areas of grassland areas supported populations of yarrow, creeping willow, evening primrose, wild parsnip, common vetch *Vicia sativa*, and greater knapweed *Centaurea scabiosa*.
- 3.4.26 The presence of greater bird's-foot trefoil, common figwort *Scrophularia nodosa*, creeping buttercup *Ranunculus repens*, meadow vetchling and square-stemmed St John's wort *Hypericum tetrapterum* indicate that the ground is seasonally damp. Shrubs, bramble and Japanese knotweed are encroaching into the grassland in many locations (Plate 14 and 15).
- 3.4.27 Smaller grassland 'glades' occur on the southern boundary, between the railway embankment and scrub woodland (Plate 16). These areas are characterised by abundant hairy sedge and low open growth of dewberry, which together dominant the composition. The species diversity is low to moderate. Creeping cinquefoil ss frequent with occasional sand sedge, glaucous sedge *Carex flacca*, eyebright, agrimony, meadow vetchling, tansy, common fleabane, square-stemmed St John's wort, common knapweed and selfheal.
- 3.4.28 Southern marsh orchids and greater bird's-foot trefoil were both locally occasional. Hard rush was noted in dried out areas of winter pooling. Small but established stands of Japanese knotweed are growing into these grassland areas.

Dune Slack Vegetation

- 3.4.29 A very small, partially shaded, area of regenerating vegetation in the centre of the site is characterised by creeping willow, water mint *Mentha aquatica*, dotted sedge *Carex punctata* and glaucous sedge with sharp rush *Juncus acutus* and sea rush *Juncus maritimus* (Plate 17). Other species occurring at low frequency included creeping bent, dewberry, eyebright species, bird's-foot trefoil, fairy flax *Linum catharticum*, and selfheal.
- 3.4.30 This habitat has developed on ground that is subject to extended periods of waterlogging each winter and the assemblage of species is typical of areas of seasonally flooding in sand dunes or other coastal habitats.

Reedbed

- 3.4.31 Small dense stands of common reed occur in the three low-lying areas, each bounded by dense shrub willows with patches of Japanese knotweed (Plate 18). The reedbeds habitats remain seasonally flooded during water. Shallow open water is present in summer on the margin of one of the reedbeds. Small populations of common spike-rush *Eleocharis palustris*, water plantain *Alisma plantago-aquatica*, a stonewort (charophyte) species and an aquatic bryophyte were observed.

Bare ground / Ephemeral Vegetation

- 3.4.32 An area of recolonising hardstanding (foundations of demolished large buildings and associated yards) lies in the centre of Production Development Zone with a smaller area adjoining the northern boundary.

- 3.4.33 Thin layer of accumulated dry friable substrate lies on top of the hardstanding (bare ground) but remains largely unvegetated (Plate 19). A low diversity bryophyte carpets has formed in some locations, but the cover of herbaceous plants is sparse, comprising species that can tolerant periodic waterlogging including silverweed *Potentilla anserina*, eyebright, mint *Mentha* sp. and hard rush primarily around the margins where the recolonising shrub willows create partial shade. Yellow-wort was also an occasional colonist of the bare ground.
- 3.4.34 The area of hardstanding is enclosed on all sides by scrub woodland creating sheltered conditions equivalent to a glade (Plate 20).
- 3.4.35 The second small area of concrete hardstanding adjoins unnamed port road on the northern boundary (Plate 21). It is associated with more established ephemeral vegetation cover and has a high percentage cover of bryophytes. Colonising species include perforate St John's wort, bird's-foot trefoil, eyebright, hard rush, common reed, jointed rush, southern marsh orchid, creeping willow, creeping cinquefoil and hairy sedge.

Railway embankment

- 3.4.36 The north facing embankment of the railway sidings primarily supports regenerating willow scrub and open areas colonised by bryophytes (Plate 22) with a few areas of sparsely vegetated clinker substrate. Colonising species included maidenhair spleenwort *Asplenium trichomanes*, polypody *Polypodium* sp., herb Robert and male fern along with the invasive non-native species, wall cotoneaster *Cotoneaster horizontalis*.

3.5 Phoenix Wharf Berth

- 3.5.1 Phoenix Wharf Berth is a linear, broadly rectangular area of level ground between the open water dock and unnamed port road. It is approximately 0.16ha in size and is separated from the access road by a crash barrier which runs the length of the southern boundary.
- 3.5.2 The habitats that comprise stands of bracken and bramble thicket with scattered butterfly bush, willow scrub and two young sycamore *Acer pseudoplatanus* trees on the side of the dock.
- 3.5.3 The percentage cover of bracken is relatively high at the western end and a layer of dead fronds has built up on the ground beneath. There is a transition to bramble thicket which is the dominant habitat in the eastern part of this area.
- 3.5.1 At the eastern end of this area, part of the old wooden berth remains intact. The surface is sparsely vegetated bare ground with a few bryophyte species form an extensive carpet over the ground with a low percentage cover of drought tolerant herb species growing on the consolidated crushed stone substrates. Locally frequent higher plants include biting stonecrop *Sedum acre*, false oat-grass *Arrhenatherum elatius*, hemp agrimony *Eupatorium cannabinum*, hogweed and butterfly bush.
- 3.5.2 A few small stands of Japanese knotweed are present on the side of the unnamed port access road.

3.6 Temporary Construction Area 1

Overview

- 3.6.1 This location is previously developed land with a substrate of unsealed made ground consisting of a mix of materials including crushed concrete, steel waste slag, concrete and sealed tarmac with negligible soil cover.
- 3.6.2 Pioneer habitats are forming on the area through natural colonisation with a mosaic of open naturally regenerating grassland, mixed species ephemeral vegetation and sparsely vegetated bare ground. Shrub species are colonising and starting to coalesce into scrub on the eastern side.

- 3.6.3 This area adjoins the open water dock with a tarmac access track running parallel to the dock edge. The area is bounded to the east by an entrance road into Port Talbot steelworks and docks with a large industrial complex located close to the southern boundary.

Open Mosaic Habitat

- 3.6.4 The mosaic of sparse ephemeral vegetation, mixed species ephemeral vegetation, open structured grassland, and bare ground covers the majority of this area of the site (Plate 23). The botanical species assemblage for this habitat is presented in Appendix B.
- 3.6.5 The percentage cover of herbs, grasses and bryophytes varies across the habitat influenced by variation in the underlying substrate.
- 3.6.6 In mixed species ephemeral vegetation the herb cover is generally high (50% herb, 30% bryophyte 25 -50% cover with less than 10% bare ground), with the sparser vegetated areas generally between 50 and 70% bare ground.
- 3.6.7 A number of herb species occur frequently throughout; kidney vetch, black medick, and ribbed melilot and hawkweed oxtongue and becoming locally abundant (Plates 24 and 25). The main colonising grass species are creeping bent and Yorkshire fog which are both occur frequently with more localised areas of red fescue.
- 3.6.8 A wide range of species occur across the area at relatively low frequency including many indicators of neutral grassland. calcareous grassland and open mosaic habitat including wild carrot *Daucus carota*, yellow-wort, common centaury, hare's-foot clover *Trifolium arvense*, hop trefoil *Trifolium campestre*, perforate St John's wort and red clover *Trifolium pratense*.
- 3.6.9 Bird'-foot trefoil, quaking grass *Briza media*, bee orchid *Ophrys apifera*, pyramidal orchid, flattened meadow-grass *Poa compressus*, tansy *Tanacetum vulgare* and sheep's fescue *Festuca ovina* were all rare or present as localised populations.
- 3.6.10 Additional species occurring in most of the sparsely vegetated areas on crushed made ground include eyebright species, which was locally frequent, compact brome *Bromus madritensis*, fern grass, and fescues *Vulpia* spp.
- 3.6.11 Very sparsely vegetated ground in the centre of the site (Plate 26). These were species poor vegetation with buckshorn plantain the principal colonising species along with white stonecrop *Sedum album* and less frequently biting stonecrop *Sedum acre*. Only a few other herbs and grasses occur, and all at very low frequency.
- 3.6.12 Oxtongue broomrape *Orbanche picridis*, a nationally rare plant that parasitises hawkweed oxtongue, is locally frequent across much of the open mosaic habitat but largely absent from the sparsely vegetated areas in the centre (Plate 27).

