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# Environmental Statement

## Non-Technical Summary

### Hillingdon Water Sports Facility and Activity Centre

November 2023

Q220454

# Contents

# 1 Introduction

## Background

This Non-Technical Summary presents a summary of the findings of an Environmental Statement (ES) that reports the findings of an Environmental Impact Assessment (EIA) process. The ES accompanies a detailed planning application for a proposed development known as the 'Hillingdon Water Sports Facility and Activity Centre' at Broadwater Lake, Moorhall Road, Harefield, Uxbridge, UB9 6PE (the 'Site'). The planning application is submitted to London Borough of Hillingdon (LBH). LBH is also the applicant for the planning application ('Applicant'). **Figure 1.1** shows the location of the Site. The majority of the Site is located within the Mid-Colne Valley Site of Special Scientific Interest (SSSI) (see Section 2.0 for further details).

The Proposed Development will provide a leisure-led development which will provide a facility for water-based activities including sailing, rowing, kayaking and land-based activities such as camping and high ropes, together with supporting buildings and structures. The proposals have been designed to provide a new base for the Hillingdon Outdoor Activity Centre (HOAC). The proposals also involve the relocation of the existing Broadwater Sailing Club (BSC) facilities. BSC already use Broadwater Lake for sailing and club activities. Localised dredging of the lake is required to create depths suitable for sailing and generate material to be re-used for partial land reclamation and islands creation. The proposals also involve a commitment for the long term management of the water environment and wildlife at Broadwater Lake. The proposals are subsequently referred to as the 'Proposed Development'. A more detailed description of the Proposed Development is provided in Section 5: Description of the Development.

## Why is this Development needed?

HOAC is a registered Youth Educational Charity providing outdoor and environmental education for the whole community but with priority given to young people and those who are disadvantaged or disabled. Until 2020, HOAC operated at a 45 acre site in Dews Lane, Harefield, Uxbridge, UB9 6JN within LBH. The majority of HOAC users were local schools, colleges, community groups and businesses. HOAC offered a wide range of land and water based activities and was a valuable community resource for outdoor education.

The HOAC had to close in October 2020 due to construction of High Speed 2 (HS2) Phase 1, the new high speed rail line connecting London, Birmingham and Crewe. The land required for construction of HS2 resulted in closure of the lake for watersports and it was accepted that HS2 would impair the land based activities of HOAC during the construction period. The High-Speed Rail (London – West Midlands) Act 2017 "the HS2 Act"[1] includes a legal requirement for HS2 to fund relocation of the HOAC to an alternative site which is suitable for their needs. Further information on the need for the Proposed Development is provided in the Planning Statement which accompanies the planning application.

[1] https://www.legislation.gov.uk/ukpga/2017/7/contents/enacted

## What is an EIA and ES?

EIA is a process which is required by UK legislation for certain development projects which are likely to have significant impacts on the environment. The purpose of EIA is to ensure that decision makers, and the public, understand environmental effects of a development before deciding whether to grant planning permission. The findings of the EIA process are reported in an ES which is submitted with the planning application.

The findings of the EIA process are provided in a report known as an ES which is submitted with the planning application. The ES provides environmental information about the site, the Proposed Development, its predicted environmental effects and the measures proposed to mitigate any adverse effects. This document provides a summary of the ES in non-technical language.

The EIA process was carried out by a team of competent experts who also prepared the ES. The ES was prepared in line with the relevant UK legal requirements (the EIA Regulations[1] (as amended)[2]), and good practice. The ES comprises:

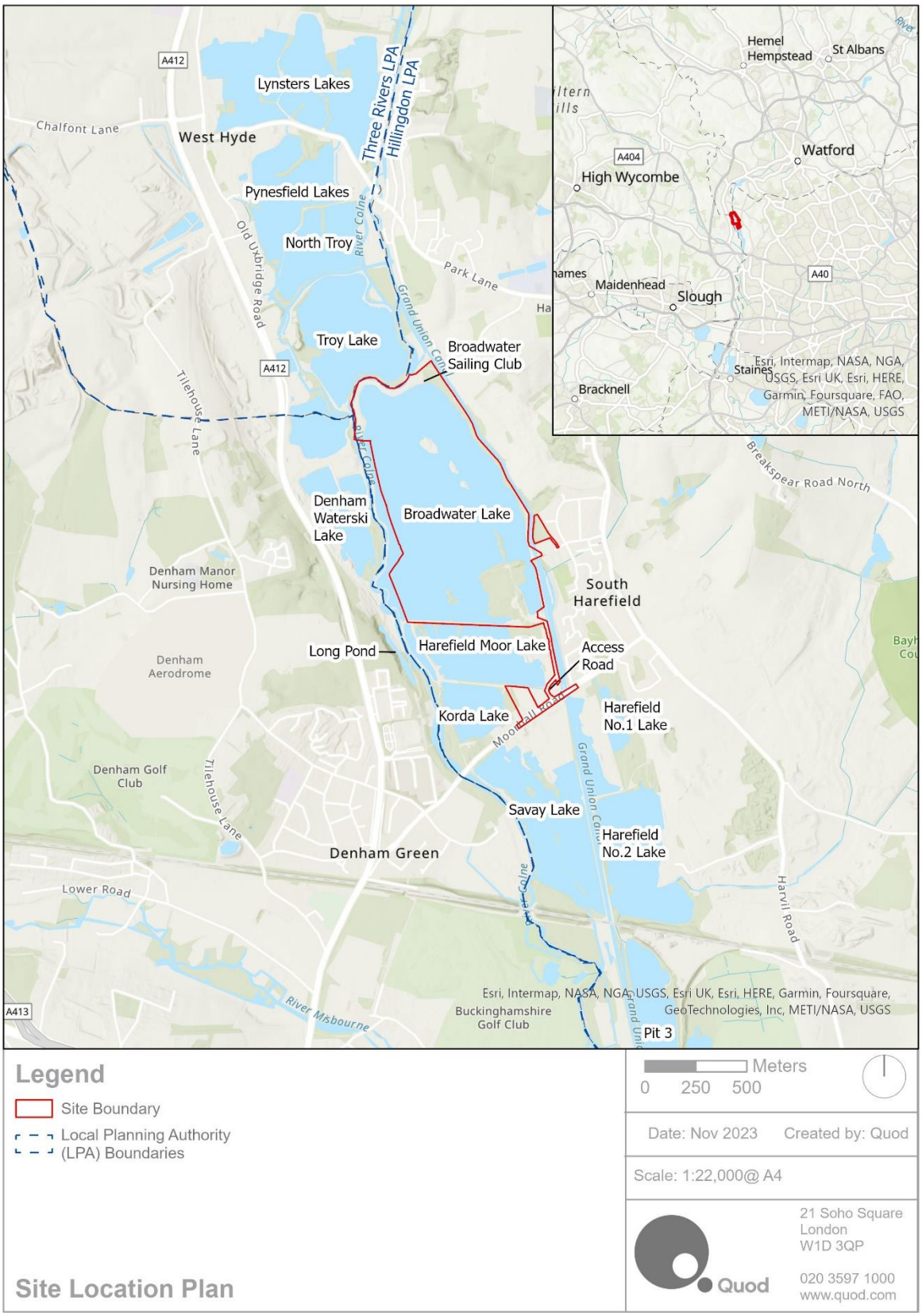
- **Non-Technical Summary (NTS)** (this document)
- **Volume I:** Main Body
- **Volume II:** Appendices

## How do I comment on the planning application?

The planning application for the Proposed Development, including the ES and other supporting documents such as the Design and Access Statement, Landscape Strategy, Planning Statement and detailed drawings, are available to view on LBH's website at https://www.hillingdon.gov.uk/planning and hard copies are available at Hillingdon Council, Civic Centre, High Street, Uxbridge, UB8 1UW.

Copies of the ES can also be purchased from Quod. Please email reception@quod.com quoting Reference No. Q220454 for further details or contact 020 3597 1000. Additional copies of this NTS are available free of charge.

## Figure 1.1: Site Location Plan



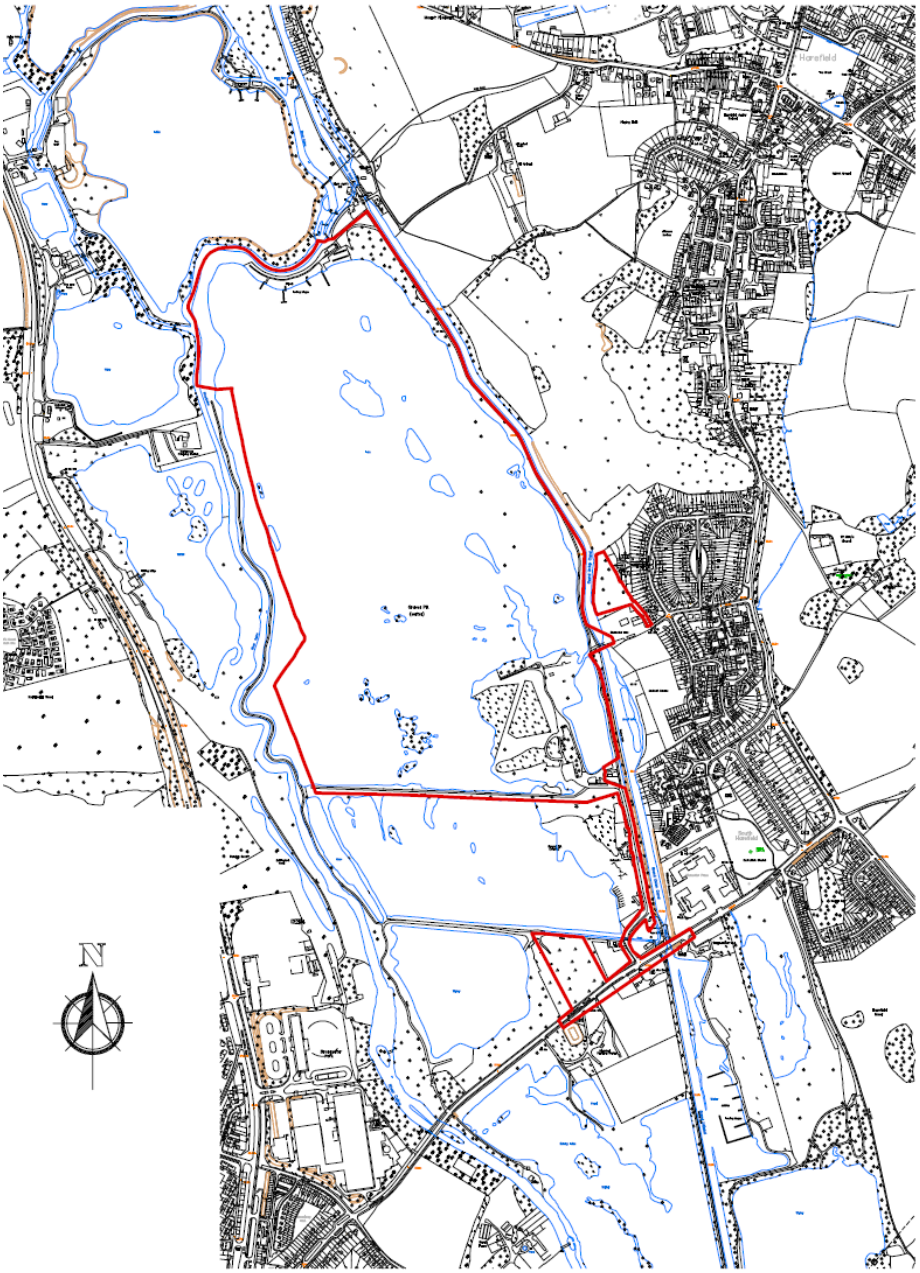
# 2 Site and Setting

## Where is the Site?

The Site is located in the administrative boundary of London Borough of Hillingdon and is approximately 5km north of Uxbridge town, within the Colne Valley Regional Park. South Harefield village lies to the east of the Site, immediately beyond the Grand Union Canal.

The Site is in close proximity to the boundaries of Buckinghamshire Council (adjacent to the west boundary of the Site) and Three Rivers District Council (adjacent to the northern boundary of the Site) as shown on **Figure 1.1.** The planning application boundary of the Site is shown on **Figure 2.1.**

Figure 2.1: Site Boundary



## What does the Site include?

The Site extends to approximately 80 hectares. **Figure 2.2** shows some of the key features within the Site.

The majority of the Site comprises Broadwater Lake (approximately 62 ha), a large body of water with a number of small islands bordered by trees and scrub. The lake was created after the area was used as a quarry for sand and gravel extraction between the 1960s and the 1990s. Broadwater Lake is the largest of four lakes within the Mid-Colne Valley Site of Special Scientific Interest (SSSI). The extent of the SSSI designation is shown on **Figure 2.3.** The Site is also located within the Green Belt.

The south of Broadwater Lake includes a peninsula shaped landform (the 'peninsula') formerly utilised as a gravel washing / processing plant with two silt lagoons and a landfill for inert quarry wastes. Structures associated with the Sites former quarry use remain at the Site including weighbridge, aggregate hoppers, concrete foundations and areas of hardstanding.

The quarry was decommissioned by the operator in 1992. Since then, the silt lagoons, areas of the peninsula have colonised with native broadleaf woodland comprised of pioneer and wetland species such as alder, silver birch and willows.

An area of open water (referred to as the 'lagoon') is located to the east of the peninsula within the Site.

