



BNG Addendum

Response to Arup and Environment Agency Comments

HWSFAC, Broadwater Lake, London Borough of Hillingdon

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1 Introduction

Harper Environmental Ltd have provided a Biodiversity Net Gain (BNG) assessment in support of a revised planning application for a new children's outdoor sailing and water sports facility (HWSFAC) at Broadwater Lake, Hillingdon (the proposed development).

Arup, working on behalf of the London Borough of Hillingdon Planning department, have undertaken an independent technical review of the ecology assessments submitted in support of the proposed development. In particular initial comments have been received on the BNG assessment.

This technical note provides a response to the points Arup have raised in relation to the BNG assessment. Broadwater Lake has been referred to as 'the lake' within this report. The statutory metric has been referred to as 'the metric'.

In addition, Section 3.6 provides a response to comments raised by the Environment Agency in their later dated 9 January 2026 (NE/2023/136465/02).

This document is issued as an **Addendum to the submitted BNG Assessment** and supersedes the previously submitted metric. It provides supplementary information in response to Arup and the EA's comments and presents an updated statutory metric calculation.

The updated Biodiversity Metric is provided at **Appendix B**.

For background context, Natural England have recently responded to the application with 'no objection subject to mitigation'.

2 Arup Comment

“The BNG metric calculation considers that the new ‘floating reedbed habitats’ will both ‘triple the area of emergent vegetation at the lake, and at least double the area of shallows’ as well as ‘not result in a loss of open water’ and improve the condition of the lake from moderate to fairly good. Accounting for these in this way risks double counting the benefits and a potential higher resultant BNG value.

Following the metric calculation rules, our suggestion would be that floating reed habitat would either count as an additional area of habitat creation that reduces the area of open water, or that it improves the habitat condition by diversifying the open water habitat (and becomes part of the same area of open water habitat that is maintained in its classification as such).

There is a question as to the likelihood of these measures positively impacting water quality/condition in a measurable way, when the images below demonstrate that the scale of intervention is relatively minor compared to the base area of the waterbody.

*This may also apply to **other new aquatic features** being added where these overlap with pre-existing open water habitat, namely underwater planters, floating reedbeds, and marginal vegetation (reed fringes).*

Given the current gain is 10.01% for area units, if the value of floating (and similar) habitats were to be re-calculated, it is likely the overall gain would fall below the mandated minimum 10%.

*Please can the Applicant comment on the approach applied **and consider updating the BNG calculation** in line with this interpretation of the metric rules. Should the recalculated value fall below 10%, consideration should be given to the potential inclusion of **additional enhancement measures**, on or off-site.”*

3 Response

Key points (highlighted in bold above) have been addressed below, namely:

- a) double counting of floating reedbeds;
- b) the impact of other aquatic features;
- c) recalculation of the BNG metric; and
- d) additional enhancement measures.

Some background research was undertaken in support of the below response. Relevant sources have been listed in Appendix A Research Sources.

3.1 Double counting of floating reedbed habitat

The points Arup raise on the evolved interpretation of the metric rules and more recent practice since 2023 have been very helpful and indeed highlight that the submitted BNG assessment requires an update in alignment with current approaches.

Having reviewed the metric provided, alongside 2024–25 updates to statutory BNG guidance, practice around stacking and Rule 4 clarifications, we agree with the underlying interpretation: floating habitats should not be counted both as additional habitat area and as unchanged open water where the same footprint is involved, as this would effectively double-count benefits and over-state the BNG outcome. The most robust way to avoid this is to treat each square metre of habitat as belonging to one habitat type only, with any condition uplift expressed through that single habitat entry.

Therefore, the additional floating islands / Floating Treatment Wetland (FTW) areas have been treated as part of the open-water lake habitat for the purposes of the metric, rather than as separate terrestrial/wetland habitat polygons. Their contribution has been captured through an uplift to lake condition, reflecting their role in:

- contributing to necessary water-quality remedies (nutrient processing and dissolved oxygen support);
- supporting biofilm filtration, temperature and light gradients;
- creating structural refuge and foraging habitat for macroinvertebrates and fish;
- offering nesting/loafing refugia for bird colonies; and
- providing valuable real-world data to contribute to the evidence base for nutrient removal or WQ benefits provided by FWTs within open water¹ - for which evidence will augment more prevalent scenarios for FWTs e.g:
 - local to source pollution inputs as edge habitat (Gallions Lake, Thames 21); or
 - as part of stepped regimes, e.g. in polishing systems:
<https://www.sciencedirect.com/science/article/abs/pii/S0925857413003650>

Under this approach, the total mapped lake open water area is not reduced by the footprint of floating islands, planters or edge-attached floating vegetation. The floating habitats remain within

¹ <https://createdigital.org.au/floating-treatment-wetlands-an-innovative-path-to-sustainable-treatment-and-thriving-habitats/>

the lake polygon, and their ecological benefits are recognised through the condition assessment rather than as an additional overlapping habitat type.

