Preliminary Environmental Information Report

Appendix 8C: National Vegetation Classification (NVC) Survey

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Future Energy Llanwern Limited

Contents

1.0 National Vegetation Classification (NVC) Survey

1.1 Introduction

1.1.1 This Appendix presents the results of the NVC survey at Future Energy Llanwern in relation to an application for a Development Consent Order (DCO) for the installation of solar photovoltaic panels. The surveys were commissioned by Future Energy Llanwern Ltd.

1.1.2 The area within the PEIR assessment boundary is hereafter referred to as the 'Site'.

Aims

1.1.3 The aims of this report are to:

- Describe the methods used for sampling and identifying botanical communities present within specified points of the ditch network;
- Assess the ecological value of the ditch network at the Site, based on desk study data, the sampled field data and assumptions based on the information available.

1.2 Method

Desk Study

1.2.1 Please refer to **Appendix 8A** for methods of data collection during the desktop study.

1.2.2 A number of reports were provided by Natural Resources Wales (NRW) which provide information regarding surveys of the reens over previous years. These reports have been reviewed and information pertinent to the NVC survey is summarised.

Survey Methods

1.2.3 An NVC survey was undertaken following the Extended Phase 1 Habitat survey, sampling several reens and ditches across the Site.

1.2.4 Prior to the NVC survey, a desktop assessment was undertaken whereby OS maps, aerial photography and historical aerial photography were studied for any indication of areas of potential interest and any changes in management. Survey locations were selected in advance, selecting locations with a wide geographical spread across the Site and including any highlighted during the Phase 1 Habitat survey as having a relatively diverse assemblage of plants, higher water quality and/or indicator species of higher value habitats.

1.2.5 The survey was carried out on 25, 26 and 27 July 2023 by Matthew Davey (BSc (Hons) MSc MCIEEM, FISC Level 4) when weather conditions were largely dry with good visibility. The late afternoon of 26 July had intermittent showers, with heavy rain starting at approximately 4pm, at which time the survey was halted for the day. The methodology was adapted from that described in section 3.6 Sampling Water Margins in the National Vegetation Classification User's Handbook (Rodwell, 2006), and British Plant Communities Volume 4 (Rodwell, 1995).

1.2.6 An initial walkover of the areas was undertaken, to ensure the sampled stretch of watercourse (habitat parcel) was of a uniform vegetation type, with consistent physical characteristics (e.g. of uniform colour/vegetation shapes, sward structure, management, location, slope and aspect).

1.2.7 Habitat parcels were then studied, and plant coverage was recorded using the DOMIN scale. This entailed 5 4m x 4m quadrats placed randomly through each sample location. In situations where the habitat was too narrow for a 4m x 4m quadrat, the dimensions were adjusted so the area sampled remained the same, for example 8m x 2m. Marginal and emergent vegetation were surveyed and analysed as separate communities to the floating and submerged vegetation (Rodwell, 2006; Rodwell, 1995). A net was used to survey submerged vegetation with 5 sweeps per sample where it was safe to do so, along with targeted sweeps for any submerged or floating plants which were visible from the bank. In addition, a search for rare/notable plant species was also carried out. Data was entered into the TABLEFIT

programme to determine the “goodness-of-fit” to particular NVC communities (Rodwell, 1991a, 1991b, 1992, 1995 & 2000) setting parameters for mixed species cover and composition. Resulting matches were compared and assessed against NVC Handbooks before a final assessment of NVC community type was made.

1.2.8 A digital map of the NVC habitats was produced using QGIS (QGIS Development Team (2018) Geographic Information System Open-Source Geospatial Foundation Project).

Limitations

1.2.9 Care has been taken to ensure that balanced advice is provided on the information available and collected during the study period(s), and within the resources available for the project. However, the possibility of important ecological features being missed due to survey timings, absence during surveys or the year of survey cannot be ruled out. In addition, the lack of evidence or records of protected species on Site does not preclude their presence from Site.