BSC have planning permission[2] to sail in the northern part of Broadwater Lake (up to 50 boats at any one time). They operate from a single storey club house and storage containers are located on the northern shore of the lake. BSC has boat parking space for approximately 260 boats with three concrete slipways and three pontoons (one floating and two fixed) providing access to the water. BSC also has access to an area of unsurfaced parking and access road at the north end.

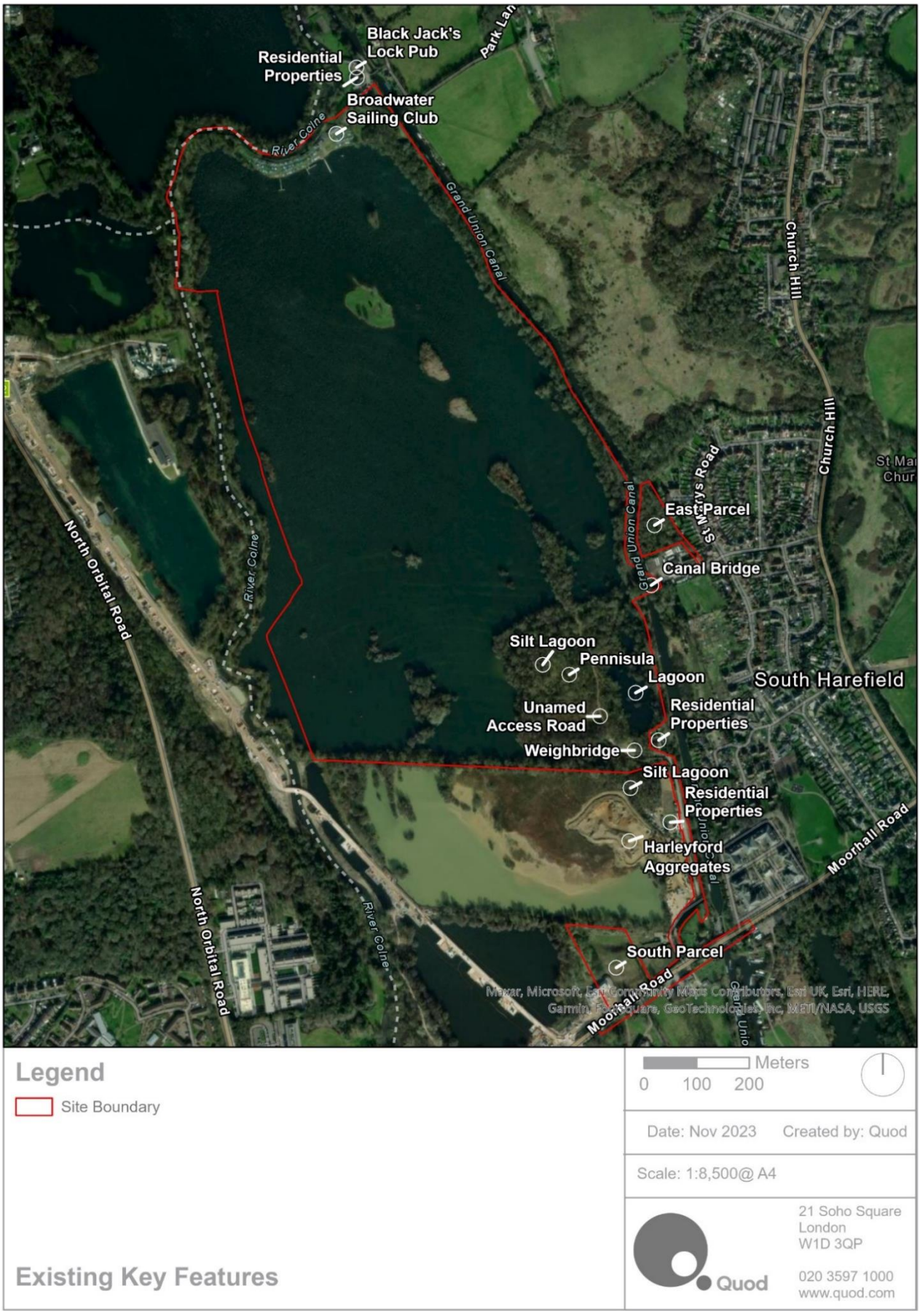
Gerrards Cross & Uxbridge District Angling Society also have access to use the Site and use it for angling.

The Site includes a brick and iron canal bridge/utility gantry across the Grand Union Canal.

The Site includes a small parcel of land immediately north of Moorhall Road ('south parcel') comprising a mixture of grassland, shrub, hedgerows and scattered trees. The Site also includes a parcel of land to the east ('east parcel') comprising an area of woodland.

[2] LBH Planning Application Reference: 2382/X/85/739

Figure 2.2: Existing Site Features



## What are the surrounding uses?

The surrounding uses of Broadwater Lake include:

- **East:** London Loop/Colne Valley Public Right of Way, the Grand Union Canal, agricultural land, residential properties and a transport logistics yard (Mayling Transport);
- **North**: River Colne, Troy Lake and Black Jack's Lock;
- **South:** Harefield Moor Lake, existing businesses; and
- **West:** River Colne, Tilehouse North Lake, Denham Waterski Lake and HS2 viaduct construction area.

The access road to Broadwater Lake which forms part of the Site is bound by a hedgerow and the London Loop to the east and existing businesses (a construction material wholesaler and aggregates supplier) and a small number of residential properties to the west.

The southern part of the Site is bound by the Moorhall Road carriageway to the east and west and the River Garden pub to the south. The eastern land parcel is bound by the Grand Union Canal to the west, a logistics site (Mayling Transport) to the south and residential properties in Harefield to the east. The south parcel is bound by Moorhall Road to the south, Harefield Moor Lake.

Land to the west of the Site is currently subject to construction works associated with the construction of the HS2 Colne Valley viaduct, a railway bridge stretching more than 3.4km across the lakes between Hillingdon and the M25. The viaduct will be around 10m above the surface of the lakes and the River Colne and Grand Union Canal will have a series of arches up to 80m long.

## What are the environmental sensitivities?

**Figures 2.3 and 2.4** identify the key environmental sensitivities within and close to the Site. The Site is set within the Green Belt and Colne Valley Regional Park, which is a mosaic of farmland, woodland and water with 200 km of rivers, canals and over 70 lakes.

The Site is located within the Mid-Colne Valley SSSI, designated for breeding and over-wintering water birds. A number of nationally and regionally important statutory designated wildlife sites are present within 2km. The Site is also designated as a Site of Importance for Nature Conservation (SINC) of Metropolitan importance.

Part of the Site is within the Broadwater Lake Nature Reserve managed by Hertsmere and Middlesex Wildlife Trust. Northmoor Hill Wood Local Nature Reserve is located approximately 300m west of the Site boundary.

Priority habitat is present on-site and in the adjacent surrounds, comprising deciduous woodland. Parts of the woodland adjacent to the west of the Site are designated as Ancient Woodland.

The Site is adjacent to the Widewater Lock Conservation Area to the south-east and Black Jack's and Copper Mill Lock Conservation Area to the north-east. The Site is 250m east of the Harefield Village Conservation Area. Broadwater Park Registered Park (Grade II) and Garden is located approximately 400m southwest of the Site boundary.

The closest listed buildings to the Site are Widewater Lock Cottage (Grade II listed) adjacent to the south-east of the Site boundary on the access road and Denham Film Studios (Grade II) less than100m south west. Two locally listed buildings are in close proximity to the Site boundary: Black Jack's Cottage adjacent to the north east and a building at Mayling Transport Yard east of the Site across the Grand Union Canal.

A Public Right of Way (U74) is located adjacent to the eastern part of the Site which runs along the Grand Union Canal which forms part of the Colne Valley Trail and London Loop as shown on **Figure 2.3.** A short section of the London Loop is within the Site.

Most of the lake within Site is in Flood Zone 3. The peninsula is largely in Flood Zone 1 (low risk of flooding) and access to Moorhall Road is in Flood Zone 2 (medium risk). The Site is located within a groundwater Source Protection Zone. Surveys of the lake show that much of the lake is over 2m in depth, with areas of shallower water and islands present.

## How is the Site currently used and managed?

BSC use the northern part of the lake throughout the year. Members are allowed to sail all year between an hour after dawn to an hour before dusk. BSC also use the lake for sailing races and regattas on Saturdays, Sundays and occasional Wednesdays (summer and winter).

The lake is also used by anglers including the Gerrards Cross & Uxbridge District Angling Society and British Carp Study Group.

The Applicant has also reported that unauthorised use of the Site takes place including animal poaching, dog walking, open water swimming, fly tipping and wood collection. The Site is not actively managed for wildlife or the water environment and there is no management plan in place.

## Figure 2.3: Environmental Sensitivities Map (1)

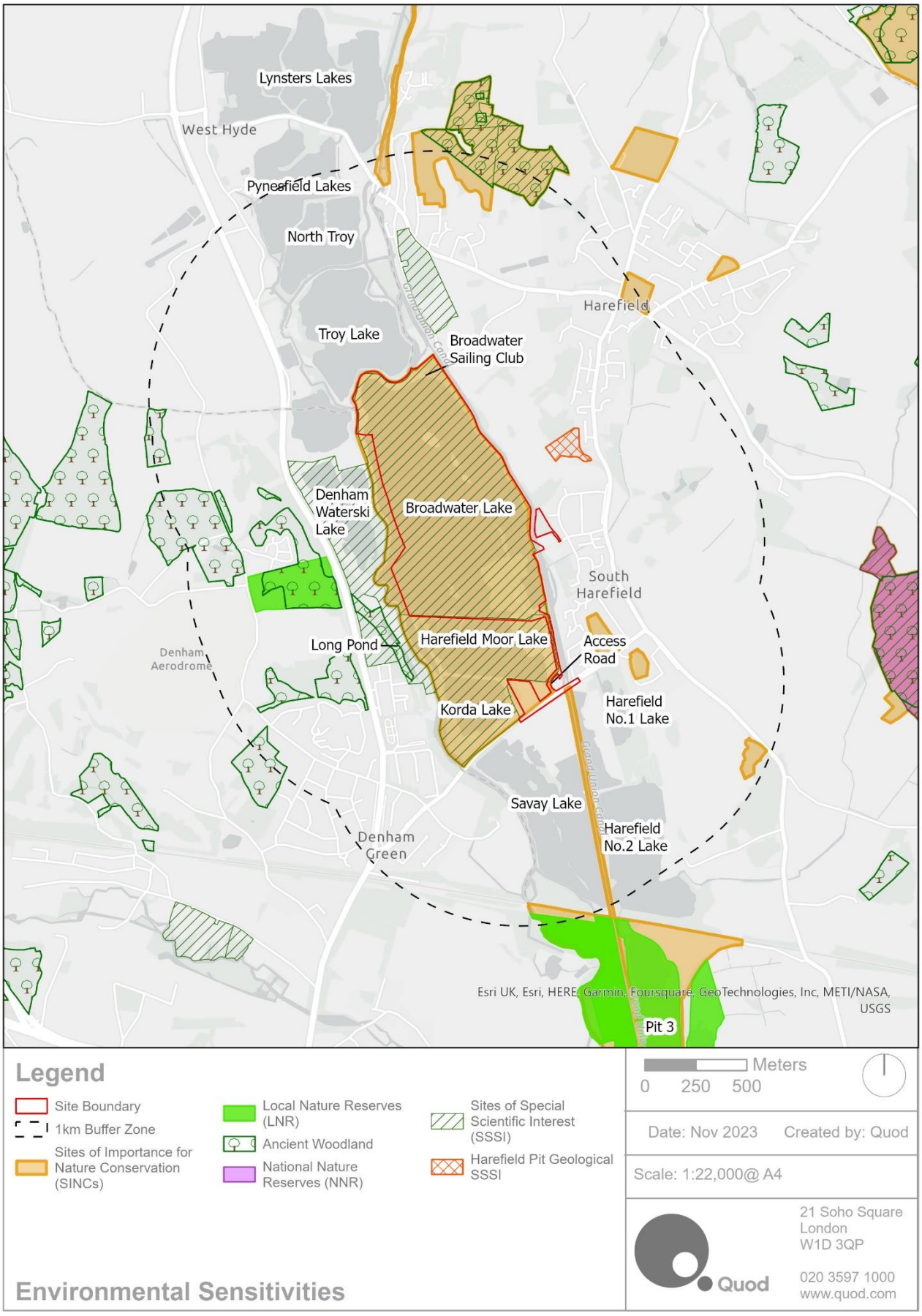
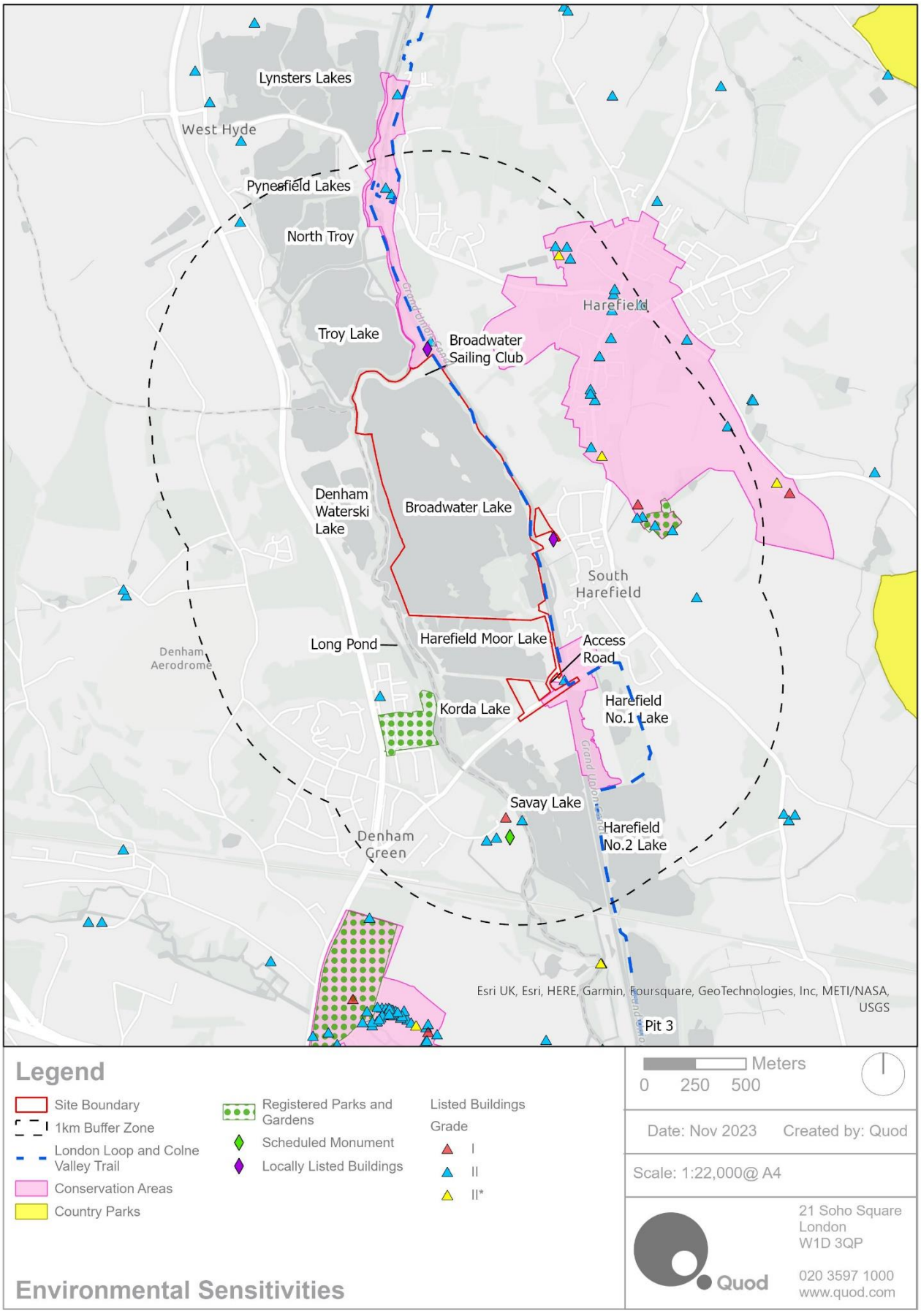


