



## UNIVERSAL DESTINATIONS & EXPERIENCES UK PROJECT

Former Kempston Hardwick Brickworks  
and adjoining land, Bedford

**Environmental Statement Volume 3**

**Appendix 6.8 Macrophyte Survey Report**

Report reference: 4.6.8.0

Revision number: 00

Date: June 2025





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# 1 INTRODUCTION

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## 1.1 PROJECT BACKGROUND

- 1.1.1. This macrophyte survey report has been prepared in support of the planning proposal for the Proposed Development as described in **Chapter 2: Description of the Proposed Development (Volume 1)** of the Environmental Statement.
- 1.1.2. The Site boundary is shown in **Figure 1: Macrophyte Survey Area of Annex 1: Figures**. The Site equates to 268ha and is divided into four zones referred to as the Core Zone, Lake Zone, West Gateway Zone, and East Gateway Zone. These Zones are hereafter collectively referred to as 'the Site'. This assessment focussed on the watercourses located in the Core Zone and the West Gateway Zone.

### ECOLOGICAL BACKGROUND

- 1.1.3. The Aquatic Habitat Scoping Assessment (**Appendix 6.2: Aquatic Habitat Scoping Assessment Report (Volume 3)**) identified the potential for the watercourses within the Site to support macrophyte communities.

## 1.2 SCOPE OF THE REPORT

- 1.2.1. WSP was commissioned to carry out macrophyte surveys of Elstow Brook and the Core Zone watercourse within the Site. The objectives of this report are to:
- Identify the potential of Elstow Brook and the Core Zone watercourse to support legally protected or otherwise notable macrophyte species;
  - Provide recommendations to enable compliance with relevant legislation and planning policy; and
  - Identify the need for avoidance, mitigation, compensation, or enhancement measures.

## 2 METHODS

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### 2.1 DESK STUDY

- 2.1.1. An online desk study was undertaken in April 2024 to review existing ecological baseline information available in the public domain and to obtain any information held by relevant third parties. The full desk study methodology is reported in the Aquatic Habitat Scoping Assessment (**Appendix 6.2: Aquatic Habitat Scoping Assessment Report (Volume 3)**).

### 2.2 MACROPHYTE SURVEYS

- 2.2.1. To establish an accurate composition of the macrophyte communities, macrophyte surveys were conducted along stretches of Elstow Brook and the Core Zone watercourse.
- 2.2.2. Macrophyte surveys were carried out in August 2024 by a team of suitably experienced and qualified aquatic ecologists.
- 2.2.3. Macrophyte surveys were carried out using the Water Framework Directive (WFD) UK Technical Advisory Group's<sup>1</sup> methodology for assessing macrophytes in rivers. This conforms with industry standard methodology.
- 2.2.4. Surveying recorded the presence of all macrophytes to species level where possible. Where this was not possible macrophytes were recorded under genus or other aggregate taxon level.

### 2.3 NOTES AND LIMITATIONS

- 2.3.1. Every effort has been made to provide a comprehensive description of the macrophyte communities located within the Site; however, the following specific limitations apply to this assessment:
- During the macrophyte survey, the Core Zone watercourse was noted as dry for much of its length within the Site boundary, with only a few small areas of shallow retained water and damp soil, therefore a full macrophyte survey could not be conducted. However, to gain an understanding of the macrophyte community present, visual observations of macrophytes present were made and species recorded. These surveys enabled an assessment of the macrophyte communities present within the watercourse and are therefore considered valid and sufficiently robust to inform the impact assessment and necessary mitigation measures.

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<sup>1</sup> Water Framework Directive UK Technical Advisory Group (2014) *UKTAG River Assessment Method Macrophytes and Phytobenthos: Macrophytes (River LEAFACS2)*. Available at: <https://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Biological%20Method%20Statements/River%20Macrophytes%20UKTAG%20Method%20Statement.pdf> [Accessed: 05 March 2025].

## 3 RESULTS

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### 3.1 DESK STUDY

- 3.1.1. Results from the desk study undertaken in April 2024 are reported within the Aquatic Habitat Scoping Assessment (**Appendix 6.2: Aquatic Habitat Scoping Assessment Report (Volume 3)**).