1.3 Results

Desk Study

1.3.1 Murton et al. 2020a, details the survey results from 2010-2013 associated with the Gwent Levels and Newport Wetlands. These surveys recorded a good diversity of floating vegetation across the SSSIs, albeit duckweed was dominating a number of areas in the reens and field ditches. Gwent Levels – St Bride’s Site of Special Scientific Interest (SSSI), which located approximately 7km to the west, was found to be the only SSSI with over 60% of points surveyed to support submerged plant species, whilst Gwent Levels – Whitson SSSI (which overlaps the west of the Site) was also recorded to support relatively high level of submerged plants, with 7 native submerged species recorded.

1.3.2 Field ditches were recorded to most frequently support tall emergent vegetation and duckweed, whilst open water and duckweed were most frequently recorded associated with the reens. The notified plant hairlike pondweed was recorded across the SSSIs, along with plants within the Gwent Levels assemblage, namely frogbit *Hydrocharis morsus-ranae,* tubular water-dropwort *Oenanthe fistulosa,* and

Arrowhead *Sagittaria sagittifolia.* These plants were not found in two SSSIs, namely Gwent Levels - Redwick & Llandevenny (which overlaps the central section of the Site) and Gwent Levels - Magor & Undy (which overlaps with the eastern extent of the Site).

1.3.3 Hairlike pondweed was recorded at a small number of points within the reens which contains survey points 7, 10 and 12 (see **Figure 8.3.1**) in 2013, although this was not recorded again in repeat surveys in the reen containing survey point 7 in 2023. Frogbit was recorded in the reen containing survey points 10 in 2013 and 2023.

1.3.4 Duckweeds were common throughout the SSSIs and indicate high levels of nutrients and potentially eutrophication. The report further stated that "*Lack of management of privately owned field ditches and low water levels are likely to be the main factors limiting species abundance and diversity in the field ditches.*" 63% of the field ditches were also assessed as heavily shaded, limiting their value.

1.3.5 The update results from 2023 recorded a small number of reens improving in quality, with a larger number decreasing in ecological quality, including a number recorded to have dropped to the point of failing the SSSI criteria for the designations (Rodgers, 2023). The reasons for the decline was not specified however it is considered likely that it would be a combination of the above reasons (eutrophication, poor management, overshading).

NVC Survey

1.3.6 12 survey points were selected to cover an even distribution across the Site. These were selected to sample a range of field ditches are large reens.

1.3.7 NVC habitats that best fit the habitats within the survey area are shown in **Figure 8.3.1** and described in **Table 8C-1** below.

1.3.8 Of the species recorded at the Site, frogbit was recorded in two quadrats within Sample 11. This species is included in the characteristic assemblage of species at the Site (Murton et al., 2020b). No other species listed as a qualifying species of the

SSSI[1], or part of the characteristic assemblage was recorded.

Table 1C-1 National Vegetation Classification Results

Sample No.[2]	Marginal and Emergent NVC Community	'Goodness of fit' result from TABLEFIT	Floating and Submerged NVC Community	'Goodness of fit' result from TABLEFIT
1 (boundary B295)	S26 – Phragmites australis - Urtica dioica tall herb fen	44 – Very Poor	A2 - *Lemna minor* community	96 – Very Good
2 (boundary B353	Mg1 - Arrhenatherum elatius grassland	58 – Poor	A2 - *Lemna minor* community	55 – Poor
3 (boundary B256)	S26 - Phragmites australis - Urtica dioica tall herb fen	28 – Very Poor	A5b - Ceratophyllum demersum community, *Lemna minor* subcommunity	82 – Very Good
4 (boundary B221b)	W24a - Rubus fruticosus – Holcus lanatus underscrub, Cirsium arvensis – C. vulgare subcommunity	50 – Poor	N/A – this ditch was entirely dry and choked with bramble.	
5 (boundary B217b)	S22c - *Glyceria fluitans* water-margin vegetation, *Alopecurus geniculatus* sub-community	32 – Very Poor	A5b - Ceratophyllum demersum community, *Lemna minor* subcommunity	87 – Very Good
6 (boundary B193)	N/A – this ditch was dry at the east and not visible to the west due to tall scrub and as such survey was not possible. The data collected from the visible sections of the dry east was confirmed to be W24a - *Rubus fruticosus – Holcus lanatus* underscrub,			