Naturally regenerated grassland

- 3.6.13 Longer naturally regenerating grassland over 50% grass cover has established locally in the eastern half of the site where a shallow soil is forming over time (Plate 28). Yorkshire fog is the most abundant species. White clover locally abundant and ribwort plantain is frequent. A few of the species found in the mixed species ephemeral vegetation survive in the grassland most notably black medick, kidney vetch *Anthyllis vulneraria* and wild carrot. Grassland herb species include selfheal, ox-eye daisy *Leucanthemum vulgare*, yellow rattle *Rhinanthus minor*, common knapweed, yarrow, hairy tare *Vicia hirsuta*, wild parsnip, and tufted vetch and meadow vetchling. Locally false oat-grass and red fescue are abundant with cock's-foot frequent. Bramble has also colonised and is likely to be increasing in extent.

Scrub

- 3.6.14 Shrub willows, (primarily grey willow), and butterfly bush have colonised the eastern side of the area, including alongside the eastern boundary fence. Gorse *Ulex europaeus* has also colonised and is locally abundant. The shrubs are maturing but have not yet coalesced to form blocks of dense scrub and are associated with the naturally regenerating grassland which in places is becoming rank.
- 3.6.15 Young colonising scrub is scattered across the open mosaic habitat and is abundant on both sides of the surfaced track parallel to the edge of dock (Plates 29 and 30).
- 3.6.16 The dockside habitats have become substantially recolonised and primarily supports a mix of scattered scrub, abundant ivy *Hedera helix* growth and low bramble cover. Wall cotoneaster (invasive non-native) is frequent and hedge bedstraw *Galium mollugo* is locally abundant. A small block of dense willow and butterfly bush scrub is present at the southern end of the dockside.

3.7 Temporary Construction Area 2

Overview

- 3.7.1 Temporary Construction Area 2 adjoins the unnamed port road is separated from the Production Development Zone by a large reedbed to the west and operational industrial sites to the north.
- 3.7.2 It is bounded by the disused railways to the south with the operational area of the steelworks beyond. The railway track has a gradual gradient running down diagonally from the higher ground in the centre of this area, to the level of the unnamed port road on the north-eastern boundary.
- 3.7.3 Temporary Construction Area 2 is primarily scrub woodland dominated by shrub willows, with bramble thicket, bracken and stands of Japanese knotweed. Willow scrub extends into the margin of a 1ha area of reedbed on the western boundary.
- 3.7.4 The south-eastern part of the area is a mosaic of naturally generating grassland, and rank neutral grassland, tall ruderal and ephemeral vegetation with dense and scattered scrub. A lay-by alongside the unnamed port road comprises unsealed bare ground.

Scrub Woodland

- 3.7.5 The scrub woodland comprises multi-stemmed willows with an understorey dominated by bramble vegetation growing up to 1m in height (Plates 31 and 32). Common nettle and male ferns occur occasionally.
- 3.7.6 The grey willow shrubs form a 10m high canopy. Dense bramble thicket and gorse occur in a central area where there is a gap in the willow canopy. The margins of the scrub woodland support a mix of bramble, butterfly bush, bracken, Japanese knotweed and tall ruderals with yellow flag iris *Iris pseudacorus* being present in low lying hollow.

Wet Woodland

- 3.7.7 The north-western part of the woodland comprises a mix of alder *Alnus glutinosa*, grey willow and goat willow on the margin of the reedbed (Plates 33 and 34). This area of woodland becomes seasonal flooded and the ground is sparsely vegetated. Common reed and hard rush occur at low frequency in areas of seasonal pooling with hairy sedge, bryophytes, bramble and dewberry growing on the drier edges. Pendulous sedge *Carex pendula* and hemp agrimony *Eupatorium cannabinum* occur rarely.

Naturally Regenerating Grassland

- 3.7.8 The south-eastern part of Temporary Construction Area 2 is small area (less than 0.1ha) supporting a mosaic of bramble and rank neutral grassland with tall ruderal vegetation on the boundary of the scrub woodland with smaller areas of more open neutral grassland and sparsely vegetated ground (Plate 35).
- 3.7.9 The more open grassland areas are characterised by abundant dewberry, hairy sedge, Yorkshire fog and red fescue.
- 3.7.10 Herb species recorded in the small area of grassland include common knapweed, yellow rattle, pyramidal orchid, common restharrow, marsh orchid species, eyebright species, wild carrot, hawkweed ox tongue, yarrow, wild parsnip, hop trefoil, tufted vetch, common mouse-ear *Cerastium fontanum*, common vetch, meadow vetchling, wild strawberry and common toadflax *Linaria vulgaris*.
- 3.7.11 The grassland structure becomes more rank on the margins of scrub with more frequent tall ruderals (hogweed, dock, spear thistle, teasel *Dipsacus fullonum*, evening primrose) and grass species include false-oat grass and hybrid couch grass (Plate 36).
- 3.7.12 The surface has undulations and hard rush, common fleabane, water mint, gipsywort *Lycopus europaeus*, and common reed were all noted where the ground was lower lying.
- 3.7.13 Very localised patches white stonecrop and bryophytes are growing over areas of sparsely vegetated hardstanding.

Invasive Non-Native plants

- 3.7.14 Stands of Japanese knotweed are present on the edges of the willow scrub woodland. The plant growth varies in height, age, and size throughout. The mature longer established stands are located more towards the centre, where it is intertwined with the willow scrub woodland.
- 3.7.15 Younger growth of Japanese knotweed is located sporadically around the borders of the habitats onsite. A few individual young plants were noted growing within the woodland and merging with the bramble thicket. However, the majority of the younger Japanese knotweed growth is situated on the southern boundary.

4 DISCUSSION AND RECOMMENDATIONS

Designated Sites

- 4.1.1 There are no statutory designated nature conservation sites within 2km of the site boundary of the Harbourside site.
- 4.1.2 The closest nationally important sites lie over 3km from the survey area: Margam Moors SSSI lies to the south of the steelworks and comprises coastal/floodplain grazing marsh. Eglwys Nunydd SSSI is designated for its waterfowl populations. Both designated sites are separated from the development areas by the steelworks with negligible habitat connectivity or linkage.
- 4.1.3 Kenfig SSSI/NNR/SAC, and Crymlyn Bog and Pant y Sais SSSI/NNR/SAC are all located within 10km of the survey with a small part of the Glaswelltiroedd Cefn Cribwr SSSI/SAC lying within 10km of the disused railway line.
- 4.1.4 There are no non-statutory designated sites located within 500m of the survey area.
- 4.1.5 Potential effects on statutory and non-statutory sites from the detailed development proposals will be assessed within the EcIA and ES chapter.