### 3.2 MACROPHYTE SURVEY

#### Elstow Brook

- 3.2.1. Elstow Brook, a tributary of the River Great Ouse, crosses through the West Gateway Zone, flowing under Manor Road, and then follows the Marston Vale Railway Line along the western boundary of the Lake Zone. The total length of the watercourse within the Site is approximately 1.9km (see **Figure 1: Macrophyte Survey Area of Annex 1: Figures**).
- 3.2.2. No macrophyte species were recorded during the macrophyte survey of Elstow Brook.
- 3.2.3. Within the Site boundary, Elstow Brook was recorded as being a heavily re-shaped and homogenous channel, with steep banks. It was noted that management of the watercourse had been carried out along the full length of the watercourses within the Site boundary, prior to the macrophyte survey, in which the riparian vegetation, including common reed *Phragmites australis*, had been cut back and/or removed.
- 3.2.4. During the macrophyte survey, dried specimens of an invasive waterweed *Elodea* sp., were noted within the spoil, likely from the management of the watercourse, that has been discarded on the bank top.
- 3.2.5. Survey photographs are presented in **Annex 2**.

#### ‘Core Zone’ Watercourse

- 3.2.6. This is an ordinary watercourse located within the Core Zone, flowing in an approximate south to north direction towards Manor Road. The length of the watercourse within the Site boundary is 1.5km (see **Figure 1: Macrophyte Survey Area of Annex 1: Figures**).
- 3.2.7. During the macrophyte survey, the Core Zone watercourse was noted as dry for much of its length within the Site boundary, with only a few small areas of shallow retained water and damp soil.
- 3.2.8. The bank tops and bank faces consisted of emergent vegetation of multiple species including:
- Hairy willowherb *Epilobium hirsutum*;
  - Bittersweet *Solanum dulcamara*;
  - Sedge species *Carex* spp.;
  - Water mint *Mentha aquatica*;
  - Reed sweet grass *Phalaris arundinacea*;
  - Common reed *Phragmites australis*; and
  - Horsetail species *Equisetum* spp.
- 3.2.9. Terrestrial tall herb vegetation was also present on the bank tops along much of the watercourse within the Site.

- 3.2.10. Despite the dry nature of the channel during the macrophyte survey, some in-channel macrophyte species were recorded. The species observed included:
- Common duckweed *Lemna minor*;
  - Water starwort species *Callitriche* spp.;
  - Reed mace *Typha latifolia*;
  - Water plantain *Alisma plantago-aquatica*;
  - Fool's watercress *Heloscandium nodiflorum*;
  - Watercress *Nasturtium officinale*; and
  - Yellow flag iris *Iris pseudacorus*.
- 3.2.11. The presence of these species suggests that the watercourse holds water for at least part of the year. It should also be noted that despite not being recorded during the macrophyte survey, likely due to the dry nature of the watercourse, a submerged water-crowfoot *Ranunculus* sp. was recorded in flower in the aquatic habitat scoping assessment.
- 3.2.12. Survey photographs are presented in **Annex 2**.



## 4 DISCUSSION

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### Elstow Brook

- 4.1.1. During the macrophyte survey it was evident that the macrophyte community present within Elstow Brook is likely impacted by watercourse management. It was assessed that this watercourse management likely occurs in order to maintain the shape of the watercourse.
- 4.1.2. Common reed was recorded along the margins of the watercourse during the aquatic habitat scoping assessment, with evidence of cut common reed along the banks during the macrophyte survey.
- 4.1.3. There was also evidence of an invasive non-native species (INNS), that had likely been removed from the watercourse during the watercourse management. *Elodea* species are known to reproduce vegetatively in the UK, through small pieces of stem which break off from the main plant. These pieces are known to have high survival rates and can rapidly spread throughout a watercourse. When present in a watercourse, the plants can form dense stands that impact the growth of other macrophytes through the blocking of light and the production of anoxic conditions<sup>2,3</sup>.
- 4.1.4. Without anthropogenic and environmental pressures, Elstow Brook likely provides suitable habitat to support a macrophyte community of moderate diversity. However, it was assessed that management practices and the presence of *Elodea* sp., likely impact the macrophyte community present, preventing the establishment of many species, resulting in a community of low diversity and conservation value.

### Core Zone Watercourse

- 4.1.5. During the macrophyte survey, the Core Zone watercourse was noted as dry for much of its length within the Site boundary, with only a few small areas of shallow retained water and damp soil.
- 4.1.6. Despite the lack of water within the watercourse at the time of survey, macrophyte species were recorded as growing within the channel, particularly on areas of damp soil. No species of conservation interest, nor any INNS, were recorded in the macrophyte survey of the Core Zone watercourse; however, it is important to note the presence of a water crow-foot species recorded in the channel during the aquatic habitat scoping assessment.
- 4.1.7. The Core Zone watercourse was assessed as providing suitable habitat for a low-moderately diverse macrophyte community, that may be impacted by episodic dry periods.