[1] Fine-leaved pondweed *Potamageton trichoides* and rootless duckweed *Wolffia arrhiza* are both qualifying features of the SSSIs. Frogbit *Hydrocharis morsus-ranae*, tubular water-dropwort *Oenanthe fistulosa*, soft hornwort *Ceratophyllum submersum* and arrowhead *Sagittaria sagittifolia* are all components of the notified assemblage of plants in the SSSI.

[2] Sample locations are shown on Figure 8.3.1. Boundary/ field locations are shown within **Appendix 8B**.

	Cirsium arvensis – C. vulgare subcommunity (63 – Fair 'goodness of fit')			
7 (boundary B156)	S26 - Phragmites australis - Urtica dioica tall herb fen	35 – Very Poor	A2 - *Lemna minor* community	81 – Very Good
8 (boundary B82)	W24 - Rubus fruticosus – Holcus lanatus underscrub	40– Very Poor	A2a - *Lemna minor* community, Typical sub-community	100 – Very Good
10 (boundary B86)	S26 – Phragmites australis - Urtica dioica tall herb fen	35– Very Poor	A2 - *Lemna minor* community	74 – Good
11 (boundary B95)	W24 - Rubus fruticosus – Holcus lanatus underscrub	34– Very Poor	A2 - *Lemna minor* community	72 – Good
12 (the ditch at the boundary of F79 and F509)	S26c - *Phragmites australis* - *Urtica dioica* tall herb fen, Oenanthe crocata sub-community	63 – Fair	A2a - *Lemna minor* community, Typical sub-community	100 – Very Good
13 (boundary B341)	S26b - Phragmites australis - Urtica dioica tall herb fen, Arrhenatherum elatius sub-community	47 – Very Poor	A2 - *Lemna minor* community	69 – Fair

Bankside and Marginal Vegetation

1.3.9 Bankside and marginal samples within the survey area that show the strongest affinities with communities described in the NVC are the W24a Rubus fruticosus – Holcus lanatus underscrub (sample location 6) and Cirsium arvensis – C. vulgare subcommunity, and S26c - Phragmites-Urtica fen - Oenanthe crocata (sample location 12) with 'Fair' goodness of fit.

1.3.10 Phragmites australis -Urtica dioica tall herb fen (including a number of sub-communities) was recorded at the majority of locations, albeit (other than location

12) with only a ‘poor’ or ‘very poor’ fit to this community. This is likely due to the relatively high proportion of bramble and ruderal vegetation present within the marginal habitat, with locations 2, 4, 6, 8 and 11 having particularly high proportions of such species as reflected by their associated community classifications.

Floating and Submerged Vegetation

1.3.11 Samples of floating and submerged vegetation showed a much stronger affinity with communities described in the NVC, primarily relating to A2 - Lemna minor community (and associated subcommunities), reflecting the high dominance of common duckweed which covered much of the water surface across the Site. The community A5b - Ceratophyllum demersum community, Lemna minor subcommunity was recorded to a lesser extent, reflecting locations where duckweed was still dominant on the surface, and with abundant submerged rigid hornwort.

1.4 Further Survey Work

1.4.1 No further ecological survey work is considered necessary for the Proposed Development; however any changes to the proposed masterplan or if any significant amount of time has passed since the date of this report, a re-appraisal may be required.

1.5 Summary

1.5.1 The Gwent Levels SSSI is designated in part due to its reen and ditch habitat which form an important component of the coastal floodplain and grazing marsh habitat which forms the designation.