Habitats

- 4.1.1 Scrub willow has grown up over the last 20 years and as a habitat lacks structural and species diversity. The ground flora typically has low diversity and substantial areas remain sparsely vegetated beneath the multi-stemmed shrubs.
- 4.1.2 The very extensive stands of Japanese knotweed have low biodiversity value.
- 4.1.3 There are several areas of naturally regenerated grassland within the Production Development Zone, the largest area being in the eastern half with further areas on the northern boundary adjoining the unnamed port road and grassland 'glades' in between blocks of willow scrub and Japanese knotweed.
- 4.1.4 The grasslands generally support a diversity of plants with over 30 grassland indicator species recorded across the habitats as a whole, reflecting the low nutrient status of the underlying substrates. This level of diversity confers the grassland habitats with county level importance. The other habitats present in the Production Development Zone are stands of bracken, bramble, hawthorn scrub, stands of reed (seasonally wet), and a very localised stand of dune slack vegetation.
- 4.1.5 Temporary Construction Area 1 supports primarily sparsely vegetated ground with scattered scrub, adjoining the eastern boundary of the open water dock. The regenerating habitats create a mosaic of bare ground, ephemeral vegetation and grassland which together classifies as an 'open mosaic habitat on previously developed ground' (OMH), a Section 7 Habitat of Principal Importance.
- 4.1.6 Willow scrub is the most extensive habitat in Temporary Construction Area 2, but the south-eastern section comprises a mix of naturally regenerated grassland, tall ruderal, scattered scrub, ephemeral vegetation and bracken. The western boundary overlaps the margin of the reedbed. A small seasonally flooded area of woodland with a canopy of alder and willow scrub classifies as wet woodland a Section 7 Habitats of Principal Importance.
- 4.1.7 A mitigation, compensation and biodiversity enhancement strategy should be designed for the development to fully offset the loss / damage to habitats and achieve an overall gain for biodiversity.

Bats

Roosts

- 4.1.8 There are no larger trees within the survey area with gaps or cavity features that would have the potential to provide roosts sites for bats. The open ivy cover on the two young semi-mature sycamores on the edge of the dock, within the Phoenix Wharf Berth area, have negligible value as potential roost features. The multi-stemmed willow shrubs have narrow diameter trunks and lack features that could be used by roosting bats
- 4.1.9 There are no buildings within the survey area although a car port adjoins the eastern boundary of the Production Development Zone. A daytime inspection of this structure should be undertaken to assess its potential to be used by roosting bats.

Activity

- 4.1.10 Overall the habitats in the Production Development Zone will be associated with an invertebrate fauna and would be expected to have a reasonable abundance of aerial invertebrates on which bats could prey, in particular the edges of scrub woodland and adjoining grassland and reedbed.
- 4.1.11 The Temporary Construction Area 2 supports a relatively small area of scrub woodland habitat and also has the potential to be used by foraging bats. The disused railway line and sidings to the south of this construction area and the Production Development Zone is a potential bat flightline.
- 4.1.12 In contrast the majority of Temporary Construction Area 1 is sparsely vegetated cover with only scattered young scrub and has lower potential value for foraging bats.
- 4.1.13 Bat activity surveys comprising transects and remote recording should be completed for the site to assess the assemblage of bat species that use the site and levels of activity for each species.

Otter

- 4.1.14 There are past records of otter from the River Afan to the north-west of Port Talbot Docks. As otter is a species with large territories it is assumed that the intertidal section of this river falls within the territory of an otter.
- 4.1.15 The open water dock lies adjacent to the mouth of the river and has the potential to be a foraging habitat for otter.
- 4.1.16 Within the survey area, the extensive 1ha reedbed located between the Production Development Zone and Temporary Construction Area 2 could also attract otter but its context, separated from the dock, by series of industrial operational units and areas of hardstanding means that there is no direct connectivity.
- 4.1.17 The multi-stemmed willow shrubs comprising the scrub woodland, generally lack areas of dense cover in which otters could remain hidden during the day.
- 4.1.18 Following a precautionary approach, the presence/absence of potential laying up places within the site should be assessed with a focus on any areas of dense cover within 100m of the open water dock.

Badger

- 4.1.19 No signs of badger activity were recorded within the survey area during the habitat walkover surveys in 2021 and 2022 or during other daytime walkover surveys. The potential value of the habitat for the establishment of setts and as foraging habitat is considered to be sub-optimal because of the nature of the site which is flat with limited burrowing opportunities and in part subject to winter waterlogging. No field signs of badger have been recorded during any of the

walkover survey visits. There is very high confidence in the absence of active setts within the survey area.

Breeding Birds

- 4.1.20 A number of the habitats present within the site have potential to be used by nesting birds. Bramble thicket, stands of gorse and hawthorn having highest potential value due to the cover they provide, while the stands of common reed and the stands of bracken are also habitats that could support nest sites.
- 4.1.21 The multi-stemmed willows and areas of butterfly bush have lower value providing fewer potential nesting opportunities to their very open growth structure (lacking areas of dense cover) and the narrow diameter of the limbs without internal cavities.
- 4.1.22 The stands of Japanese knotweed have low value as a habitat in which birds could nest. Following the removal of the accumulation of standing and fallen dead Japanese knotweed stems in spring 2022 there is minimal cover for nesting birds in the base of the stands.
- 4.1.23 An assessment should be made of the assemblage breeding birds in each part of the survey area, drawing upon observations of bird activity in summer 2022 and breeding survey work completed in equivalent habitats adjoining the boundary of the Production Development Zone.

Wintering birds

- 4.1.24 The scrub woodland and grassland habitats within the site have the potential to be used by a range of passerine species over winter feeding on seeds and invertebrates. Areas of seasonal pooling within the site could attract waders particularly snipe *Gallinago gallinago* which feed on invertebrates in wet mud in dense cover.
- 4.1.25 The open water dock has value for a number of gull and waterbird species. The sections of the dock adjoining Phoenix Wharf Berth and Temporary Construction Area 1 will form part of the habitats available to these species during winter months with old berth structures on the dockside providing a potential roost site for gulls and an area of reedbed on the opposite side of the water.
- 4.1.26 The walls of the dock are vertical sided with deep open water and no areas of tidal mud on the margins of the dock on which wader species could feed.
- 4.1.27 A survey of the wintering bird activity should be completed for the parts of the dock within and adjoining the proposed development and temporary working areas.

Reptiles

- 4.1.28 Reptile surveys in the wider docks in 2021 confirmed the presence of the common lizard, slow worm and grass snake with populations associated with grassland, scrub and wetland habitats.
- 4.1.29 The composition of habitats in the survey have potential value for reptiles and the record centre hold a past record of common lizard from the northern boundary of the Production Development Zone with the grassland, scrub woodland margins and reedbed being features of highest potential value.
- 4.1.30 A reptile survey should be completed to assess the presence /absence of species in the different parts of the survey area and review the potential sizes of populations of the different species where presence is confirmed.

Amphibians

Great Crested Newts

- 4.1.31 There is a past record of great crested newt from a waterbody in the southern part of the Port Talbot steelworks, approximately 2.5km from the boundary of the survey area.
- 4.1.32 Surveys for great crested newts in the two waterbodies in wider Harbourside site, undertaken in 2021, have confirmed their very likely absence from the waterbody in the former mineral extraction (c675m west of the Production Development Zone) and the concrete sided pond below the artificial sand martin bank (c375m west of the Production Development Zone).
- 4.1.33 Within the Port Talbot steelworks the closest area of permanent open water with vegetated margin lies over 500m from the Production Development Zone and Temporary Construction Area 2.
- 4.1.34 Areas of unvegetated, potentially seasonal, open water within the steelworks should be assessed to determine if they have the potential to support breeding great crested newts. Any potential breeding habitat within 250m of the development/working areas should be subject to environmental DNA testing and traditional survey methods to determine the presence/absence of this species.