This “condition-only” approach is consistent with the principle that floating habitats must either:

- be treated as diversifying and enhancing the existing lake habitat, in which case they remain part of the same open-water polygon; or
- be treated as additional habitat area, with a corresponding reduction in open water.

We propose to adopt the first option as the cleanest application of the current rules and evolving practice.

3.2 Impact of other new aquatic features

3.2.1 Island edges

Where islands edges will be reduced in height to be below the water table in hydrological winter (and likely also in non-drought summers), these areas have been counted as increased area of open water and not as separate habitat within the metric.

The comment against this created open water habitat area in the metric has been updated as follows:

Increased open water area by scalloping islands to create gently shelving areas. Contributes to improved lake condition by providing more shallows. Potential for aquatic macrophytes and emergent plants to establish but survival unknown.

Due to the fluctuation in water height over the year and over subsequent years, aquatic emergent vegetation at the lake has a very hard time surviving and struggles to establish (for example see remnant areas of dead reedbed at the lake in the south-west from a previous failed enhancement scheme). Although it would be greatly beneficial for emergent vegetation or fen-type habitat to establish in these new shallow edges, there is insufficient confidence to allow for fen habitat to be claimed as being created within the BNG metric. On balance it is believed these areas will endure as open water.

Benefit to the lake condition is still realised from the increased shallow (<1m) marginal areas improving the naturalness of the physical structure of the lake.

Loafing water birds also enjoy these shallows, as seen just off the north edge of island 2 where a very small shallow area of gravel at the water surface is always occupied by 5-6 birds throughout the year.

Interventions to support the establishment of pockets of fen habitat could be undertaken in future years as part of agreed site management under the MEMP.

3.2.2 Marginal vegetation / Peninsula edge (beach and lagoon)

No separate habitat has been entered into the metric for marginal vegetation / emergent beds or aquatic planting. This is for the same reasons stipulated above for island edges whereby there is uncertainty about the success of establishment. Measures to create and support long term establishment of marginal vegetation will need to be implemented over the long term in response to

observations of the habitat at the lake. This will be important to contribute to the improvement of lake condition as described within the metric. This management will be secured within the MEMP.

3.2.3 Underwater planters

Underwater tree planters have not been counted either towards the change in lake condition, or as affecting the area of open water.

The trees that will grow in the planters are to be provided primarily to visually partition and screen the open water of the lake from the south-west bird refuge area, and will also provide additional breeding sites for a range of species. Providing a benefit to the breeding, moulting and wintering bird assemblages that cannot be quantified within the BNG metric.

The planters will be submerged and will hold individual willow trees that can thrive with their roots entirely immersed in water (as seen at the lake already). The planter design mimics the islands that appear at the lake – these are mounds of gravel. On the vast majority of these islands, only the willow trees growing within the gravels are above the water, there is no actual landmass above water at the normal water levels for the lake.

The surface area of each planter individually will be below the minimum mapping unit for BNG (<25m²) and these will be designed to not appear above the surface of the water in hydrological winter.

Trees are mapped as a feature overlying another habitat (unless the habitat is dominated by trees i.e. woodland) and do not cause the underlying habitat to be reduced in area for the purposes of the BNG metric.

The trees have not been considered as contributing to the overall improvement of the lake condition – they don't provide shallows, and there is no evidence that tree roots will significantly remove nutrients from the water. The planters will not affect the circulation of the water in the lake, being widely spaced and small in size. Therefore although the planters are an artificial feature they are very limited in extent, within a waterbody that is already artificial in its origins, and so are not considered to negatively impact the lake condition. They provide a foothold for trees to establish, providing benefits for birds at the lake.

Therefore the approach adopted (assessment of the trees as rural individual trees within the metric, overlying another habitat beneath) is considered to be correct and not double counting.

3.3 Recalculated BNG score

The BNG calculation has subsequently been updated so that floating reedbeds are reflected solely in the open water condition score rather than as both extra habitat area and unchanged open water.

The recalculated area-based gain is 9.72%.

The planning submission was originally made prior to 12 February 2024 and, notwithstanding subsequent revisions, retains its original submission date for the purposes of the Environment Act transitional arrangements. The proposal is therefore not subject to mandatory 10% Biodiversity Net Gain requirements.

Notwithstanding this, the Applicant remains committed to delivering meaningful biodiversity enhancements through the scheme design and long-term management of Broadwater Lake, as secured via the MEMP.