Figure 2.4: Environmental Sensitivities Map (2)



# 3 EIA Methodology

The Proposed Development falls within the type and scale of development that requires an EIA under the EIA Regulations. An EIA has been undertaken to meet the requirements of the relevant legislation and the ES provides the information required by the relevant EIA Regulations.

The EIA considers impacts during the construction and operation of the Proposed Development. The construction phase assessment addresses the temporary activities involved in building the Proposed Development. Where relevant, these temporary effects are described separately below. The operational assessment considers the situation when the Proposed Development is completed and being used.

## How was the scope of the ES agreed?

An EIA scoping study was undertaken by the Applicant's EIA team to establish the 'scope' or focus of the EIA and to identify which environmental topics should be included for further assessment. This included a review of relevant legislation, policy and guidance, the current environmental condition (referred to as the 'baseline' condition) and the potential effects of the proposed Development.

An EIA Scoping Report was prepared which set out the proposed scope and content of the ES. This was submitted to LBH in February 2023 alongside a request for a 'scoping opinion'. On 19th May 2023, LBH issued a scoping opinion, which provided their feedback on the matters to be included in the ES. The scoping opinion also included advice from LBH's external EIA advisor and responses from stakeholders including Natural England and the Environment Agency.

The ES includes the following technical chapters which are based on LBH's scoping opinion:

- Chapter 7: Biodiversity
- Chapter 8: Water Resources and Flood Risk
- Chapter 9: Ground Conditions and Contamination
- Chapter 10: Landscape and Visual Impact Assessment

Other topics were scoped out of the ES as significant effects were not identified. However, the planning application is accompanied by a number of other reports which have informed the EIA.

Although scoped out, climate change has been taken into account within each of the technical chapters as part of the assessment. It is not anticipated that future predictions of climate change will have any effect on the proposed use of the Site as a recreational area, as the Proposed Development does not include construction or operational uses and activities that will generate emissions at a scale that have the potential to cause significant adverse or beneficial effects for climate.

## How were significant effects identified?

For each of the topics above, the ES provides a description of the current environmental conditions (the 'baseline'), as well as a description of how the environment may change in the future without the Proposed Development (the 'future baseline'). Each assessment identifies receptors which could

be sensitive to impacts of the Proposed Development such as local residents, designated sites, habitats and species, communities, road users and the local economy.

The ES predicts the environmental effects of construction activities and once the Proposed Development is complete and operational. Construction is expected to commence in 2024, with completion in 2025 (see Section 6 for more details), and these years were taken as the assessment scenarios for the EIA. Detailed construction methods are not yet available however, the ES is informed by a draft Construction Method Statement and an Outline Construction Environmental Management Plan (CEMP) has been developed.

Environmental effects were identified and assessed using a variety of methods, including computer modelling and calculations. Effects were then assessed as being significant or not significant. Each assessment attaches a level of 'significance' to the effects that were identified, i.e. either major, moderate, minor or negligible. The significance of effects was determined by competent experts using best practice and published standards. Judgements of the significance of the effect typically reflect the relationship between the scale of predicted change compared to the baseline (i.e. magnitude of the impact) and the sensitivity (or value) of the resource or receptor being affected. Effects are expressed as being either temporary or permanent, and adverse (negative), negligible or beneficial (positive). Effects are based on worst-case assumptions and take account of measures.

The EIA was undertaken in parallel with the design process and measures to avoid effects, particularly on the designated features of the SSSI, which were designed into the Proposed Development. Mitigation measures are also secured through other documents including an Outline CEMP, Draft Mitigation and Ecological Enhancement Plan (MEMP) and Draft Lake Management Plan (LMP).

The assessments also consider 'cumulative' effects which are those that can arise from individual effects of the Proposed Development interacting and affecting the same receptor (intra-project effects). Cumulative effects which are those that could result from the Proposed Development in combination with other development schemes in the vicinity of the Site (inter-project effects) are also considered. The cumulative schemes that were considered included HS2.

# 4 Alternatives

The ES provides a description of the reasonable alternatives to the Proposed Development that were considered by the Applicant in line with the EIA Regulations

## Has the 'No Development' scenario been considered?

The Proposed Development will deliver a replacement HOAC facility, which was formerly operating from a site at Dews Lane, Harefield, UB9 6JN ('Dews Lane site'). The Dews Lane site was subject to a Compulsory Purchase Order and is now under the ownership of HS2. HOAC ceased to operate from the Dews Lane site in October 2020. The High-Speed Rail (London – West Midlands) Act 2017 ("the HS2 Act")[i] includes a statutory requirement for HS2 to fund the relocation of the HOAC to an alternative site, which is suitable for their needs. As such, a scenario where HOAC is not provided with a replacement facility is not considered to be a reasonable alternative.

In a No Development scenario, the Proposed Development would not proceed. This would mean that the baseline and future baseline conditions at the Site (as explained in Sections 7 – 10) of the ES are likely to remain.

The Applicant's aims for the Proposed Development are to deliver public social and health benefits to the local community. The Applicant also seeks to conserve and enhance the special features of the Mid-Colne Valley SSSI and the Broadwater Lake waterbody, in accordance with planning policy and other statutory duties. These objectives are proposed to be delivered partly through the physical elements of the Proposed Development but also through a commitment to long term management set out in the Draft MEMP and Draft LMP which accompany the ES.

The Site is not currently being managed for the benefit of nature conservation or the water environment and the Applicant is committed to the long-term stewardship and management of this part of the Mid-Colne Valley SSSI. The package of management and enhancement measures included in the Draft MEMP and LMP is unlikely to be delivered in the absence of the Proposed Development.

The Proposed Development is also expected to deliver the following social and community benefits:

- Opportunities for community cohesion;
- Increasing access to water sport activities to disabled and disadvantaged people;
- Training and skilling opportunities for young people;
- Making the natural environment accessible, providing opportunities for leisure and educating children from urban areas on fauna and flora;
- Sustaining physical activity and a healthy lifestyle; and
- Stewardship and operation – builds on previous experience to create the opportunities for all residents in Hillingdon (and beyond) to engage in water sports.

The above benefits would not be delivered in the absence of the Proposed Development.

## What alternative sites were considered?

An assessment of alternative sites (an 'Alternative Site Assessment') was undertaken by the Applicant and considers whether there are any alternative sites available for delivery of a permanent replacement HOAC facility.

The existing HOAC site is located at Dews Lane in South Harefield within the Colne Valley. As such, the Applicant considered alternative sites within the Colne Valley and beyond, within a 10km radius of the Dews Lane site. **Figure 4.1** shows the extent of the study area for the Alternative Site Assessment.

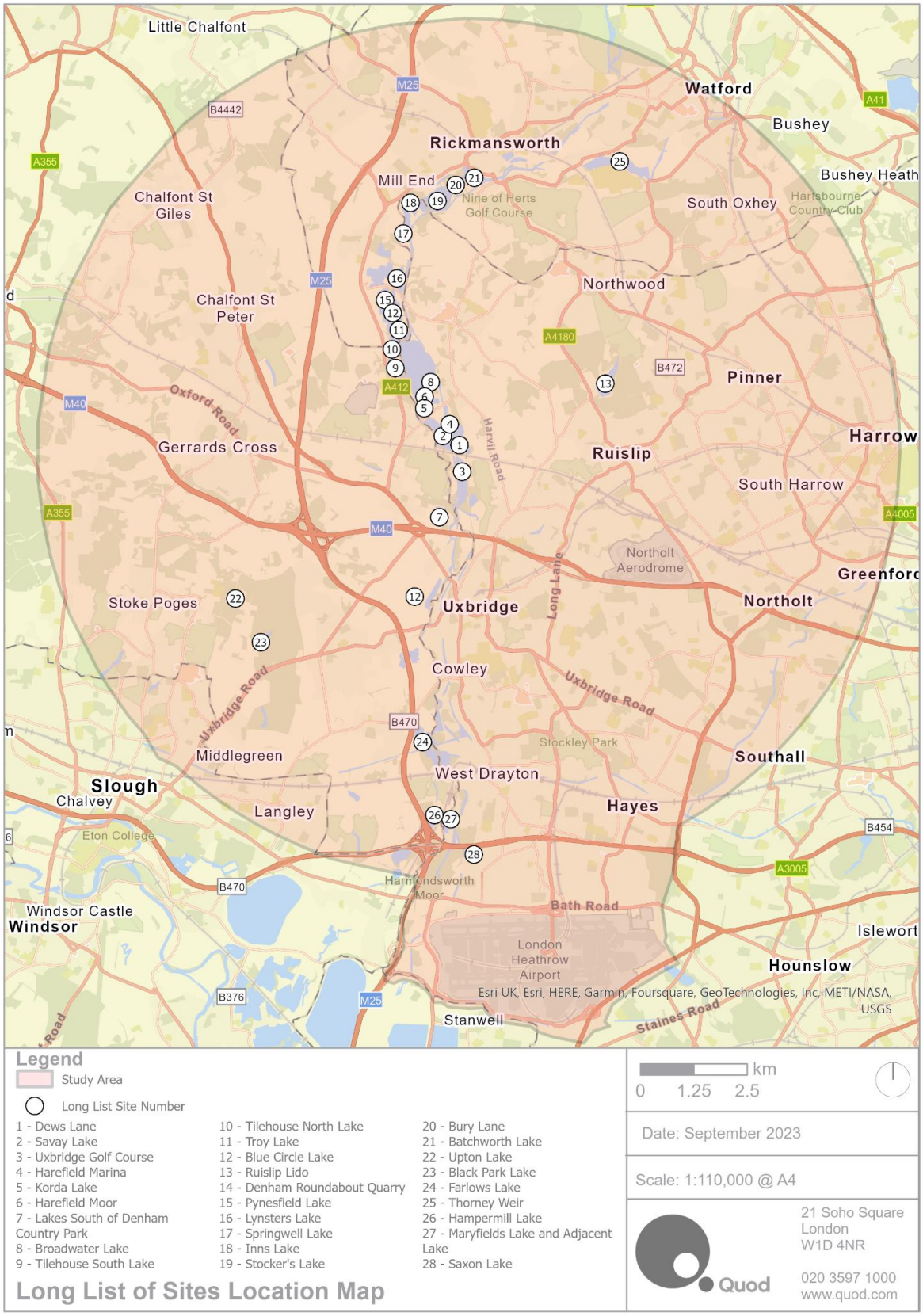
HS2 will cross the former HOAC Dews Lane site on the Colne Valley viaduct and will require the demolition of three of HOAC's buildings. Construction of the viaduct will also require the placement of pier structures within the former HOAC site, with approximately 10 in the 18 hectare lake (Harefield No. 2), which HOAC used for water based activities. The lake at the Dews Lane site will no longer be suitable for water-based activities following completion of HS2 and therefore this alternative is not considered further.