1.5.2 The reens and ditches surveyed at the Site vary in habitat quality from late successional banks with limited evidence of aquatic influences in the bankside communities which were becoming scrub encroached (notably at locations 4 and 6, and to a lesser extent locations 8 and 10) to bankside habitats dominated by tall emergent species (primarily common reed), particularly associated with the reens at locations 1, 3, 7, 10, 12 and 13. Location 5 supported a community consistent with a higher level of livestock access, maintaining open aquatic communities less dominated by tall emergent or scrub species. This variation is likely in part due to the management of these features which are understood to be cleared on a

rotational basis, with those dominated by scrub (and to a lesser extent by reeds) likely more mature examples.

1.5.3 The ditches and reens, while not of exceptional quality are all representative of the priority habitat coastal floodplain and grazing marsh. However, a relatively high proportion of these appear to be a late successional stage being heavily dominated by common reed and other emergent species, with some holding very little water, or even none at all at time of survey (location 4). No ditches or reens were considered to be in an early successional stage with the exception of location 5 which was subject to poaching and disturbance from livestock. Location 3 was accessed by livestock to a lesser extent and while dominated by tall emergent species, there was ample space for smaller marginal plants and annuals to establish. It is considered this location represented a good mid-succession example of reen habitat.

1.5.4 NVC survey data does not allow for a direct application of the SSSI Performance Indicator criteria to be applied due to its nature of being focussed on a single community at a single location, rather than assessing the lengths of each ditch/ reen. Nevertheless, it is noted that each reen should have a diversity of habitats comprising areas of short, medium and tall emergent plants, along with areas of bare ground and poaching to ensure a diversity of successional habitats is present along their length. Whilst some areas of poached ground and bare mud were present (notably at Locations 3 and 5), along with a small number of other localised instances of poaching, it was clear that the majority of the reens and ditches support relatively mature tall emergent and marginal vegetation, with a lack of disturbance. Of the indicator species[3] listed, the only species recorded during the NVC surveys was frogbit, located at Location 11 only. As such, from the evidence recorded (which is acknowledged to not be appropriate for a formal SSSI condition assessment due to methodological aims and objectives), it appears that the reens and ditches lack earlier successional stages, which may be reducing the abundance and distribution of the SSSI indicator species.

1.5.5 It is considered that the Site supports a lower botanical species diversity than

[3] Fine-leaved pondweed and rootless duckweed are both qualifying features of the SSSIs. Frogbit, tubular water-dropwort, soft hornwort and arrowhead are all components of the notified assemblage of plants in the SSSI

expected, and that sensitive management would benefit the Site, particularly opening out the late successional ditches and reens, maintaining a small amount of grazing and poaching. This conclusion is consistent with the findings of Murton et al. 2020a and Rodgers, 2023 across the Gwent Levels SSSIs.

1.6 References

Murton, K., Rodgers, K. and Hunt, A. (2020b) Conservation Objectives for the reen and field ditch habitat feature and aquatic plant features of the Gwent Levels SSSIs and Newport Wetlands SSSI. Natural Resources Wales.