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<sup>2</sup> GB Non-Native Species Secretariat (2016) *Canadian pondweed (Elodea canadensis): Risk Assessment Summary Sheet*. Available at: [https://www.nonnativespecies.org/assets/Uploads/Elodea\\_canadensis\\_Canadian\\_pondweed.pdf](https://www.nonnativespecies.org/assets/Uploads/Elodea_canadensis_Canadian_pondweed.pdf) [Accessed: 05 March 2025].

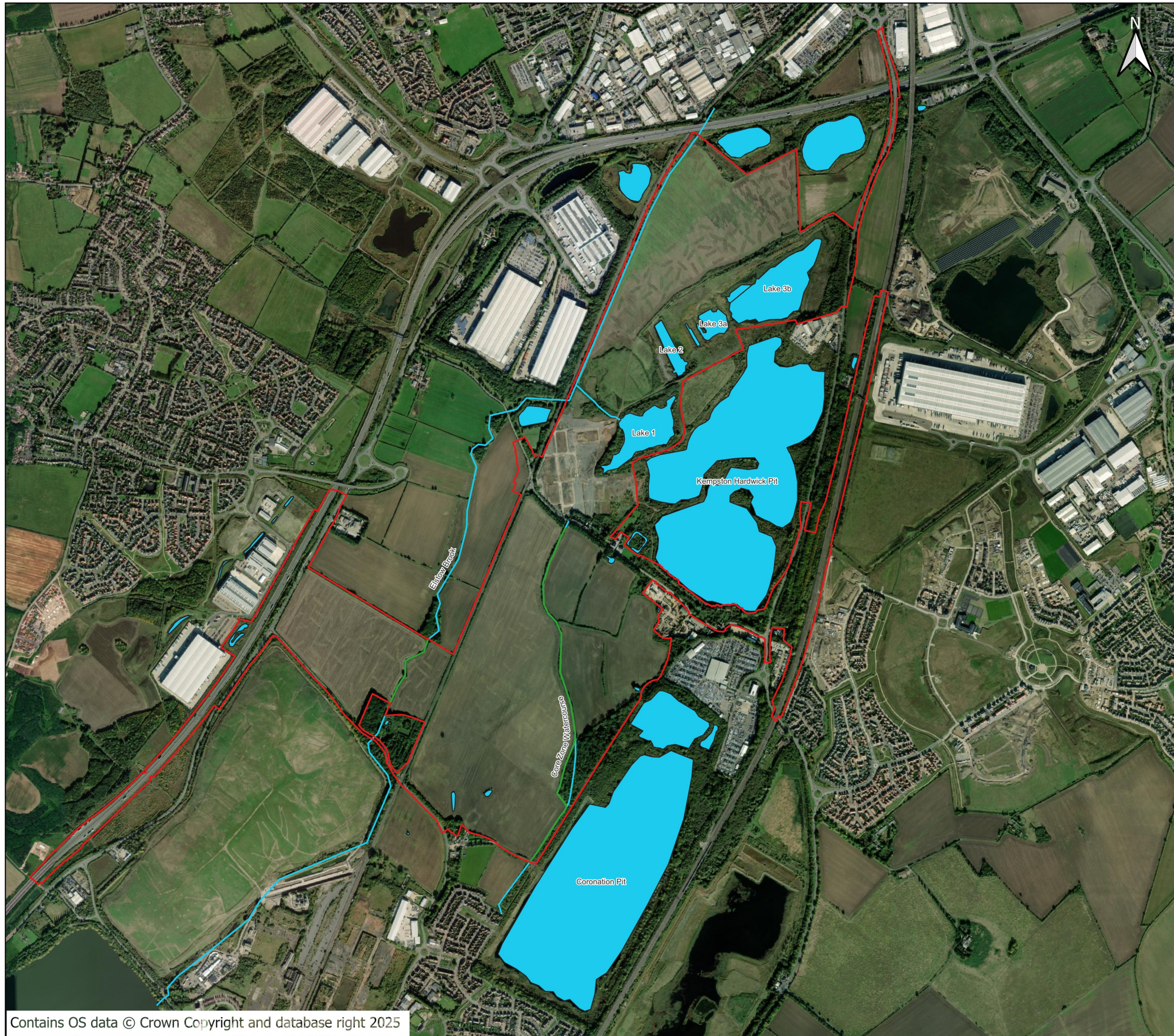
<sup>3</sup> GB Non-Native Species Secretariat (2016) *Nuttall's waterweed (Elodea nuttallii): Risk Assessment Summary Sheet*. Available at: [https://www.nonnativespecies.org/assets/Uploads/Elodea\\_nuttallii\\_Nuttalls\\_waterweed.pdf](https://www.nonnativespecies.org/assets/Uploads/Elodea_nuttallii_Nuttalls_waterweed.pdf) [Accessed: 05 March 2025].