A total of 28 sites were identified in a 'Long List' of alternative sites options, including the Site and the existing Dews Lane site. Following further review, three were short-listed for more detailed assessment (i.e. Troy Lake, Ruislip Lido and Broadwater Lake).

Of the three shortlisted sites, the Applicant considers that Broadwater Lake is the only viable option for the Proposed Development. The Site meets the majority of the recreational requirements criteria in terms of lake and land area, accessibility of the lake, water quality, contamination, recreational restrictions, site security, public access, access to wider amenities and site availability. The Site includes the requirements for localised dredging within areas which are deemed too shallow for sailing activities.

Despite considering 27 other alternatives to Broadwater Lake, no other suitable site was identified by the Applicant that would be able to accommodate both the HOAC land and water based activities and recreational requirements.

## Figure 4.1: Alternative Sites Considered by the Applicant



## What alternatives for the location of BSC and HOAC were considered within the Site?

The following alternative arrangements for location of BSC and HOAC were considered at Broadwater Lake itself:

- BSC in its existing location on the northern lake shore. HOAC co-located with the existing BSC site.
- Retaining BSC in existing location and relocating HOAC to the peninsula.

These alternatives were discounted due to lack of space to accommodate recreation criteria of HOAC, increased management burden on HOAC, decreased ability to deliver services on a like for like basis to those delivered at the original site and increased potential impacts on wintering and breeding birds.

## What alternative designs have been considered?

The masterplan has been informed by ecological and other surveys, and engagement with stakeholders including LBH, Natural England and the Environment Agency. The buildings and layout of the Proposed Development have also been designed to minimise the visual impact of the buildings and minimise the need to import material to the Site.

The main alternative designs considered by the Applicant for the layout of the peninsula and areas of reclaimed land are shown in **Figure 4.2** and included:

1 – Existing Peninsula Only

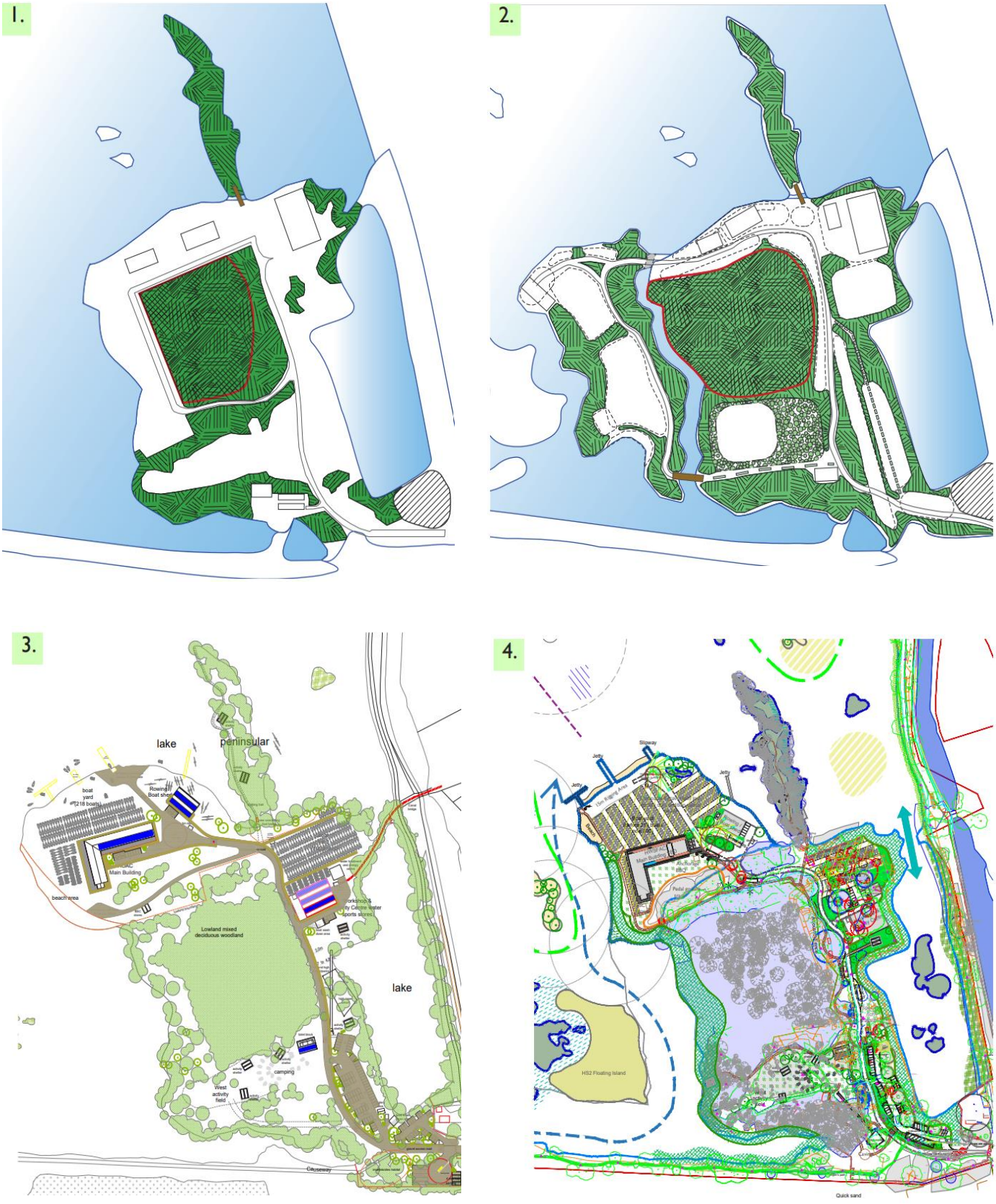
2 – Existing Peninsula and Reclaimed Land (West)

3 – Existing Peninsula and Reclaimed Land (North)

4 – Existing Peninsula and Reclaimed Land (North – Further Options)

Initial proposals included development on the existing peninsula land. This was discounted due to the sensitivity of the habitats and the associated direct effects. Options 2 and 4 involved the existing peninsula but also included some areas of land reclaimed from the lake to the west and north. Option 4 was selected over Option 2 as the preferred option for the peninsula layout as it minimises the impacts on sensitive ecological habitats (including wet woodland) on the existing peninsula land by creating new land for development. Land reclamation within the lake to the north of the peninsula was also chosen as it offers more opportunity to provide refuges for the birds disturbed by the proposed activities in the peninsula.

Figure 4.2: Peninsula and Reclaimed Land Alternatives



## What alternatives were considered for land reclamation?

The use of existing 'hardstanding' on the peninsula as fill material was discounted to avoid potential risks of contamination to surface and groundwater. The importation of material from alternative off-site locations was discounted to avoid potential impacts associated with additional HGV movements on the local road network and potential impacts on local/regional material supplies.

Therefore material arisings from dredging of the lake will be used to form the reclaimed land on the peninsula and the creation of new islands.

## Were alternatives for the location of water-based activities considered?

No other alternatives were considered for the location of water-based activities within Broadwater Lake for the following reasons:

- It is within the existing area of the lake used by BSC, and therefore avoids additional areas of disturbance;
- It is an area of the deepest water in the lake which is more suitable for the proposed uses and would therefore require less dredging than areas of shallower water; and
- It avoids areas of the lake which are more ecologically sensitive and provides opportunities for enhancements in these areas.

## Will HS2 mitigation measures be affected?

The land reclamation would result in the mitigation proposed at Broadwater Lake by the HS2 ES (gravel islands/rafts) being less than 50m from the peninsula which raises the risk of predators being able to access the birds it would be designed to provide for. The HS2 gravel islands/rafts have therefore been moved further south to address this issue and minimise disturbance effects from HOAC activities.

## Were alternative site access arrangements considered?

The are currently no Public Rights of Way within the Site, apart from a short section of the London Loop adjacent to the Grand Union Canal. The Applicant considered the potential to provide enhanced public access through the Site but discounted this on safeguarding and safety grounds to protect future users of the facility.

Existing vehicular access to the Site is provided from Moorhall Road to the South. Alternative access is not available due to the existing constraints including the River Colne, HS2 construction site and Grand Union Canal. Vehicular access from the north was discounted as this would potentially result in additional significant effects to ecological receptors, residential receptors and locally listed heritage assets (e.g. Black Jack's cottage and Bridge 179 over the Grand Union Canal).

## Were alternatives buildings and structures considered?

Initially, the BSC and HOAC facilities were designed as separate buildings, each with their own changing rooms, sanitary facilities, and dedicated spaces such as a classroom for HOAC and a

social area for BSC. However, in order to minimise the footprint of and reduce visual impact, the Applicant decided to consolidate these functions into a single building – the Main Building.

# 5 Description of the Development

Consultation with relevant stakeholders has been ongoing throughout the pre- planning application stage, which has informed the proposals.

## What would the Proposed Development deliver?

**Figure 5.1** shows an illustration of the Proposed Development and shows the proposed buildings on reclaimed land in the south of the Site.

Figure 5.1: Proposed Development Masterplan (Illustrative Image)

The Proposed Development will consist of:

- Use of part of Broadwater Lake for sailing and other water-based recreational activities. Use of Broadwater Lake for sailing by BSC would continue. No motorised boats would be used apart from for safety purposes.
- Localised dredging of the lake to create depths suitable for sailing and generate material for land reclamation to create a platform for development on the peninsula. Two islands would also be removed;
- New buildings including a two storey Main Building for use by HOAC and BSC (including changing facilities, meeting and training rooms, storage, and seasonal worker accommodation), activity shelters, a Boat Shed and Workshop (described below);
- Facilities for outdoor land based activities including pedal karting, caving, archery, high level ropes, low level ropes, zip lines, big swing, general activities and pond dipping;
- New pontoons (3 no.) and slipways (2 no.).
- Camping area;
- Areas for boat parking, car and cycle parking, and coach drop off and turning area;
- Demolition of the existing BSC club house and removal of associated car/boat parking (this will be re-provided at the peninsula in the south of the Site);
- Improvements to the unnamed access road from Moorhall Road;
- Package of ecological enhancement measures, including habitat creation including new floating and fixed islands within the lake, new woodland dense vegetation screens and boundary treatment; and
- Long-term management of the wildlife and water environment, including a monitoring programme.

The existing peninsula would be extended through land reclamation and will be where all new buildings will be sited including BSC. The proposed layout of the peninsula (including the area of land reclamation) is shown on **Figure 5.2**. The reclaimed land will accommodate the Main Building, one of the boatyards and the pontoons and slipway for the water-based activities. The only access to the water will be at this location.

Figure 5.2: Peninsula Masterplan Layout

Table 5.1 describes the buildings and structures that are proposed.

Table 5.1: Proposed Floorspace and Use

| Building/Use | Floorspace (sqm) Gross External Area (GEA) |
|---|---|
| **Main Building** | 2,470 |
| **Boat Shed** | 698 |
| **Workshop** | 758 |
| **Other Buildings** | 1,707 |
| **Total** | **4,749** |

The Main Building is an 'L' shaped building located on the western side of the extended peninsula. The building will be double storey (10.98m AOD) constructed using bricks and would have a pitched roof of clay tiles with solar panels (where suitable). The Main Building will be shared by HOAC and BSC and will include office accommodation, changing facilities, toilets and associated amenities, a crew room for use by the BSC, and a multi-purpose activity room. The first floor will comprise additional multi-functional, social space and accommodation for seasonal staff, providing 14 bedrooms. **Figure 5.3** provides an illustrative image of the Main Building.

The Boat Shed will include racking storage for boats and storage for sailing equipment. The Workshop will provide space for general maintenance and repair activities and the storage of materials / equipment. Both the Boat Shed and Workshop will be single storey (7.04m and 5.85m respectively). A number of smaller buildings (referred to as 'Other Buildings') are proposed across the Site for ancillary use associated with the Proposed Development. These include 7no. activity shelters, an outdoor toilet block, energy centre, angler's huts and bird hides.