Invertebrates

- 4.1.35 The range of habitats and micro-habitats within the survey areas as a whole offers a wide range of opportunities for invertebrates within the Site. Open mosaic habitats in the Temporary Construction Area 1, flower-rich naturally regenerating grassland, and scrub will all contribute to the value of the site for invertebrates.
- 4.1.36 Many invertebrate species have very precise requirements for habitat 'niches' and the range of ground conditions increases the diversity of micro-habitats available to invertebrates. The wildflower populations will provide valuable sources of nectar and pollen in the context of the site and its surroundings.
- 4.1.37 Detailed surveys of terrestrial invertebrates in 2021 in the wider Harbourside site confirmed the presence of a number of red data book and Section 7 species, primarily associated with the grassland, banks, and flower-rich habitat features.
- 4.1.38 A precautionary assessment of the assemblage of invertebrates should be completed for the survey area, drawing upon surveys of equivalent habitats completed in the wider port.

Higher Plants

- 4.1.39 The botanical composition of the habitats has been assessed alongside the habitat surveys and have confirmed the presence of a range of positive indicator species and indicator species listed in the Guidelines for the Selection of Wildlife Sites in South Wales (The South Wales Wildlife Sites Partnership, 2004) and species listed as of local importance in the SEWBRc datasets.
- 4.1.40 A detailed survey of the legally protected Schedule 8 plant, oxtongue broomrape, was completed within the survey area in early July 2023 with guidance from the national experts Chris Thorogood and Fred Rumsey. The survey was undertaken alongside a survey of the wider Harbourside site to assess the distribution of the plant within the docks. A strategy will be required to protect the population of oxtongue broomrape.
- 4.1.41 In addition, basil thyme *Acinos arvensis*, a Section 7 species of principal importance, has recorded in the sidings area to the south of the Production Development Zone.
- 4.1.42 The development proposal should address the effects on locally important species associated with open naturally regenerating grassland and flower-rich ephemeral vegetation through measures integrated into the mitigation, compensation and biodiversity enhancement strategy.

Lower Plants

- 4.1.43 Bryophytes form a widespread component of many of the pioneer habitats establishing on the previously developed ground. A bryophyte survey should be undertaken to assess the species assemblages present in areas of habitat of higher potential value within the survey area. The survey should confirm the presence/likely absence of species of conservation concern and local importance.

4.2 Invasive Species (Schedule 9)

Japanese knotweed

- 4.2.1 Japanese knotweed has been present throughout large areas of Production Development Zone for many years and now forms very extensive stands. More localised stands occur within and adjoining in the Temporary Construction Area 2.
- 4.2.2 An Invasive Non-native Species (INNS) eradication strategy for the whole of the Port Talbot Docks is being designed and implemented by Associated British Ports (ABP) to eradicate the established stands and prevent future spread across. The first stage of the ABP management works is to remove the Japanese knotweed infestation within the Production Development Zone. These works are programmed for spring and summer 2023 and will result in the felling of scrub and disturbance of grassland habitats into which Japanese knotweed is spreading.

Other Schedule 9 Species

- 4.2.3 Two invasive species listed under Schedule 9 have been recorded within the site. Wall cotoneaster occurs extensively on the dockside in Temporary Construction Area 1 and on the railway embankment on the southern boundary of the Production Development Zone where it is more localised. Montbretia is present in localised patches in the centre of the Production Development Zone growing on the boundary of the scrub woodland.
- 4.2.4 Each species should be subject to systematic excavation in advance of earth movements to avoid spread. Materials could be temporarily stored and then subject to burial or removed from site. The control measures should form part of the INNS strategy and be implemented in advance of development.

Sea Buckthorn

- 4.2.5 Although sea buckthorn is not listed in Schedule 9 in Wales or England, it is non-native in South Wales and is an invasive species in the docks where it has colonised grassland habitats. All the established plants are spreading into the surrounding habitats and in few places form extensive stands.
- 4.2.6 Following good environmental practice enabling works and construction activities should be designed to avoid the spread any sea buckthorn encountered. The avoidance of the spread of the sea buckthorn should be included in the INNS eradication strategy for the port wide strategy.

5 CONCLUSIONS

- 5.1.1 A range of habitats occur within the survey area, the majority of which have established on previously developed ground. A few areas remain sparsely vegetated bare ground, but across the site there are extensive areas of open structured grassland, rank grassland and scrub woodland (dominated by young willows). The floristic diversity is locally high, primarily associated with open grassland associated patches of ephemeral vegetation.
- 5.1.2 One nationally rare legally protected plant species (oxtongue broomrape) and a number of locally important plant species occur within the survey area, primarily associated with open grassland habitats and ephemeral vegetation.
- 5.1.3 Where these habitats form a patchy mosaic they classify as a open mosaic habitats on previously developed ground (a habitat of principal importance). This is the principal habitat type in Temporary Construction Area 1.
- 5.1.4 The scrub woodland regenerating on previously developed ground is of recent origin and has relatively low nature conservation value. This habitat is most extensive in the Production Development Zone with Japanese knotweed growing alongside and within the scrub woodland in a number of areas.
- 5.1.5 The very extensive reedbed overlapping the boundary of Temporary Construction Area 2 qualify as a S7 Habitats of Principal Importance. The localised stands of reed in the Production Development Zone will be dry for over half of the year and have lower value.
- 5.1.6 Consistent with planning policy, the development seek to retain existing high value habitats through avoidance within the site layout and masterplan. Where avoidance is not possible, new areas of high value replacement habitat should be created within the wider port and/or as part of off-site compensation.
- 5.1.7 A specific strategy will need to be implemented for the conservation of the nationally important population of oxtongue broomrape. The potential for re-use of surface substrates and feasibility of the relocation of key plant species should be explored.
- 5.1.8 The recently established flower-rich pioneer habitats that characterise Temporary Construction Area 1 should be allowed to fully re-establish following the short term use of this area of land. The underlying substrate should be re-exposed and allowed to naturally regenerate. Viable seeds of many wildflower species will remain in the ground enabling a restoration to an open regenerating grassland and open mosaic habitat.
- 5.1.9 The development proposal should minimise the fragmentation of retained and created habitats and avoid indirect disturbance of off-site habitats through separation from construction activities.
- 5.1.10 Several invasive non-native species listed on Schedule 9 of the Wildlife and Countryside Act are present within the survey area. The control/eradication of Japanese knotweed and other Schedule 9 species will create benefits for biodiversity.
- 5.1.11 The survey area has value for a range of faunal populations. Development proposals should seek to limit impacts where possible and include the creation of new habitats for the species groups affected by development proposals. Phase 2 surveys should be completed for bats, badger, otter, birds, reptiles, great crested newts and bryophytes.
- 5.1.12 Avoidance, mitigation and compensation should specifically be addressed for the faunal populations within the site and the assemblages of species.
- 5.1.13 Features of value for specific faunal species should be incorporated into areas of replacement habitat and compensation areas. Broader species interests should also be considered in the mitigation and compensation offsetting effects associated with the development of the Harbourside site.

- 5.1.14 Faunal species protection measures will need to be implemented as part of the enabling works to comply with legislative obligations.
- 5.1.15 The mitigation, compensation and biodiversity enhancement should ensure that the development achieves an overall gain for biodiversity to fully offset the value of habitats that will be lost or damaged.