# Annex 1

## FIGURES







- Key
- Site boundary
  - Macrophyte survey
  - Watercourses
  - Lakes

0 250 500 m



Client:  
Universal Destinations & Experiences

Project:  
Universal Destinations & Experiences  
UK Project

Title:  
Figure 1 - Macrophyte Survey Area

Drawing No: 70116516-Appendix 6-8-Figure 1 Drawn: LB

Date: 16/05/2025 Checked: LM

Scale: 1:15,308 Approved: VD



# Annex 2

## **SITE PHOTOGRAPHS**





**Figure 2-1 – Elstow Brook**



**Figure 2-2 – Elstow Brook**



**Figure 2-3 – Elstow Brook**



**Figure 2-4 – Elstow Brook**





**Figure 2-5 – Core Zone Watercourse**



**Figure 2-6 – Core Zone Watercourse**



**Figure 2-7 – Core Zone Watercourse**



**Figure 2-8 – Core Zone Watercourse**





**Figure 2-9 – Core Zone Watercourse**



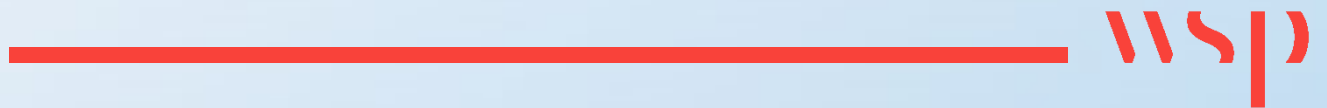
**Figure 2-10 – Core Zone Watercourse Divergence**



**Figure 2-11 – Core Zone Watercourse Water Crow-Foot (from aquatic habitat scoping assessment)**

# Annex 3

## **RELEVANT LEGISLATION AND POLICY**





This report has been compiled with reference to the following relevant wildlife legislation and planning policy. Full details of all relevant legislation and policy are provided in **Appendix 3.1: Legislation, Policy and Guidance for all ES Technical Topics (Volume 3)**.

### ***Natural Environment and Rural Communities (NERC) Act 2006***

Species and Habitats of Principal Importance in England and Wales are listed under *Section 41* and *Section 42* respectively of the *NERC Act*<sup>4</sup>. The *Section 41* and *42* lists detail species that are of principal importance for the conservation of biodiversity in England and Wales and should be used to guide decision-makers such as local and regional authorities when implementing their duty to have regard for the conservation of biodiversity in the exercise of their normal functions – as required under *Section 40* of the *NERC Act 2006*.

### ***The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017***

The purpose of the WFD<sup>5</sup> is to establish a framework for the protection of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater and for water all waterbodies (unless artificial or heavily modified) to achieve “good” ecological status.

Ecological Status is expressed in terms of five classes (high, good, moderate, poor, or bad). These classes are established on the basis of specific criteria and boundaries defined against biological, physico-chemical and hydromorphological elements. Biological assessment uses numeric measures of communities of plants and animals (for example, fish and rooted plants). Physico-chemical assessment looks at elements such as temperature and the level of nutrients, which support the biology. Hydromorphological quality looks at water flow, sediment composition and movement, continuity (in rivers) and the structure of physical habitat.

The overall Ecological Status of a water body is determined by whichever of these assessments is the poorer. For example, a water body might pass ‘Good Status’ for chemical and physico-chemical assessments but be classed as ‘Moderate Status’ for the biological assessment: In this case it would be classed overall as ‘Moderate Ecological Status’. To achieve the overall aim of good surface water status, the Directive requires that surface waters be of at least Good Ecological Status and Good Chemical Status. To achieve High Status, the Directive requires that the hydromorphological Quality Elements are also in place.

When considering the effect of a development or activity on a waterbody it is a regulatory requirement under the WFD<sup>5</sup> to assess if it will cause or contribute to a deterioration in status or jeopardise the waterbody achieving good status in the future.

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<sup>4</sup> HM Government (2006) *Natural Environment and Rural Communities Act 2006*. Available at: <https://www.legislation.gov.uk/ukpga/2006/16/contents> [Accessed: 25 March 2025].

<sup>5</sup> HM Government (2017) *The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017*. Available at: <https://www.legislation.gov.uk/uksi/2017/407/contents> [Accessed: 25 March 2025].



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