Figure 5.3: Illustrative Image of the Main Building

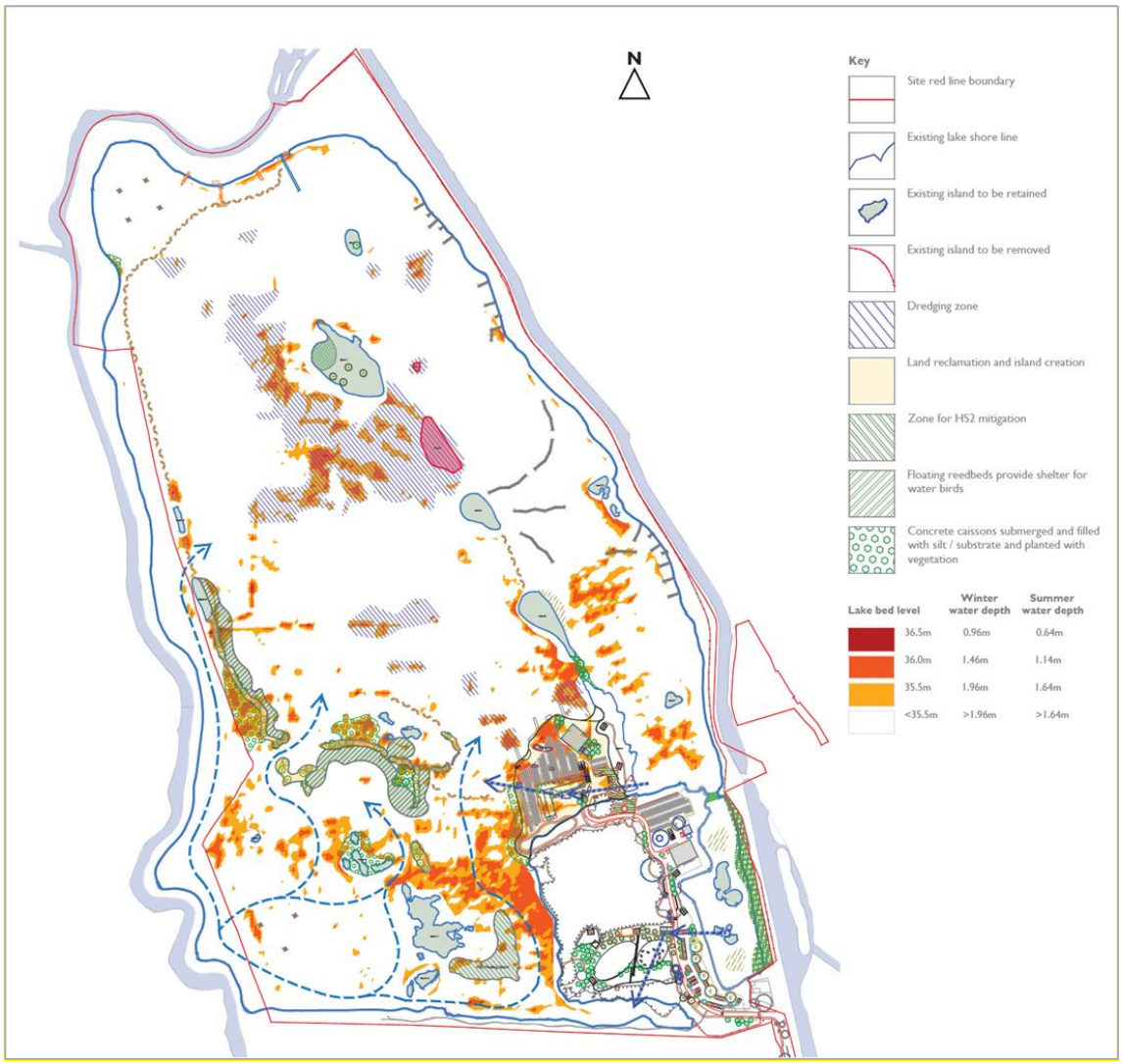
## What works will take place in the lake and peninsula?

Localised dredging of the lake is proposed to increase the lake depth up to 2m in some locations in order to facilitate sailing uses from launch locations on the extended peninsula. **Figure 5.4** shows the likely extent of the dredging proposed and the area of the extended peninsula. The following works are proposed in Broadwater Lake:

- Extension of the existing peninsula through land reclamation of approximately 16,100m$^2$ using clean dredged material from the lake;
- Removal of two islands in the centre of the lake (approximately 2,100m$^2$);
- Creation of smaller islands (8 in total) using dredged material (approximately 4,300m$^2$ in total), a beach area (approximately 300m$^2$ in total) and 'shallows' throughout the lake using dredged material; and
- Construction of three lake pontoons and two concrete slipways on the new reclaimed land on the peninsula.

The Proposed Development will reduce the total surface area of water in the lake by approximately 14,000m$^2$.

Figure 5.4: Extent of Dredging Zones, Island Loss & Creation and Land Reclamation




## What activities and uses are proposed?

The main user groups for HOAC comprises local schools, colleges, scout and guides groups with the more local schools and residents of Buckinghamshire and South Bucks District visiting on a regular basis. HOAC will also offer holiday/summer holiday courses.

HOAC will only operate at the Site between 1 April and 31 September, on weekdays between 8:30am to 5:30pm. Management, monitoring and staff training (on land only) will take place all year round. HOAC activities are unlikely to overlap with those of BSC as they operate at different times.

HOAC will support the following outdoor land-based activities: archery; peddle karting (non-motorised); team building; bird watching; big swings; zip-wire; abseiling and aerial trekking; camping; foraging; overground caving and pond-dipping (see **Figure 5.5**). HOAC will also undertake the following water-based activities at the lake: sailing, kayaking, rowing, raft building, windsurfing and angling.

HOACs usage of the Site will is expected to be up to 200 children plus 20 at any one time. Up to 100 children could be on the water at any one time with supervision.

The existing planning approval for the BSC sailing area extends to 36.3ha. The proposed sailing area will reduce slightly to 27.2ha. However, this would not adversely affect the BSC's usage of the lake.

BSC will continue to operate at the Site although the location of their sailing area will be subject to minor adjustment. No other changes are proposed to how BSC operate the club and its activities/events.

Figure 5.5: Indicative Images of Proposed Land-based activities


High ropes


Low ropes


Zip line


Giant swing


Pedal karting


Caving


Pond dipping


Archery

## What ecological mitigation and enhancement measures are proposed?

The Proposed Development has been designed to avoid habitat loss and mitigate adverse effects from people using the new facility. A package of mitigation measures and enhancements are proposed for the designated features of the SSSI (including breeding and wintering birds) and other important habitats and species using the Site. Some of the key ecological mitigation and enhancement measures are shown on **Figure 5.6.**

A description of the main ecological mitigation and enhancement measures are provided below:

- Two floating reed bed rafts for bird refuge within the north western area of the lake;
- New native scrub in the north east of the Site to provide a sheltered grassland 'ride' for bats to forage and commute and a sheltered area for nesting birds and mammals;
- Wildflower grassland in open areas in the north east of the Site;
- A small pond in the north east of the Site;
- Floating reedbeds to provide bays for shelter for birds and young fish;
- Enhanced lake margins for invertebrates, bats and birds;
- Bird and bat boxes;
- Enhancement of existing island habitats and lake shallow/edge areas;
- Creation of new islands to create refuges for birds in the west of the lake;
- Dense barrier vegetation to screen the eastern shore of islands and the reclaimed land from the north;
- Removal and management of non-native invasive species;
- New tree/woodland planting and native fruit trees;
- A wildlife pond for invertebrates; and
- Planting of grassland and wildflowers alongside paths on the peninsula.

The Applicant is committed to ensuring that measures are in place during construction to avoid effects on the SSSI and these will be included in a CEMP. The Applicant has also committed to the long-term management and stewardship of Broadwater Lake and a Draft MEMP for a period of 30 years. The Draft MEMP sets out how important features would be managed to conserve and enhance their ecological value.

The Draft MEMP also sets out a programme of monitoring that would be used to inform the future management of the Site. The final MEMP would be developed with key stakeholders including LBH, Natural England, Environment Agency and local conservation groups.

## Figure 5.6: Key Ecological Mitigation and Enhancement Measures

**New Solid Islands and Caisson Planting**

New islands created using clay and silt dredged from within the lake, to be planted with willows and suitable for lower plants and shrubs.

The Caisson planting area adjacent to the west shore of the reclaimed land to be submerged.

Planting to include trees, grasses, ruderal and shrub species.

Species to be native and locally sourced.

**Floating Reedbeds**

Floating platforms designed to be fully covered with reeds, sedges, and other wetland plants with extensive root systems.

These plants are chosen for their ability to tolerate wet conditions and perform various ecological functions. The roots of the plants dangle below the mat into the water, creating a submerged zone where biological and chemical processes take place.

Reedbeds to have a diverse structure with between 60 and 80% reeds Phragmites australis.

**Emergent Macrophyte Planting to Caissons**

Underwater planting beds created with concrete caissons, filled with lake-derived dredged materials and planted with typical native aquatic and emergent plants.

Riparian and emergent planting consists of plants that are not fully aquatic but are tolerant of wet and marshy ground conditions. These plants typically grow at the margins and banks of ponds, streams and lakes.

Selection of species to be based on those already present in Broadwater Lake or adjacent northerly Colne Valley lakes.

Plants to be obtained from local native sources having the same genetic provenance as Broadwater Lake.

## What are the access and parking proposals?

The Proposed Development will be accessed via an existing access road which connects to Moorhall Road. This road will be improved with new road surfacing, a new dedicated pedestrian footway, new street lighting and 10mph speed limit. Emergency access to the Site will also be available from the north.

The majority of HOAC users will arrive at the Site by coach from local schools and therefore a coach turning and drop off area is provided together with two coach parking spaces. Vehicle parking for all users will be predominantly located on existing hardstanding or gravel in the southern part of the peninsula. A total of 82 car parking spaces are provided (including blue badge and electric vehicle charging) including reprovision of the 45 spaces used by BSC. Cycle parking stands would also be provided.

## Will the Proposed Development use renewable energy?

Electricity supplies will provided be via an existing 6.6kV electricity sub-station in the north-east corner of the peninsula. Photo-voltaic panels will be located on the roof of the Main Building, Boat Shed and Workshop (where feasible), to generate renewable energy. A water source heat pump system will also be installed drawing water from the lake as an energy source. A water source heat pump uses below water pipework to absorb energy from water in the lake.

## How will utilities be provided?

Foul water from toilets and washbasins will be pumped off-site via a separate foul water drainage system to a point of connection to the public sewerage network approximately 100 m east of the Site. The canal bridge will be upgraded and used to route services (including electricity, telecommunications, mains water and foul water) into the Site.

## Will there be lighting at the Proposed Development?

A lighting strategy has been developed which includes measures to minimise ecological disturbance and visual effects of lighting. No fittings will be located near any potential bat roosting sites and dark buffer zones have been maintained between occupied areas and foliage wherever possible. Lighting would also be directed away from sensitive areas and switched off when not in use.

# 6 Construction

## How long is construction of the Proposed Development expected to take?

Construction of the Proposed Development is expected to take place over a period of approximately 14 months. The timing of works has been designed to minimise disturbance to birds and to ensure that mitigation measures are in place before the main construction works commence. Land reclamation and dredging will only be undertaken within the months of September to November as this is the least sensitive period for both breeding and over-wintering birds.

Works are expected to start in the third quarter ('Q3') of 2024 and be complete by the end of Q3 2025, subject to securing planning permission, other consents and licences.

Working hours will be 7am to 6pm Monday to Friday and 7am to 1pm Saturday only with noise activities restricted to after 8am.

## Where will access and construction worksites be located?

Access during construction will be from Moorhall Road to the south via the access road. There will be no overnight accommodation on the Site during construction. Security fencing and fencing to protect sensitive habitats and trees will be provided. The compound and welfare facilities will be located to the west of the peninsula.

A 2m visual and acoustic fence will be installed around the woodland, slightly inset behind the tree line. This would be installed prior to the commencement of the main construction stage on the peninsula and ahead of the bird breeding season.

## What works will be carried out during the construction phase?

The construction stage is split into separate activities as follows:

- Enabling Works – Site Preparation and Site Access Road (June – July 2024)
- Enabling Works – In-lake works (August – November 2024):
  - Phase 1a and 1b – Deployment of floating reedbeds to create initial protected areas.
  - Phase 2 – Caissons placed ready for island formation.
  - Phase 3a – Removal of islands and reprofiling of island 2.
  - Phase 3b – Filling of caissons.
  - Phase 3c – Fill (new island formation).
  - Phase 4a and 4b – Enabling dredge and main dredging.
  - Phase 4c – Peninsula extension / land reclamation.
- Construction – Main Works, Peninsula, canal bridge works and demolition of BSC (December – August 2025)

- Future Ecological Enhancements

## What environmental management and mitigation measures will be in place?

An Outline Construction Environmental Management Plan (CEMP) has been prepared and is provided as an appendix to the ES. The Outline CEMP sets out the measures to avoid, minimise or offset environmental effects during the works that contractors would have to adhere to. A detailed CEMP would be developed by the contractor (once appointed) and agreed with key stakeholders before works commence.

## How will wildlife be protected during construction?

A range of measures will be in place to protect important ecological features which are included in the CEMP. These include:

- **Woodland and Trees** – woodland and trees to be retained would be protected using fencing and other standard measures. There would only be a small amount of tree/woodland loss;
- **Invasive species** – a treatment programme for dealing with invasive species such as Japanese knotweed and Buddleia would be implemented;
- **Bats** – important habitats for bats would be retained and protected using fencing. Construction works would be undertaken during daylight hours and artificial lighting be required this would follow good practice guidance;
- **Woodland Breeding Birds** – a fence would be installed to avoid visual and noise disturbance of birds using the woodland. Where nesting habitat is to be removed this would be undertaken outside the bird breeding season (March to September inclusive), or other steps taken to avoid effects;
- **Wintering Birds (Lake)** - Construction on the peninsula would be timed to avoid adverse effects where possible and would be screened using fencing to avoid disturbance of wintering birds;
- **Breeding Birds (Lake)** - Construction affecting the lake would be carefully planned and timed to avoid or minimise adverse impacts. Construction on the peninsula along the water edge would be visually and acoustically screened to avoid visual and noise disturbance of the breeding bird populations;
- **Badgers, hedgehog and reptiles** – appropriate good practice measures would be in place to avoid harm to these species during the works.
- **Aquatic species –** appropriate measures to ensure clean surface water run-off into the lake.