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Multi-Agency Geographic Information for the Countryside: www.magic.gov.uk

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Legend

Site Boundaries

Rev	Description	By	CB	Date



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Client LanzaTech

Project Project Dragon

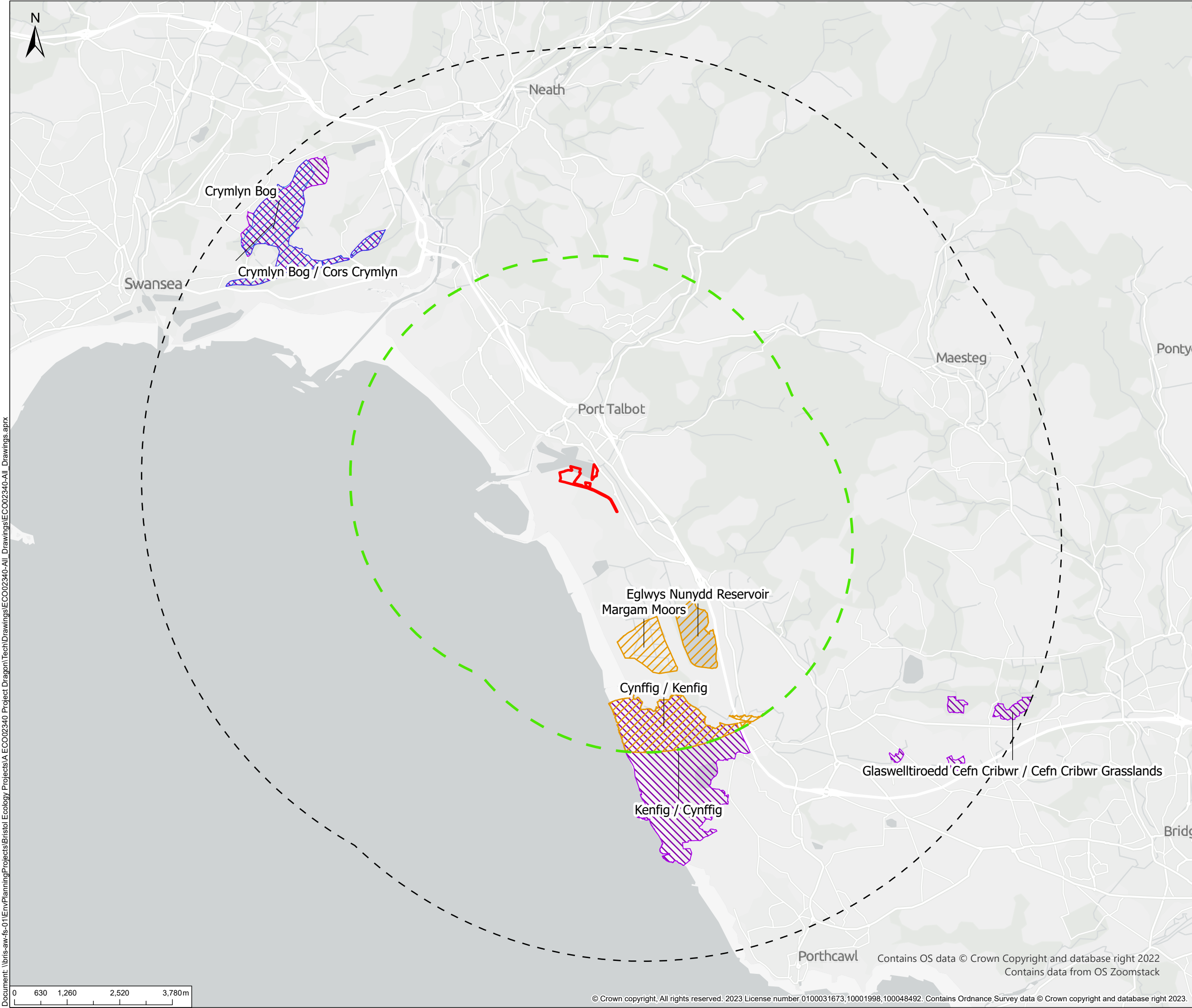
Title Site Area Plan

Status	Drawn By	PM/Checked By
ISSUE	OW	TO
Project Number	Scale @ A3	Date Created
ECO02340	1:3,000	JAN 2023
Figure Number		Rev
1		-

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- Legend
- ECO02340 EIA Study Area
 - ECO02340 EIA Study 10km Buffer
 - ECO02340 EIA Study 5km Buffer
 - SSSI
 - RAMSAR
 - SAC

Rev	Description	By	CB	Date



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Client LanzaTech

Project Project Dragon

Title Statutory designations plan within
 10km and 5km radius Project
 Dragon

Status	Drawn By	PM/Checked By
Draft	OW	
Project Number	Scale @ A3	Date Created
ECO02340	1:87,000	03/02/23
Figure Number		Rev
2		-

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- Legend
- ECO02340 EIA Study Area
 - Ancient Semi Natural Woodland
 - Ancient Woodland Site of Unknown Category
 - NRW Priority Area (Woodland - PAWS)
 - Plantation on Ancient Woodland Site
 - Restored Ancient Woodland Site
 - NRW Priority Area (Lowland Wetland)
 - Wildlife Site / SINC (Adopted)