3.4 Further enhancement options

Whilst 10% BNG is not a statutory requirement for this application, the Applicant will continue to explore proportionate opportunities for further on-site enhancement within their land control, to be progressed where feasible through detailed design and the MEMP process.

This does not constitute a commitment to achieving a specific numerical BNG target or to securing off-site units, but reflects an adaptive management approach to lake restoration based on monitoring outcomes and ecological response.

Off-site biodiversity units are not proposed at this stage, given the project's transitional status and the emphasis on delivering enhancements directly within Broadwater Lake.

3.4.1 Lake condition improvement

The Lake Condition Assessment sets out how lake condition is targeted to be improved. The Lake Condition Assessment is cross-referenced within the Draft MEMP (Section 3.4). Some detail is reproduced below along with a comment relating to this report. As can be seen, some measures will be delivered initially through the proposed development, while others will be delivered longer-term.

Lake Condition Assessment Detail	Comment / Captured in the BNG assessment
<i>(For physical naturalness) Proposed development will deliver:</i>	
<i>Excavation of shallow submerged areas on islands</i>	Yes part of the proposed development
<i>Creation of beaches and shallow ledges around the peninsula</i>	yes part of the proposed development
<i>Development of emergent vegetation within new shallows</i>	No not quantified , as unknown where this might succeed, possibly very little or none could establish without further long-term intervention (provided for within the MEMP)
<i>Provision of floating reedbeds</i>	Part of the proposed development but not captured within the BNG metric as a specific area
<i>In the future further opportunities exist to go beyond development proposals:</i>	
<i>Soften / remove steep edges where feasible</i>	Yes secured through MEMP, would possibly be done with a digger pulling in bed sediments and bankside materials into an area contained by a silt curtain
<i>Creation of fringing wetland around peninsula through selective coppicing and pruning back of willows at the water's edge</i>	Yes secured through the MEMP if management of peninsula woodland agreed with managing body for the lake
<i>Create reedbed filtration within east channel to mitigate polluted water input (from the adjacent canal) and create further fringing wetland</i>	This measure also relates to improvement of hydrological and chemical naturalness. The original intent was to include this in the proposed development upfront but due to the complexity of the project was pushed back to become part of longer-term enhancement

	<p>proposals through the MEMP. Could be brought forward if required.</p> <p>As reedbed habitat it would replace an equivalent area of wet woodland along the lake shore.</p>
<p><i>An ambitious target long-term would be the equivalent of 1/3rd of shoreline to have emergent vegetation or fen / reedbeds through long-term interventions and enhancement.</i></p>	<p>A long-term target envisaged to be set as a principle through the MEMP, but this needs to be a responsive target through success of initial trial works, and monitoring feedback mechanisms in the MEMP.</p>

If further detail on future enhancements above those captured in the BNG metric is required, a Lake Enhancement Strategy could be produced to provide more detail, forming part of the Final MEMP.

3.5 Securing the provision of floating habitats

Although floating habitats are no longer quantified as a discrete habitat area within the BNG metric, their delivery forms part of the proposed development and will be secured through planning condition via the final Landscape Scheme and MEMP.

The precise extent and configuration of floating habitats will be defined at detailed design stage and set out within a Lake Enhancement Strategy forming part of the Final MEMP, allowing provision to be refined over time in response to monitoring and ecological performance.

3.6 Response to Environment Agency Biodiversity Net Gain Comments

The Environment Agency provided comments on the BNG assessment relating to the treatment of floating reedbeds, lake condition uplift and the River Colne watercourse.

The submitted statutory metric has been updated to address concerns regarding potential double counting of floating habitats. Floating reedbeds are no longer treated as a discrete habitat type and are instead incorporated within the open-water lake polygon, with any ecological benefit reflected through condition only. This ensures that habitat area is not overstated and aligns with current statutory metric guidance and practice.

Following this revision, the recalculated area-based BNG gain is approximately 9.72%.

Post-development the lake remains classified as *fairly good condition* within the updated metric (uplifted from moderate condition in the baseline, in line with previous iterations of the metric). The proposed works introduce localised physical enhancements (including a beach and shallow margins at the north-east of the peninsula, and scalloped island edges on island 2 and 6) as well as creating floating habitats to provide a large new area of emergent / fen-type vegetation with extensive underwater root-zone that actively filters and removes nutrients from the water. However these measures are not solely relied upon for the uplift in overall lake condition. Potential longer-term improvements to physical and chemical naturalness will be progressed adaptively through the MEMP, informed by monitoring outcomes. There are 10 years within the BNG metric to achieve the lake condition improvement, and the MEMP provides the mechanism for this to be achieved and maintained over 30 years.