## Will material be managed and reused?

Materials generated from the demolition of BSC and other works would be re-used to create suitable platforms for development, where suitable. The re-use of these materials will reduce deliveries to the Site.

Material dredged from Broadwater Lake will be used to form new islands within Broadwater Lake and the extension to the peninsula. No material would be imported. Floating islands would be used to minimise the volume of materials needed. A Site Waste Management Plan and Materials Management Plan would be in place during the construction works which would ensure materials are used effectively and that waste is avoided, minimised or re-used wherever possible.

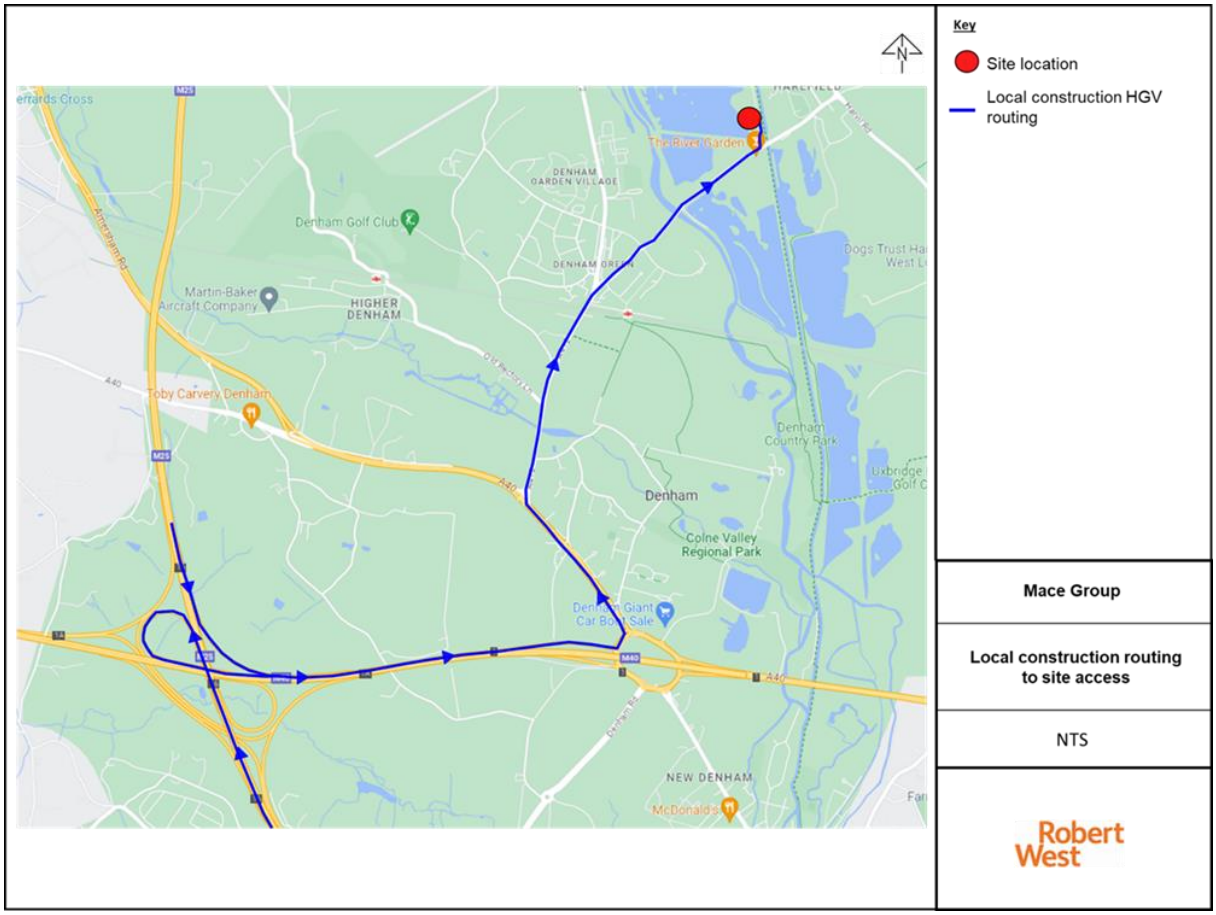
The Applicant's main objective is to limit the generation of waste, and to reuse, recycle and recover waste generated by the Proposed Development.

The contractor will undertake the appropriate environmental control measures for environmental good practice during the construction works. It is considered that the majority of the excavated and construction waste will be inert and can be appropriately reused on site, where possible, or sent for beneficial reuse or recycling locally. Following the creation and implementation of the draft SWMP as well as implementation of the principles of the waste hierarchy and measures to reuse/recycle the waste, it is anticipated that the waste will be managed to appropriate standards.

## What measures will be in place to manage construction traffic?

Construction vehicles would be managed through a Construction Logistics Plan and the CEMP. **Figure 6.1** shows the proposed construction vehicle routing to the Site. Heavy Goods Vehicles (HGVs) will be required to approach the Site from Denham via the main road network and avoid the village of Harefield. Around 770 HGVs are expected to be required throughout the construction period of 14 months. Even during peak construction periods, an average of three daily HGV trips and up to 30 van and car trips (Light Goods Vehicles) are expected daily.

Figure 6.1: Proposed Construction HGV Routing




## Will construction works be monitored?

Construction works will be subject to monitoring to ensure that measures proposed to protect ecological receptors and water resources are effective. If monitoring indicates an issue or that mitigation is not effective, the proposals would be reviewed in consultation with relevant stakeholders and appropriate action taken.

# 7 Biodiversity

## How were the environmental effects identified?

An assessment was undertaken in line with industry guidance[3] and in accordance with relevant British Standards. The ecological baseline was established through a combination of desk-based research, reviewing published and available information, field surveys to gather new information (on habitats and species), and consultation with Natural England and other stakeholders. The impacts, potential effects and their significance were then assessed using CIEEM guidance and professional judgement.

## What is the baseline?

The ecological baseline comprises designated sites, habitats and species that occur on-site and within the Zone of Influence of the Proposed Development.

Broadwater Lake is one of the larger lakes set within the Colne Valley, which is an area of water-filled gravel pits, whose character is influenced by the presence of the River Colne. There are numerous lakes within the Colne Valley all of which are ecologically connected and used by a range of waterbirds both resident and migratory. Due to its size, Broadwater Lake has notable value for breeding birds (Borough importance) and wintering birds (National importance).

A range of waterbirds use the lake and its islands. During the winter months in 2022-23, there were 33 species of waterbird recorded including a range of ducks, geese, waders, gulls, grebes and other water birds, although only 17 species were regularly present. The numbers of wintering shoveler (a duck of medium conservation concern) at the Site are of National importance with 1.66% of the estimated Great Britain (GB) wintering population recorded in January 2023 (315 birds). Pochard (a high conservation concern species) occurs in Regionally important numbers (0.79% of the GB winter population). Tufted duck (a species of low conservation concern) occurs in relatively high numbers onsite but the peak count of 455 is only of Borough importance (0.35% of GB population). Other species are evaluated as being of Local importance or lower. During the summer months, the breeding assemblage of water birds includes 17 species confirmed or probably breeding. Pochard, shoveler, gadwall, common tern, cormorant and little egret were the most important breeding waterbirds, valued at the Borough level.

Birds also the woodland on islands within the lake and along the banks of the lake, adjacent River Colne and Grand Union Canal. There were 41 species recorded on the Site or in the immediate surrounds during spring / summer 2023. There were 13 species confirmed as ‘breeding’ while 15 species were ‘probably breeding’. For breeding birds, the species with the highest assessed value (Borough level) at the Site was Cetti’s warbler (a species of low conservation concern but listed in

[3] Chartered Institute of Ecological and Environmental Management (CIEEM) (2019) Guidelines for Ecological Impact Assessment

Schedule 1 of the Wildlife and Countryside Act 1981[4]). This is a bird of open water and fen. Other species occurred in relatively low numbers and had Local or lower importance.

The Site is designated as part of the Mid-Colne Valley SSSI. Different groups of birds are designated as important features of the SSSI, either due to the diversity of species, or because a species occurs in unusually high numbers. These important designated features / species are:

- Aggregations[5] of non-breeding birds – Population of tufted duck;
- Aggregations of non-breeding birds - Variety of wintering bird species;
- Assemblages of breeding birds – Mixed: Lowland open waters and their margins, Lowland fen and lowland damp grassland;
- Assemblages of breeding birds – Mixed: Scrub, woodland;
- Assemblages of breeding birds - Variety of species; and
- Standing Open Water.

The units of the SSSI together (as a whole) provide the mosaic of habitats necessary to support all the designated features. Natural England has assessed the condition of the SSSI in 2023 as being 50% favourable and the remainder being unfavourable (stable or declining). The condition reflects how rich the biodiversity of the Site is relative to the time when the Site was designated as a SSSI.

There are a large number of designated nature conservation sites within 2km of the Site. Many of these designations cover more than one site and also overlap. However, the majority will not be affected by the Proposed Development due to their distance from the Site.

The assessment focuses on the sites which have lakes within them including:

- Mid-Colne Valley Site of Importance for Nature Conservation (SINC) – this covers the Site and also extends 2km south incorporating two further SSSIs- Frays Farm Meadows and Denham Lock Wood.
- Local Nature Reserves (LNRs) - Denham Country Park LNR, Denham Quarry Park LNR;
- Colne Valley Gravel Pits (CVGP) (an undesignated group of lakes) including Springwell and Stocker's Lakes SINC; and
- Grand Union Canal (part of the London's Canals SINC).

There are a very limited range of semi-natural habitats at the Site that reflect the history of the Site as a working gravel pit until the 1990s – the habitats have largely developed since that time. The majority of the peninsula is covered by hardstanding, covered with buddleia and some willows that have grown in cracks in the concrete. Young wet woodland (a Priority habitat[6]) occurs at the peninsula within an area which was formerly an open silt lagoon until as recently as the 2000s. The wet woodland is species poor with pools of water and deadwood on the ground. Many islands are covered with willows and have also been classified as wet woodland; some apparent islands are single willows emerging from the water. Along the access road, at the sides of the lake and along

[4] All birds are protected in some form under this Act, but species listed in Schedule 1 have additional protection during the breeding season as do their nests, eggs and dependent young.
[5] Related to the number of individuals.
[6] Priority habitat is identified as being important for the purpose of conserving biodiversity.

the canal all the way to BSC, mixed deciduous woodland is present with a native woodland understorey of mixed scrub, herbs and grasses.

The vast majority of the Site is covered by standing open water (Priority habitat) with very small areas of plants growing along the shoreline all around the lake such as yellow flag iris, bur-reed, common reed and reedmace. The lake has an artificial shape and lacks good amounts of soft shallow sediments. This makes it hard for water plants to grow successfully and spread. Dead reedbeds were present in one part of the lake, killed by fluctuating water levels.

The River Colne (Priority habitat) lies directly adjacent to the Site and has Regional importance as its character influences the entire Colne Valley.

There are low numbers of badger records in the area and the Site provides some limited useful habitat for this species, mainly on areas of soft ground at the peninsula, lake margins, and adjacent to BSC. The Site has Local importance for badger.

The bat population using the Site has Borough importance, being of moderate diversity and with a rare bat (barbastelle) being present. Woodland and the lake provide good commuting and foraging habitat for bats. A small number of bat roosts have been identified at the Site, but due to the young age of trees, the Site has very few high value features for bats and almost all of these lie outside the footprint of the Proposed Development. Two roosts are within area affected by the proposals but both are of low conservation value supporting small numbers of soprano pipistrelle.

Other Locally important species that use the Site occasionally include otter, grass snake and hedgehog. Fish within the lake also have Local importance and provide food for herons, cormorants, and otter. There are some moderately diverse assemblages of terrestrial and aquatic invertebrates where a range of flowering or aquatic plants present, but these areas are very localised because of the difficult artificial conditions of the Site.

Invasive and non-native species are also present at the Site and in the surrounds. These include Buddleia which causes a general reduction in biodiversity where it is present, Japanese knotweed and Giant knotweed. Signal crayfish are also present in the lake.

There is no active management of the Site for wildlife at present.

## What are the potential effects during construction?

Ecology has been placed at the forefront of the Proposed Development. The main ecological value of the Site lies within its wintering and breeding bird populations and the Applicant seeks to preserve and enhance this value. Disturbance from construction and operational activities would be the main threat to wintering and breeding birds. The Proposed Development has been informed by ecological surveys and other studies and incorporates measures to avoid or minimise effects and benefits maximised.

Construction works will be timed, to minimise effects from the Proposed Development on birds. Works in the lake itself, such as dredging and island formation, will be timed when sensitive bird species are absent (or present in only very low numbers). A significant proportion the work will be completed during September and therefore outside of the breeding and wintering bird seasons. Mitigation and enhancement measures will be installed first, before any other works take place.

The main design principle to mitigate impact associated with disturbance from construction works is to screen sensitive bird species from the disturbance. Floating reedbeds and new islands will create or enhance visually screened refuge areas around the lake. The floating reedbeds will be used to provide areas of natural cover and undisturbed areas of water. Within these areas, waterbirds will feel less vulnerable, and the effects of disturbance from localised dredging and from construction activities on land will be reduced. Two islands in the exposed centre of the lake will be removed and the materials reused to create new islands located to offer greater benefits. Underwater planting beds for aquatic and emergent plants will also be created around the islands and the edge of the peninsula. These will provide a suitable environment for plants such as water mint, branched bur-reed, purple loostrife and yellow flag iris.