Rev	Description	By	CB	Date

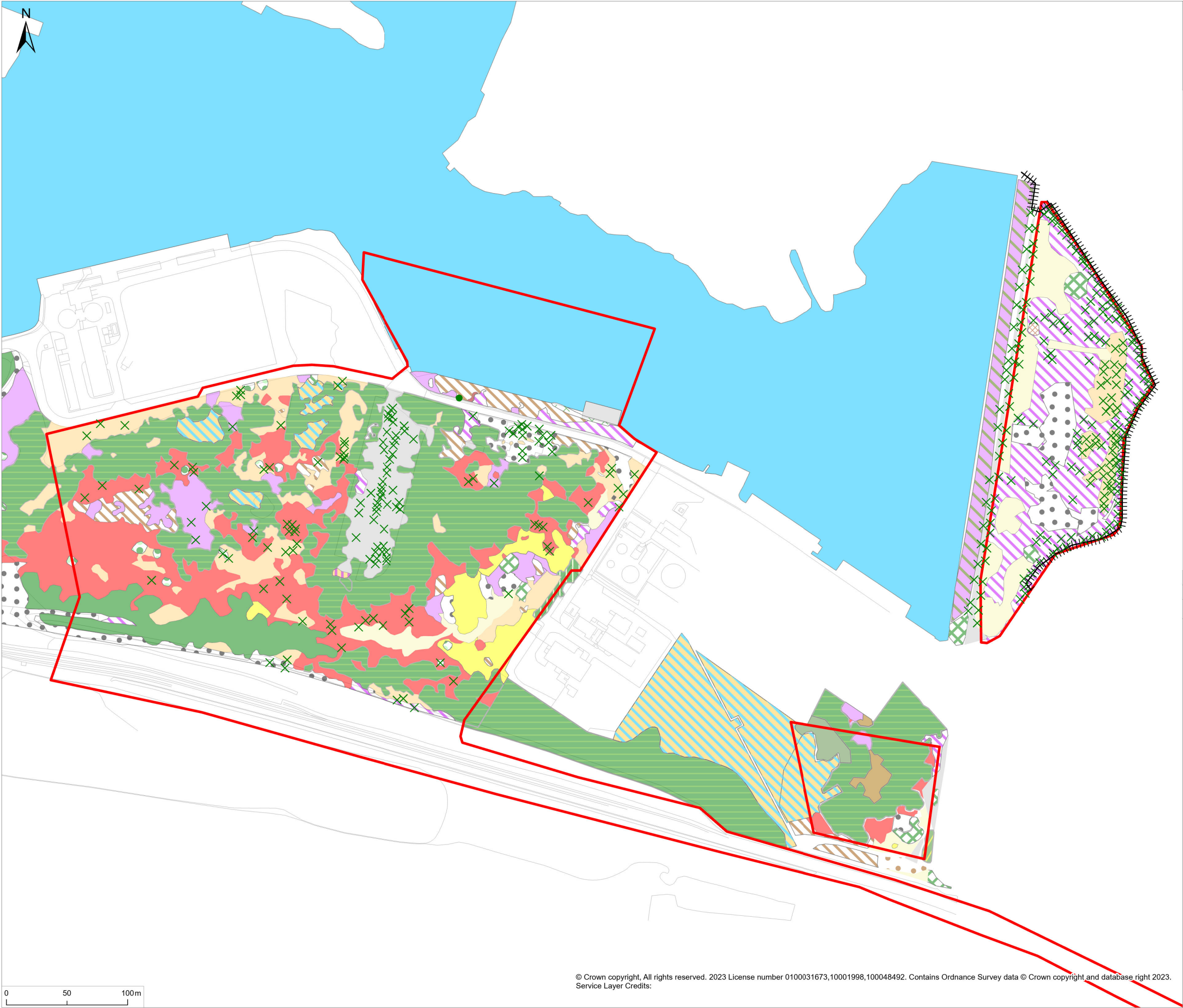


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Client	LanzaTech		
Project	Project Dragon		
Title	Non-Statutory designations plan within 2km radius Project Dragon		
Status	Drawn By	PM/Checked By	
Draft	HM	TO	
Project Number	Scale @ A3	Date Created	
ECO02340	1:23,000	03/02/23	
Figure Number			Rev
3			-
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- Legend**
- Site Boundary
 - Bare Ground/Sparsely Vegetated Ground
 - Rubble
 - Bracken
 - Bramble Scrub
 - Bramble Scrub and Japanese Knotweed
 - Broadleaved Woodland
 - Scrub Woodland (Grey Willow)
 - Buildings
 - Dune Slack Vegetation
 - Dense Scrub
 - Ephemeral Vegetation
 - Gorse Scrub
 - Hardstanding
 - Ivy/Bramble/Scattered Scrub
 - Japanese Knotweed
 - Line of trees - Broadleaved
 - Mature Conifer Tree Line
 - Naturally Regenerating Grassland
 - Naturally Regenerated Grassland (Semi-improved)
 - Non-Ruderal (Ivy and Ferns)
 - Non-native - invasive species
 - Reedbed
 - Scattered Scrub
 - Scattered Trees
 - Open Water
 - Wet woodland
 - Gorse/Bramble scrub
 - Scattered scrub
 - Scattered tree - broadleaved
 - Security Fence

Rev	Description	By	CB	Date



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Client **LanzaTech**

Project **Project Dragon**

Title **Habitat Plan Project Dragon**

Status DRAFT	Drawn By MP	PM/Checked By TO
Project Number ECO01825	Scale @ A3 1:3,000	Date Created JAN 2023
Figure Number 1		Rev -

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APPENDICES

Appendix A

Relevant Legislation

Reptiles

All common UK reptile species (Adder *Vipera berus*, Grass Snake *Natrix natrix*, Common Lizard *Zootoca vivipara* and Slow Worm *Anguis fragilis*) are protected through part of Section 9(1 and 5) of the Wildlife & Countryside Act 1981 (as amended). This prohibits:

- Intentional or reckless injuring or killing;
- Selling, offering or exposing for sale, or having in possession or transporting for the purpose of sale, any live or dead wild animal or any part of, or anything derived from, such an animal; or
- Publishing or causing to be published any advertisement likely to be understood as conveying buying or selling, or intending to buy or sell, any of those things.

These species are listed as Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016.

Nesting Birds

All birds, their nests and eggs are afforded protection under the Wildlife and Countryside Act 1981, as updated by the Countryside and Rights of Way Act 2000. It is an offence to:

- intentionally kill, injure or take any wild bird;
- intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; and
- intentionally take or destroy the egg of any wild bird.

Schedule 1 birds cannot be intentionally or recklessly disturbed when nesting and there are increased penalties for doing so. Licences can be issued to visit the nests of such birds for conservation, scientific or photographic purposes but not to allow disturbance during a development even in circumstances where that development is fully authorised by consents such as a valid planning permission.

Water Vole and Otter

Water vole and Otter and their habitats are fully protected under the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is an offence to:

- Capture, kill or injure a Water Vole or Otter;
- Damage, destroy or obstruct access to a breeding site or resting place (i.e. burrow);
- Disturb a Water Vole or Otter whilst in a place of shelter;
- Possess or control a Water Vole or Otter (live or dead), any part of a Water Vole or Otter or anything derived from a Water Vole or Otter;
- Sell, barter or exchange a Water Vole or Otter (live or dead), any part of a Water Vole or Otter or anything derived from a Water Vole or Otter; and / or
- Advertise or offer for sale, barter or exchange a Water Vole or Otter (live or dead), any part of a water vole or Otter or anything derived from a Water Vole or Otter.

Offences can result from intentional or reckless actions. Penalties include fines of up to £5000 and / or imprisonment for up to six months, per offence. Under certain circumstances a licence can be granted by Natural England to permit activities that would otherwise constitute an offence.

Otters have additional protection, being listed as a European Protected Species (EPS) under Conservation of Habitats and Species Regulations 2017. This makes it an offence to deliberately or recklessly:

- Capture, injure or kill an Otter;

- Harass an Otter or group of Otters;
- Disturb an Otter in a holt or any other structure or place it uses for shelter or protection;
- Disturb an Otter while it is rearing or otherwise caring for its young;
- Obstruct access to a holt or other structure or place Otters use for shelter or protection or to otherwise deny the animal use of that place;
- Disturb an Otter in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species;
- Disturb an Otter in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.

It is also an offence to:

- Damage or destroy a breeding site or resting place of such an animal (note that this does not need to be deliberate or reckless to constitute an offence);
- Keep, transport, sell or exchange or offer for sale or exchange any wild Otter or any part or derivative of one (if obtained after 10 June 1994).

Both species are listed as Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016.