The River Colne is included within the metric as an on-site watercourse and is currently recorded as being in *moderate condition*, with no enhancement applied. The river condition assessment was

made by a qualified and accredited RCA assessor Alex Hurley on behalf of Greengage in September 2024 including MoRPh5 assessments of the River Colne and Grand Union canal, and analysed in Cartographer. For the River Colne, three MoRPh5 surveys were undertaken (one was outside the red line boundary), with all surveyed reaches assessed as **Moderate** condition. For the Grand Union Canal, two MoRPh5 surveys were carried out. The southern section was assessed as **Poor** condition and the northern section as **Fairly Poor** condition.

No direct in-channel or bankside works are proposed as part of the development and very little of the site / red line boundary lies within the 10m riparian corridor for the River Colne. Therefore no watercourse uplift has been claimed within the BNG calculation, and opportunities to improve the river condition assessment have previously been dismissed. However these will be further explored during 2026 including a review of the original assessment, and an update river condition assessment and terrestrial habitat survey will be undertaken in 2026 in the appropriate season by an accredited surveyor, to inform the MEMP and future restoration and enhancement proposals.

The application was originally submitted prior to 12 February 2024 and, notwithstanding subsequent revisions, retains its original submission date for the purposes of the Environment Act transitional arrangements. The scheme is therefore not subject to mandatory 10% Biodiversity Net Gain requirements for either area habitats or watercourses.

Notwithstanding this, the Applicant remains committed to delivering proportionate biodiversity enhancements through the scheme design and long-term management of Broadwater Lake. Opportunities for additional marginal and riparian improvements within land under the Applicant's control will continue to be explored through the MEMP, but off-site biodiversity units are not proposed at this stage.

Appendix A Research Sources

The 2025 Statutory Biodiversity Metric user guide and gov.uk guidance

<https://www.gov.uk/government/publications/statutory-biodiversity-metric-tools-and-guides>

The 2022 Biodiversity Metric 3.1 user guide (and extrapolation regarding double counting only of different currencies of species and area units, analogous to separating WQ function)

[https://www.ofwat.gov.uk/wp-](https://www.ofwat.gov.uk/wp-content/uploads/2022/12/Biodiversity_Metric_3point1_UserGuide.pdf)

[content/uploads/2022/12/Biodiversity_Metric_3point1_UserGuide.pdf](https://www.ofwat.gov.uk/wp-content/uploads/2022/12/Biodiversity_Metric_3point1_UserGuide.pdf)

PAS 2025 SBMUG fundamental rules and application of Rule 4 (exceptional)

[https://www.local.gov.uk/sites/default/files/documents/2\(November%202025\)%20Metric%20Rules_Rule%204%20\(BNG\)_PAS%20Advice%20Note.pdf\[23\]](https://www.local.gov.uk/sites/default/files/documents/2(November%202025)%20Metric%20Rules_Rule%204%20(BNG)_PAS%20Advice%20Note.pdf[23])

Extrapolations from NE Access to Evidence library regarding functional reed bed and payment schemes, lake enhancement measures, open water enhancement, and definition of encroachment as hard/engineered within BNG watercourse metric, e.g.

Lake restoration remedy guidance <https://priorityhabitats.org/wp-content/uploads/Lake-restoration-remedy-guidance-final.pdf>

Introduction to Freshwater Wetlands for Improving Water Quality

<https://publications.naturalengland.org.uk/publication/4866931000868864?category=2433118>

Multi-functional Benefits and Biodiversity Net Gain, PAS 2025

<https://www.local.gov.uk/pas/environment/biodiversity-net-gain-bng-local-planning-authorities/bng-library/multi-functional>

Lake Naturalness Assessment Guidance 2019, NE

<https://priorityhabitats.org/wp-content/uploads/Lake-Naturalness-Assessment-Guidance-3.pdf>

The Watercourse Metric - as reached through PAS FAQs, and WWT challenge

https://www.local.gov.uk/sites/default/files/documents/PAS%20Watercourse%20Metric%20FAQs%20-%20final.pdf?utm_source=copilot.com

(WWT CEO statement regarding double counting BNG and wetlands WQ function)

<https://www.wwt.org.uk/about-us/news/biodiversity-net-gain-as-new-rules-for-developers-that-could-help-wetlands-are-introduced-sarah-fowler-addresses-key-conference>

CWT13: Manage and restore fen, reedbed and wetland mosaics

<https://www.gov.uk/find-funding-for-land-or-farms/cwt13-manage-and-restore-fen-reedbed-and-wetland-mosaics>

Potential augmentation for DO

<https://www.frogenvironmental.co.uk/products-floating-wetlands/>

<https://www.frogenvironmental.co.uk/products/silt-bubble-barriers/?category=silt-control>

<https://www.aquascienceltd.co.uk/reedbeds-islands/>