The new reedbeds and islands are expected to reduce the disturbing effects of subsequent construction activities of birds. Land reclamation to extend the peninsula for HWSFAC is proposed will avoid the loss of valuable habitats. The total area of open water within the lake will be slightly reduced as a result, but no significant negative effects on the SSSI or its designated bird assemblages are expected to result.

The largest island in the north of the lake will be reduced in height to make it more suitable for wintering and breeding birds. Muddy scrapes will also provide new habitat for wading bird species. An artificial sand martin bank will be built at the largest island to attract this species.

Once works in the lake are completed, no further disturbance to wintering birds is expected would occur from construction activities. The construction of the new facility will continue through the 2025 breeding season on land. Important woodland habitat will be retained and protected through fencing. As such, significant disturbance effects on breeding birds during construction are not predicted. Measures will be included in the CEMP to protect and ensure the safety of other species during construction works.

Overall, no significant negative effects have been assessed during the construction phase. Long term positive effects from implementation of the embedded mitigation measures at the start of the construction phase are reported in the section below.

## What are the potential effects of the Completed Development?

Once completed, the Site will benefit from improved operational controls, management and security. This will significantly reduce or prevent unauthorised uses such as poaching and fly-tipping which occur at the moment.

HOAC will operate from 1 April to 31 September each year. Activities will therefore take place during the breeding bird season but not the season which is important for wintering birds. The associated activities are a source of potential of visual and noise disturbance. During operation, water-based activities will be confined to a defined area in the centre and north of the lake. The visual screening provided by islands and floating reedbeds (as well as areas of emergent planting) is designed to prevent disturbance of breeding birds within the refuge areas. Any birds outside the refuge areas will have plenty of choice onsite of where to go if they are disturbed by the water-based activities. Some species are not sensitive to disturbance and will remain within the sailing area. The most sensitive species have mainly been recorded in areas of the lake with natural visual shielding already present, such as around islands. This behaviour is expected to continue, and these species are not considered likely to be significantly disturbed by the activities of HOAC.

During winter, only BSC will operate and no changes are expected to the level of current use although they will use a launch area at the south of the lake. Newly created refuge areas are predicted to reduce visual disturbance effects of these existing activities. This is considered to provide a significant ecological benefit for wintering bird species.

Access to the peninsula lake shore will be restricted to the pontoons, beach and launch areas along the north shore of the peninsula. This is to minimise disturbance effects. The exception will be within purpose-built bird hides providing viewpoints for bird watching. The woodland at the peninsula will also be fenced to prevent disturbance to woodland habitat or the breeding birds present. Woodland will be sensitively managed to maintain and enhance its biodiversity and condition and to protect it from pressures such as disturbance.

No negative significant effects are predicted to (the condition of) the designated features of the SSSI (i.e. the favourable status of designated features occurring onsite is predicted to remain unchanged). The species assemblages are unlikely to show significant benefits, however positive effects for some individual bird species may be recorded. This is due to the improved and greater areas of breeding habitat that will be provided including new islands, floating reedbeds and areas of emergent planting. Individual species numbers may increase at the Site and more pairs may breed successfully. New breeding species may also be attracted to the lake such as sand martin. These benefits would be valued at up to the Regional level depending on the species.

Additional enhancements are proposed to improve the condition of the SSSI and its resilience to climate change. The condition of the lake is expected to improve through increased area of plants growing within the water and at its edges. The floating reedbeds and aquatic planting will remove nutrients from the water, improving its quality. They will also increase the amount of habitat for invertebrates and fish, benefitting the birds by increasing their food resources. The lakebed will be made more natural (it is currently largely flat) by creating some deeper areas and some shallow areas. The result is predicted to be more improved biodiversity, greater food resources for birds and better quality water. This will also strengthen the lake's resilience to changes associated with climate change and warming temperatures in the future.

Broadwater Lake provides approximately 60ha of the 93.75ha of open water within the SSSI as a whole. Warming temperatures due to climate change are likely to result in the loss of open water area, reduced water quality (higher temperature, reduced dissolved oxygen, increased turbidity), and animal mortality from increased frequency and scale of algae blooms, which in turn could adversely impact birds, fish and other wildlife. The habitat improvements to Broadwater Lake would help ensure that the lake continues to support important assemblages of breeding and wintering birds in the future. This is considered to provide a significant positive effect on the entire SSSI. These benefits would be over the long-term.

The Applicant has committed to the long-term management of the Site for wildlife with aims to also improve the water environment. A Draft MEMP and Draft LMP accompany the ES and set out the objectives and key management measures. Both management plans would be developed in consultation with stakeholders. Ongoing management would be informed by a comprehensive programme of monitoring which would measures how species and habitats and species respond to changes. This would inform interventions in the future as issues arise, or as long-term trends become clearer. The Draft MEMP includes measures to manage newly created habitats as well as existing habitats such as the woodland and open water to ensure they remain in a good condition.

Management and monitoring will be designed to ensure that future threats and stressors arising to the SSSI will be identified quickly and addressed promptly and positively.

Outside the SSSI designation, ecological enhancements proposed will benefit a range of species of conservation concern or with priority status including otter, bats, grass snake, water vole and hedgehog. These enhancements will provide benefits at a Local level (not significant).

## What would be the cumulative effects with other developments?

### Construction

The cumulative impact identified is that the Development during October and November 2024 may cause more wintering birds to be using the south-west corner. If HS2 then disturbs this area as well, the impact could be greater. However, through the provision of a new, visually screened refuge area in the northern end of the lake, well away from both HS2 and from the Proposed Development, a new suitable refuge will be available. This refuge area will be visually enclosed with floating reedbeds in a long chain, behind which tern rafts will be provided. As a result of the embedded mitigation, no cumulative effects have been predicted.

### Completed Development

The cumulative impact identified is that the once operational, the Proposed Development may cause more breeding birds to be using the south-west corner as a result of increased daily sailing activities on the central part of the lake during April – September. If HS2 then disturbs this area, the value of the area as a refuge from increased sailing activities may be reduced. However, through the provision of a new, visually screened refuge area in the northern end of the lake, well away from both HS2 and from the Proposed Development, a new suitable refuge will be available. This refuge area will be visually enclosed with floating reedbeds in a long chain, behind which tern rafts will be provided. As a result of the embedded mitigation, no cumulative effects have been predicted.

# 8 Water Resources and Flood Risk

## How were the environmental effects identified?

Environmental effects on water resources and flood risk have been identified using desk-based research, published information and field surveys (e.g. water quality and sediment quality). Consultation has also taken place with statutory bodies including the Environment Agency and Affinity Water.

The significance of effects has been determined using the guidance and criteria set out in published guidance (Design Manual for Roads and Bridges). The ES chapter is accompanied by a Flood Risk Assessment which has been prepared in line with national planning policy and guidance.

## What is the baseline?

Broadwater Lake is an artificial lake (approximately 63 hectares) formed as a result of sand and gravel quarrying. Its depth ranges from less than 1m to over 5m in places. It is adjacent to the River Colne, the Grand Union Canal and similarly formed lakes. The Site overlies the Mid-Chilterns Chalk Groundwater Body which is designated as a Principal Aquifer and is used to provide drinking water. Because of the presence of adjacent and underlying gravels, the majority of the area is in direct contact with groundwater. The most recent overall water quality rating for the groundwater body (in 2019) was 'Poor'.

The water quality of the lake is considered to be 'moderate' by the Environment Agency but varies depending on a range of existing factors. The underlying groundwater is currently considered to be in poor overall condition by the Environment Agency. The sediment quality associated with the lake bed is considered to be generally acceptable in terms of human health and environmental standards.

Whilst the lake itself is subject to a higher risk of flooding, the land associated with the Proposed Development is considered to be within the lowest category of flood risk from rivers.

## What are the potential effects during construction?

Construction activities associated with the Proposed Development are not expected to directly affect the water quality in Broadwater Lake and the River Colne due to the measures that will be in place to control sediment and pollutants in the Outline CEMP. Overall, the impact on surface water quality and flows during construction will be a negligible to minor adverse effect (not significant). Established working methods would be used for dredging and the re-use of materials to minimise disturbance to the lake bed and impacts on water quality (e.g. sediments being mobilised).

Risks to groundwater will be minimised through effective implementation of measures included with the CEMP which specifies how to store and discharge water, fuels, oils and other potentially hazardous materials in accordance with best practice pollution prevention guidelines. The CEMP also includes details on how to mitigate for a leak or spill and how to minimise dewatering effects during construction. Overall, the impacts of construction will be negligible (not significant) on groundwater quality and flow.

Construction activities will be undertaken in accordance with the surface water drainage strategy which will be implemented early on during construction. There will be an impact to fluvial, surface water and groundwater flood risk of negligible magnitude resulting in a negligible effect (not significant).

Beneficial, but non-significant benefits are likely to occur to the shape and function of the lake through the creation of new habitat features.

## What are the potential effects of the completed Development?

A surface water drainage strategy has been developed by the design team. The strategy aims to manage surface water sustainably and ensure that the Proposed Development is resilient to the future impacts of climate change.

Runoff from the impermeable access road car parking areas will be directed to and treated in vegetated swales. The swales will then discharge to the lake, the lowland mixed deciduous woodland (boggy woodland), and the wildlife lagoon. Potentially contaminated run-off (e.g., fuels and oil residues) will therefore not be released into surface or groundwater. The effect of the completed Proposed Development on surface and ground water quantity will be negligible to minor beneficial (not significant).

Developments can affect flood risk by generating additional surface water runoff from rainwater falling on hard surfaces. However, the drainage system will collect surface water during stormwater events and the release of this water to watercourses would be controlled to avoid flood risk both within the Site and the surrounding area. The design team have also included measures in response to flood risk such as ensuring that the finished floor levels of the buildings are above the flood level, taking account of climate change. The Proposed Development and its future users will therefore be safe from flooding and there will be no adverse impact on other receptors (offsite). The Proposed Development will therefore result in a negligible to minor adverse effect (not significant) in term on people and property. A Flood Warning and Evacuation Plan will be in place as standard practice.

Waste water from the Proposed Development will be discharged into Thames Waters's public foul water sewer located to the east of the Site. The effects on drinking and foul water infrastructure from the Proposed Development is considered to be neutral (not significant).

Significant beneficial effects would occur to the shape and natural function of Broadwater Lake as a result of the long term ecological enhancements, management and monitoring.

A Draft LMP accompanies the ES and includes measures and monitoring that will be implemented for the operation of the Proposed Development. The Draft LMP sets out measures that will minimise the risk of negative effects to surface and groundwater quality, flood risk and hydro-morphological features of importance associated with Broadwater Lake and other water bodies. A detailed LMP will be developed in consultation with stakeholders.

## What would be the cumulative effects with other developments?

There would be no cumulative effects with other developments in the local area including HS2.

# 9 Ground Conditions and Contamination

## How were the environmental effects identified?

The baseline has been determined through desk-based research (Phase I), a Phase II site investigation comprising trial pits and boreholes and sediment sampling within the lake. The assessment of effects has been based on a Conceptual Site Model Framework which details the identified sources of potential contaminants, the pathways in which the potential contaminants may reach and potentially impact upon the identified sensitive human health, controlled waters, built and ecological receptors.

The ground conditions and contamination effects have been considered assuming reasonable worst case assumptions about the construction and operational phase activities. The significance of effects has been determined using criteria set by professional judgement.

## What is the baseline?

The majority of the Site was formerly used as a sand and gravel works and Broadwater Lake was formed by excavation and extraction of superficial granular deposits between the 1960s and 1990s.

Baseline geological conditions across the Site consist of artificial geology (made / reworked / infilled ground) to a maximum depth of 3.45m. Underlying the artificial geology is superficial alluvium and the Shepperton Gravel Member. The Site area is underlain by undifferentiated Chalk bedrock geology. A significant part of the peninsula is underlain by concrete hardstanding.

The baseline groundwater conditions indicate the presence of a shallow groundwater level beneath the Site (approximately 1m), with a number of marginal exceedances of the Freshwater Environmental Quality Standard (EQS) for heavy metals (copper, manganese and nickel). Groundwater is known to be in continuity with Broadwater Lake, the River Colne and other waterbodies.

Records indicate that areas within the peninsula have been used for historic landfilling.

Identified sources of potential contaminants (including exceedances of heavy metal concentrations, and the presence of a localised hydrocarbon contamination hotspot associated with a former above ground storage tank may pose a risk to surface water, groundwater and ecological receptors, across the Site. There is also potential for construction phase works to introduce additional contamination sources to the Site, including fuels / oils for plant machinery (due to ineffective controls), and the works associated with the dredging of lake bed sediment to form new islands and the land reclamation.

Identified sources of potential ground gas / vapour may also pose a potential gas / vapour risk to constructions workers.

## What are the potential effects during construction?

Potential risks to human health during the construction phase are that there could be potential exposure to made ground associated with historical landfilling and mineral extraction / processing, and ground gas from this historic landfilling / infilling of ground. The Outline CEMP (Appendix 6.1) includes a range of measures which would be implemented to mitigate these potential risks.