Appendix B

Grassland and Ephemeral Plant Species Assemblages

Project Dragon – Botanical Species Lists

Scientific name	Common name	Production Development Zone	Production Development Zone	Production Development Zone	Temporary Construction Area 2	Temporary Construction Area 1	Status / Importance	SINC Indicator Species			
		Naturally Regenerated Grassland (Semi-improved)	Naturally Regenerating Grassland (Open structure)	Dune slack vegetation	Naturally Regenerating Grassland	Ephemeral / Pioneer Grassland		NG	CG	MG	PI
<i>Achillea millefolium</i>	Yarrow	LF	LF		LF						
<i>Agrostis capilaris</i>	Common bent	O	LF								
<i>Agrostis stolonifera</i>	Creeping bent	F	LF	O	O	LF					
<i>Agrimonia eupatoria</i>	Agrimony	O						X			
<i>Anacamptis pyramidalis</i>	Pyramidal orchid	VLF	O		O	O	Local		X		
<i>Anagalis arvensis</i>	Scarlet pimpernel		R								
<i>Anthoxanthenum odoratum</i>	Sweet vernal-grass	R			O	R					
<i>Anthyllis vulneraria</i>	Kidney vetch	O	O			F/LA	Local		X		
<i>Arenaria serpyllifolia</i>	Thyme-leaved sandwort	R	LF			F					
<i>Arrhenatherum elatius</i>	False oat-grass	LF/VLA	R		LF	O					
<i>Artemisia vulgaris</i>	Mugwort	R									
<i>Betula sp.</i>	Birch saplings	O		LF		R					
<i>Blackstonia perfoliata</i>	Yellow-wort	R	O			O/LF	Local		X		
<i>Briza media</i>	Quaking grass					VR		X	X		
<i>Bromus hordeaceus</i>	Soft brome	O	R		R	R					
<i>Bromus madritensis</i>	Compact brome					O					
<i>Buddleia davidii</i>	Butterfly bush	O	R		O	LF	Non-native invasive				
<i>Carex arenaria</i>	Sand sedge	R	LF	O		VLF					X
<i>Carex flacca</i>	Glaucous sedge	LO	O	F		L		X	X	X	
<i>Carex hirta</i>	Hairy sedge	F/LA	O		A	R					
<i>Carex obtrubae</i>	False fox sedge	R				R					
<i>Carex spicata</i>	Spiked sedge					R		X			
<i>Carex punctata</i>	Dotted sedge			VLF			Local				
<i>Catapodium maritimum</i>	Fern grass		R			O					X
<i>Centaurea nigra</i>	Common knapweed	LF			O	R		X	X		
<i>Centaurea scabiosa</i>	Greater knapweed	R							X		
<i>Centaureum erythraea</i>	Common centaury	O	O			VLF		X	X		
<i>Centranthus ruber</i>	Red valerian					LF					
<i>Cerastium arvense</i>	Common mouse-ear	O	R		O	O					
<i>Cerastium semidecandrum</i>	Little mouse-ear										
<i>Cirsium arvense</i>	Creeping thistle	O	R								
<i>Cirsium vulgare</i>	Spear thistle	O			LF						
<i>Conyza canadensis</i>	Canadian fleabane	O	F		O	LF					

Scientific name	Common name	Production Development Zone	Production Development Zone	Production Development Zone	Temporary Construction Area 2	Temporary Construction Area 1	Status / Importance	SINC Indicator Species			
		Naturally Regenerated Grassland (Semi-improved)	Naturally Regenerating Grassland (Open structure)	Dune slack vegetation	Naturally Regenerating Grassland	Ephemeral / Pioneer Grassland		NG	CG	MG	PI
<i>Cotoneaster horizontalis</i>	Wall cotoneaster	LO	R			LF	Schedule 9 INNS				
<i>Crepis capillaris</i>	Smooth hawk's-beard	R				R					X
<i>Crepis vesicaria</i>	Beaked hawk's-beard					LF					
<i>Crocosmia x crocosmiiflora</i>	Montbretia	VLF					Schedule 9 INNS				
<i>Dactylis glomerata</i>	Cock's-foot	O	O		O	O					
<i>Dactylorhiza sp.</i>	Marsh orchid species	O			L					X	
<i>Daucus carota</i>	Wild carrot	O	O		O	LF			X		
<i>Dipsacus fullonum</i>	Teasal				R						X
<i>Dryopteris filix mas</i>	Male fern	R									
<i>Echium vulgare</i>	Viper's bugloss		R			O	Local		X		
<i>Elymus (athericus / x obtusiuscula)</i>	Sea / hybrid couch grass	VLF			LA						
<i>Epilobium ciliatum</i>	American willowherb		O			O					
<i>Epilobium hirsutum</i>	Great willowherb	O				O					
<i>Epilobium parviflorum</i>	Hoary willowherb		O			O					
<i>Equisetum arvense</i>	Field horsetail	R	R		R	R					
<i>Erodium cicutarium</i>	Common stork's-bill	R	L			O					
<i>Eupatorium cannabinum</i>	Hemp agrimony	O			O					X	
<i>Euphrasia spp.</i>	Eyebright species	R	O/LA	R	O	VLF	Local				
<i>Festuca rubra</i>	Red fescue	O/VLA	O/LF		O						
<i>Festuca ovina</i>	Sheep's fescue					L					X
<i>Foeniculum vulgare</i>	Fennel					R					
<i>Fragaria vesca</i>	Wild strawberry	R	R		O	R					
<i>Galium mollugo</i>	Hedge bedstraw	O/VLA				LA			X		
<i>Galium saxatile</i>	Heath bedstraw		VR		O						
<i>Geranium dissectum</i>	Cut-leaved crane's-bill	O	O		O	O					
<i>Geranium molle</i>	Dove's-foot crane's-bill	O	O			O					
<i>Geranium pyrenaicum</i>	Hedgerow cranesbill	R				R					
<i>Geranium robertianum</i>	Herb Robert				O	R					
<i>Geranium rotundifolium</i>	Round-leaved crane's-bill					O					
<i>Heracleum sphondylium</i>	Hogweed	O			LF						
<i>Hieracium spp.</i>	Hawkweed species	R	O			O/VL					
<i>Hippophae rhamnoides</i>	Sea buckthorn (sapling)	R					Non-native invasive				
<i>Hirschfeldia incana</i>	Hoary mustard	R				O					
<i>Holcus lanatus</i>	Yorkshire fog	A	O	O	A	A					
<i>Hypochaeris radicata</i>	Common cat's ear	R		R				X			
<i>Hypericum perforatum</i>	Perforate St John's wort	O/LF	O			O		X	X		
<i>Hypericum tetrapterum</i>	Square-stemmed St John's wort	R								X	
<i>Jacobaea vulgaris</i>	Common ragwort	R									
<i>Juncus acutus</i>	Sharp rush			O			Local				
<i>Juncus articulatus</i>	Jointed rush		R								