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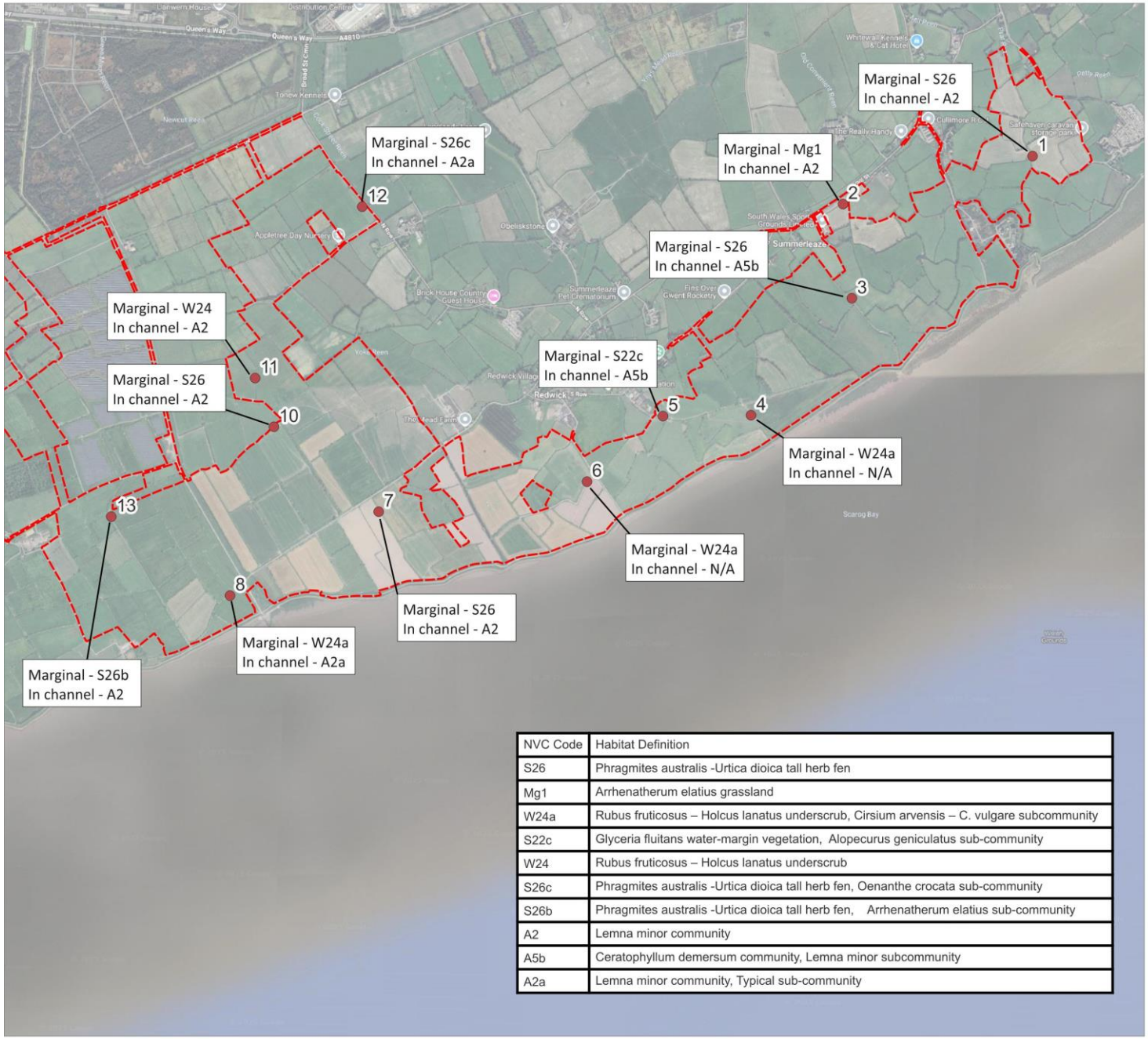
Annex A: Figures



Key:

- Site Boundary
- NVC Survey Parcel Centre Points

NVC Code	Habitat Definition
S26	Phragmites australis -Urtica dioica tall herb fen
Mg1	Arrhenatherum elatius grassland
W24a	Rubus fruticosus – Holcus lanatus underscrub, Cirsium arvensis – C. vulgare subcommunity
S22c	Glyceria fluitans water-margin vegetation, Alopecurus geniculatus sub-community
W24	Rubus fruticosus – Holcus lanatus underscrub
S26c	Phragmites australis -Urtica dioica tall herb fen, Oenanthe crocata sub-community
S26b	Phragmites australis -Urtica dioica tall herb fen, Arrhenatherum elatius sub-community
A2	Lemna minor community
A5b	Ceratophyllum demersum community, Lemna minor subcommunity
A2a	Lemna minor community, Typical sub-community

0 300 600 900 1,200 m

Figure 8.3.1:
NVC Survey Results

Project:
Future Energy Llanwern

Client:
Future Energy Llanwern Limited

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