Scientific name	Common name	Production Development Zone	Production Development Zone	Production Development Zone	Temporary Construction Area 2	Temporary Construction Area 1	Status / Importance	SINC Indicator Species			
		Naturally Regenerated Grassland (Semi-improved)	Naturally Regenerating Grassland (Open structure)	Dune slack vegetation	Naturally Regenerating Grassland	Ephemeral / Pioneer Grassland		NG	CG	MG	PI
<i>Juncus inflexus</i>	Hard rush	R	O / VLF	F	O						
<i>Juncus maritimus</i>	Sea rush			O							
<i>Lathyrus pratensis</i>	Meadow vetchling	LF			O	R		X			
<i>Leontodon hispidus</i>	Rough hawkbit	R				R		X	X		
<i>Leucanthemum vulgare</i>	Oxeye daisy	O				O		X			
<i>Linum bienne</i>	Pale flax	O				LF	Local				
<i>Linum catharticum</i>	Fairy flax		R			R		X	X		
<i>Linaria pupurea</i>	Purple toadflax	R									
<i>Linaria vulgaris</i>	Common toadflax	VR			R	R					X
<i>Lotus corniculatus</i>	Common bird's-foot trefoil	O	LF			O/LF		X	X		X
<i>Lotus penducatus</i>	Greater bird's-foot trefoil	O/LA		R						X	
<i>Luzula campestris</i>	Field woodrush	O	O								
<i>Medicago lupulina</i>	Black medick	O	O/LF			F/LA			X		
<i>Melilotus officinalis</i>	Ribbed Melilot	O/LA				O/VLA					
<i>Mentha sp</i>	Mint species	R	LF	F		R				X	
<i>Myosotis arvensis</i>	Field forget-me-not		O			O					
<i>Odonitites vernus</i>	Red bartsia	O	O		R	O					
<i>Oenothera spp.</i>	Evening primrose species	O	LF			O					
<i>Ononis repens</i>	Creeping restharrow	O	F/VLA		LF	O		X	X		
<i>Ophrys apifera</i>	Bee orchid					R	Local		X		
<i>Orobanche minor</i>	Common broomrape		R			O	Local				X
<i>Orobanche picridis</i>	Oxtongue broomrape		VR			F	National				
<i>Pastinacea sativa</i>	Wild parsnip	O	LF		R	O/LF			X		
<i>Phragmites australis</i>	Common reed	R		O	R					X	
<i>Picris hieracioides</i>	Hawkweed oxtongue	R	O			F	Local		X		
<i>Pilosella officinarium</i> agg.	Mouse eared hawkweed					L		X	X		X
<i>Plantago coronopus</i>	Buck's-horn plantain					VLA					X
<i>Plantago lanceolata</i>	Ribwort plantain	LF	F		O	LF					
<i>Plantago major</i>	Greater plantain		R								
<i>Poa compressa</i>	Flattened meadow-grass					O					X
<i>Poa pratensis</i> agg.	Smooth meadow-grass	O	O			F					
<i>Poa trivialis</i>	Rough meadow grass	LF									
<i>Potentilla anserina</i>	Silverweed	O/LF	O		O						
<i>Potentilla mixta</i>	Hybrid creeping cinquefoil	VR									
<i>Potentilla reptans</i>	Creeping cinquefoil	F/LA	F		O	LF					
<i>Prunella vulgaris</i>	Selfheal	O	O		O	O					
<i>Pulicaris dysentrica</i>	Common fleabane	O	O		O	O				X	
<i>Ranunculus acris</i>	Meadow buttercup	R									
<i>Ranunculus flammula</i>	Lesser spearwort	R		R						X	
<i>Ranunculus repens</i>	Creeping buttercup	LF		O							

Scientific name	Common name	Production Development Zone	Production Development Zone	Production Development Zone	Temporary Construction Area 2	Temporary Construction Area 1	Status / Importance	SINC Indicator Species			
		Naturally Regenerated Grassland (Semi-improved)	Naturally Regenerating Grassland (Open structure)	Dune slack vegetation	Naturally Regenerating Grassland	Ephemeral / Pioneer Grassland		NG	CG	MG	PI
<i>Reseda luteola</i>	Weld		R								
<i>Reynoutria japonica</i>	Japanese knotweed (young)	LF	LF		O						
<i>Rhinanthus minor</i>	Yellow rattle	VL			L	O		X			
<i>Rubus caesius</i>	Dewberry	A/LD	O/LA	O	A	F					
<i>Rubus fruticosus</i> agg.	Bramble	O	R			R					
<i>Rumex acetosella</i>	Sheep's sorrel		VR								
<i>Rumex crispus</i>	Curled dock	O	O			O					
<i>Salix repens</i> var. <i>argentea</i>	Creeping willow	O/VLF	VLF	A						X	
<i>Salix</i> spp. (sapling)	Willow shrub saplings	O	O/LF	LF	O	O					
<i>Saxifraga tridactylis</i>	Rue-leaved saxifrage					VL			X		
<i>Scrophularia nodosa</i> ,	Common figwort	R									
<i>Sedum acre</i>	Biting stonecrop		R			LF					
<i>Sedum album</i>	White stonecrop		O/VLD		LF	LF					
<i>Senecio squalidus</i>	Oxford ragwort		R								
<i>Silene flos-cuculi</i>	Ragged robin	R								X	
<i>Sonchus oleraceus</i>	Smooth sow-thistle					R					
<i>Tanacetum vulgare</i>	Tansy					R					X
<i>Taraxicum</i> agg.	Dandelion	O	R		R	R					
<i>Trifolium arvense</i>	Hare's-foot clover		R			LF					
<i>Trifolium campestre</i>	Hop trefoil		R		O	LF			X		X
<i>Trifolium dubium</i>	Lesser trefoil		R			R					
<i>Trifolium medium</i>	Zig-zag clover	R						X			
<i>Trifolium pratense</i>	Red clover	LF			O	O		X			
<i>Trifolium repens</i>	White clover	O/VLA				O/VLA					
<i>Tussilago farfara</i>	Colt's-foot	O	O								X
<i>Urtica dioica</i>	Common nettle	R			R	R					
<i>Verbascum thapsus</i>	Great mullein		R								X
<i>Veronica chaemdryas</i>	Germander speedwell	O	O								
<i>Vicia cracca</i>	Tufted vetch	O/LF			O	R					
<i>Vicia hirsuta</i>	Hairy tare					L					
<i>Vicia sativa</i> agg.	Common vetch	O			O	O					
<i>Vicia tetrasperma</i>	Smooth tare	LF		O							
<i>Verbena officinalis</i>	Vervain		R								
<i>Vulpia bromoides</i>	Squirrel's-tail fescue					LF		X	X		X
<i>Vulpia myuros</i>	Rat's-tail fescue					O					X

SINC Indicator Species – Habitat Types

NG = Neutral Grassland; CG = Calcareous Grassland; MG = Marshy Grassland; P-I = Post-industrial

Appendix C

Habitat Photographs - Production Development Zone

Habitat Photographs – Production Development Zone

Plate 1: Regenerating willow scrub with sparse ground flora



Plate 2: Dense young willow scrub with dewberry field layer



Plate 3: Open structured willow scrub with dewberry field layer



Plate 4: Regrowth of extensive Japanese knotweed



Plate 5: Extensive Japanese knotweed with dead stems removed



Plate 6: Willow scrub with Japanese knotweed (background)



Plate 7: South-eastern grassland strip on sandy substrate



Plate 8: North-eastern grassland



Plate 9: North eastern boundary grassland



Plate 10: Northern boundary grassland



Plate 11: Northern boundary grassland with sandy substrate



Plate 12: Grassland 'glade' with reed, JKW, dewberry and bramble



Plate 13: Central grassland glade with wildflowers



Plate 14: Central grassland glade with encroachment of bramble



Plate 15: Central 'glade' – bramble thicket



Plate 16: Southern grassland strip



Plate 17: Dune slack plant assemblage



Plate 18: Scrub enclosing stand of common reed



Plate 19: Central area of bare ground with scattered scrub



Plate 20: Part of central bare ground subject to seasonal pooling



Plate 21: Ephemeral vegetation establishing on hardstanding



Plate 22: Railway Embankment



Appendix D

Habitat Photographs – Temporary Construction Areas

Habitat Photographs – Temporary Construction Area 1

Plate 23: Naturally regenerating grassland mosaic



Plate 24: Ephemeral vegetation on tracksides



Plate 25: Flower-rich naturally regenerating grassland



Plate 26: Sparsely vegetated ground



Plate 27: Oxtongue broomrape spikes



Plate 28: Longer grassland and scattered scrub



Plate 29: Scattered scrub and wall cotoneaster and on dockside



Plate 30: Scattered scrub along track and dockside



Habitat Photographs – Temporary Construction Area 12

Plate 31: Bramble thicket within scrub woodland



Plate 32: Scrub woodland with bramble field layer



Plate 33: Wet scrub woodland adjoining reedbed



Plate 34: Boundary of reedbed and scrub woodland



Plate 35: Naturally regenerating grassland



Plate 36: Tall ruderal and rank grassland on edge of scrub



Plate 37: Woodland edge habitat (Buddleia)



Plate 38: Off-site reedbed and pipeline infrastructure