The Outline CEMP also includes measures posed to mitigate potential effects on human health, groundwater, surface water, built environment and ecology. Environmental Permits will also need to be secured to cover the works associated with the Proposed Development in line with environmental permitting legislation.

A remediation strategy also will be prepared before works commence which will present detailed mitigation and monitoring measures to ensure that the Site is suitable for the proposed end uses. This would be approved by LBH and other relevant stakeholders including the Environment Agency and Affinity Water. A report will then be prepared to present evidence to verify that the works set out within the remediation strategy have been completed.

The remediation strategy will detail the works and measures required where contaminated soils or groundwater are encountered. If these materials are unable to meet appropriate standards for re-use, they would be removed from the Site by a suitably licensed waste carrier to an appropriately licensed waste facility.

Only a small area of concrete hardstanding material to be removed from the north-eastern peninsula area. Groundworks (excavation) would also be kept to a minimum. All other areas of existing hardstanding will be left in-situ to act as a cover layer over historical landfilled areas of the peninsula. This will minimise the risk of groundwater being adversely affected.

The risks to receptors during the construction phase have been assessed to be negligible to minor beneficial. Overall, it is considered that potential effects from the construction phase of the Proposed Development will be negligible to minor adverse (not significant) with mitigation measures in place. These measures will be secured through the CEMP and planning conditions. No additional mitigation measures are considered necessary to mitigate risks from land contamination at the construction stage beyond those set out in the CEMP, those to be defined in the Environmental Permit and those instigated as part of required remediation strategies.

## What are the potential effects of the Completed Development?

Due to the nature of the Proposed Development it is unlikely that operation of the HWSFAC will give rise to any significant contamination. Chemicals, oils and washdown areas would be subject to appropriate pollution prevention measures. Maintenance and operation of the Proposed Development will be in accordance with environmental legislation and good practice whereby appropriate spillage and pollution response procedures will be established. These measures are secured through Outline CEMP.

Clean cover materials will be installed at the camping area on the peninsula to protect future users. The effects on human health from the operational development would be negligible (not significant).

The operational development would give rise to beneficial effects on the underlying groundwater due to the surfacing being provided across the Site, in the form of building roofs, parking and road areas. Together with a formal surface water drainage system across the peninsula designed in line with good practice, the development will result in reduced volumes of rainwater and surface water infiltrating into made / infilled ground. This will reduce the potential for 'leachate[7]' to be generated in landfilled areas. The effect of the completed development on surface and ground water quality and ecological receptors would be negligible to minor beneficial (not significant).

The built environment receptors during the operational phase of Proposed Development would be at Low Risk from contact with made ground / infilled ground and the effects would be minor adverse to negligible (not significant).

Ground investigation at the peninsula has informed the design of the Proposed Development, including a general assessment of ground conditions, assessment of excavations and foundation solution assessment. No significant effects are expected to the Proposed Development from geotechnical risks.

No sub-surface structures such as basements are would be at an increased risk from ground gases and vapours. As such, there would be no significant effects from ground gases / vapours.

Overall, it is considered that potential effects from the operational phase of the Proposed Development will not be significant following the implementation of appropriate mitigation measures.

## What would be the cumulative effects with other developments?

No approved developments have been identified which are of scale that are likely to lead to the production of cumulative effects. HS2 Construction works are likely to be significantly progressed, with all major earthworks that are most likely to result in cumulative effects being completed by the time the Proposed Development begins enabling and construction works phases. No significant cumulative effects are anticipated as a result of the operation of the Proposed Development.

[7] water that has percolated through a solid and leached out some of the constituents

# 10 Landscape and Visual Impact Assessment

## How were the environmental effects identified?

Desk based research, field surveys and consultation with LBH has been undertaken to inform the baseline conditions. An assessment of landscape and visual impacts of the Proposed Development has been undertaken and considers the impact the proposals will have upon the character of the landscape and the people who view that landscape.

The assessment was undertaken in accordance with 'Guidelines for Landscape and Visual Impact Assessment Third Edition' (2013) (GLVIA3) published by the Landscape Institute and the Institute of Environmental Management and Assessment. This process involves making a series of judgements relating to the sensitivity of the receptor and the magnitude of the effect on the receptor, and combining the judgements within an overall profile in order to determine the effect, its significance and the direction of the effect on each receptor.

Three Accurate Visual Representations (AVRs) were prepared as agreed with LBH to assess the impacts of the completed Proposed Development alone and combined with HS2. The selection of viewpoints was informed by a Zone of Theoretical Visibility Study and tested by site survey within a 3km radius of the Proposed Development.

## What is the baseline?

The Colne Valley is the first significant area of semi-natural landscape experience west of London. Its value as a landscape was recognised in the formation of the Colne Valley Regional Park within which the Site lies.

There are many Landscape Character Assessments (LCA) in the local area, produced by different organisations but with common themes:

- Manmade water bodies created from previous gravel excavation some of which include islands;
- Public recreation including sailing activity and adjacent Grand Union Canal towpath with trails and footpaths further afield;
- Remnant areas of derelict hard standing and structures such as the weighbridge on Site from previous industrial uses;
- Waterside edges of naturally regenerated woodland of variable condition around the waterbodies;
- Visible biodiversity, predominantly birdlife;
- A surrounding tight matrix of woodland blocks, strips hedgerows and generally small fields around the Site on the valley floor, opening out to a larger arable and woodland pattern on valley sides and farmland above;
- Heavy infrastructure, generally screened by vegetation but most present in sound; including the M25, A412, M40 and HS2 which is currently under construction;

- The occasional building associated with the river and canal, scattered houses and ongoing minerals extraction operations;
- The River Colne is generally hidden.

The Site is contained visually and restricted to a 3km radius area with only two significant public locations found to offer potential views. These are both elevated to the northeast of the lake, one being users of the Hillingdon Trail close to Merle Avenue to the southwest of South Harefield and the other from the car park of the Old Orchard Inn.

## What are the potential effects during construction?

The effects of the construction stage in landscape and visual terms would be temporary, short term and in controlled locations on the Site.

Changes in the landscape resulting from construction operations activities would include

- Loss of existing trees due to management;
- The process of creating new land to extend the peninsula and create new islands;
- Limited earthworks for cut and fill on the peninsula to achieve an accessible and safe landform for movement, boatyards and car parking;
- Limited groundworks to remove some of the concrete covering to the peninsula and replace with a clean cover layer;
- The presence of construction vehicles, plant, contractors yard and site offices; and
- Hoardings and screening barriers for mitigation.

The assessment concludes that during construction of the Proposed Development, there will be some temporary, significant moderate adverse effects on landscape features within the Site including Broadwater Lake, and its islands and shoreline. These effects are predominantly due to the partial loss of features to facilitate construction activity.

There will be no significant effects on landscape character areas.

The most significant Visual Effects are judged to be major adverse from the individual existing property adjacent to the Site entrance but limited to the temporary peak in nearby construction and construction vehicles. There will be temporary significant moderate adverse effects on users of Hillingdon Trail and associated footpaths elevated on the valley side to the northeast of the lake and visitors to the Old Orchard Inn elevated on the valley side to the northeast of the lake,

## What are the potential effects of the Completed Development?

The Proposed Development masterplan was ecologically, landscape and visually led to avoid and minimise harm and create benefits to the landscape of the Site and it's setting.

Initial minor adverse effects are predicted by:

- Less than 4.9% reduction in area of the Broadwater Lake;
- Shoreline of lake including peninsula; and
- Net gain of four islands.

With maturation of the lake enriched by islands, floating reedbeds and enhanced shoreline it is envisaged that this adverse effect would turn into a minor beneficial effect by Year 15. It is judged that the impact on islands over this period would lead to a minor-moderate beneficial effect.

Minor beneficial effects would be anticipated from:

- Management of incidental woodland and vegetation on-site with new planting;
- New planting in areas of removed remnant hard surface with pioneer vegetation; and
- Management of the wet woodland.

By Year 15 these would develop into moderate beneficial effects.

At Year 1 it is judged that there would be negligible beneficial effects of:

- The landscape and ecological enhancements in addition to the operation of HOAC on Site in addition to the existing BSC on the landscape fabric of the Colne Valley Regional Park, Colne Valley: Rickmansworth to Uxbridge LCA and Thames Valley NCA

By Year 15 these would develop locally into minor beneficial effects albeit at a regional scale of the Thames Valley NCA remain of negligible beneficial effect.

Changes to the landscape include the introduction of two buildings and a boatyard on reclaimed land so as to preserve existing valuable woodland on the Site, removing or planting over areas of existing concrete surface, a new planting scheme, creating new islands, removal of two islands for sailing, installing floating reedbeds and shaping shoreline edges so as to be more ecologically attractive.

The result of this would be a very minor reduction in lake area of less than 4.9% but an overall benefit to the landscape and its setting.

Visually, the most noticeable change to the landscape from a public place would be seen from, through or over the carpark of the Old Orchard Inn (10.1) with an increase in the extent of boat parking visible in comparison with the existing BSC, the partial view of two buildings and the incorporation of more islands and ecological habitat within a marginally reduced lake.

Through 3D modelling, the location and height of the proposed buildings and shape of extended peninsula were designed so as to maintain the longest possible views of open water and be as hidden as possible from both the Old Orchard Inn and Hillingdon Trail (see **Figure 10.1**).

Overall, the Proposed Development would not result in significant adverse effects on the identified landscape and visual receptors. There are beneficial (not significant) landscape effects predicted to the island and shoreline of Broadwater Lake, Colne Valley Regional Park and the LCAs. Significant beneficial landscape effects are predicted to woodland and vegetation features within the Site. Beneficial visual effects (not significant) are predicted for existing users of the Site.

## What would be the cumulative effects with other developments?

There would be no change to the significance of the effects assessed of the Proposed Development when considered alongside the HS2 viaduct within the landscape.

Figure 10.1: Views from the carpark of the Old Orchard Inn (Baseline and with Proposed Development

# 11 Summary

The section summarises the key mitigation and monitoring measures that will be implemented to minimise potential adverse effects during construction and operational phases of the Proposed Development.

## Construction

### General

- Detailed Construction Method Statement (CMS) to be prepared and agreed with LBH and relevant key stakeholders, including dredging and land reclamation methods;
- Detailed CEMP to be agreed in accordance with the Outline CEMP to include ecological mitigation measures, Dust Management Plan, pollution prevention measures, emergency response, incident reporting etc.
- Adherence to the Framework Construction Logistics Plan (CLP), and details agreed with LBH and TfL.
- Ecological Clerk of Works and Environmental Manager to be in place during the construction phase of works.

### Biodiversity

- Timing and phasing of works substantially in accordance with the principles defined in Chapter 6: Construction unless otherwise agreed to avoid adverse effects on ecological receptors.
- Invasive Species Management Plan.

### Water Resources and Flood Risk

- (as set out under General)

### Ground Conditions and Contamination

- Pre-demolition asbestos survey of remnant buildings and structures.
- Additional site investigation, site monitoring and quantitative risk assessment;
- Remediation Strategy and subsequent Remediation Verification Report.
- Environmental Permits under the Environmental Permitting Regulations (England and Wales) 1996 likely to include Waste Framework Directive (EPR Schedule 9 – Waste operations and materials facilities), the Landfill Directive (EPR Schedule 10 – Landfill), Mining Waste Directive (EPR Schedule 20 – Mining waste operations) and Groundwater activities (EPR Schedule 22 – Groundwater activities).
- CL:AIRE Definition of Waste: Code of Practice (CoP) for the removal/re-use of material from the lake.
- Piling Risk Assessment.
- Materials Management Plan, including earthworks assessment.

### Landscape and Visual Impacts

- Tree protection measures implemented in line with BS 5837, 2012 Trees in Relation to Design, Demolition and Construction.
- Colour of hoarding to be recessive, e.g. green/brown.

## Completed Development

### Biodiversity

- Operational timing of HOAC to 1 April to 31 September.
- Detailed MEMP to be developed in consultation with key stakeholders and implemented by landowner/operator.
- Ongoing management of new/enhanced habitats for period of at least 30 years.
- Detailed lighting design to be developed with ecologist and in line with good practice.
- Operational Management Plan, including lighting controls and management of recreational activities.

### Water Resources and Flood Risk

- Detailed LMP to be developed in consultation with key stakeholders and implemented by landowner/operator.
- Detailed design in accordance with measures set out in the ES chapter (Embedded Mitigation), including principles of surface water drainage, flood risk avoidance / resilience and use of clean cover materials.
- Flood Evacuation and Warning Plan.

### Ground Conditions and Contamination

- Use of clean cover system in the camping area and use of no-dig layers as required.

### Landscape and Visual Impacts

- Details of landscape planting for the lake and peninsula to be agreed with LBH and other key stakeholders.
- Ongoing management of new/enhanced habitats for period of at least 30 years.

## Monitoring Programme

The ES proposes that a comprehensive programme of monitoring is undertaken for the construction and operation of the Proposed Development, although it should be noted that this is not in response to significant adverse effects being identified.

A comprehensive long-term monitoring programme for water quality has been proposed. This is designed to measure the changes to water quality and inform further interventions in the future as issues arise, or as long-term trends become clearer.

The existing habitats on-site (SSSI designated habitats being woodland and open water), and the enhancements provided by the Proposed Development (aquatic planting, floating reedbeds and new

islands), will be monitored to ensure they remain in a good condition, developing and functioning as planned.

Ongoing management will be informed by the results of the monitoring. The programme of monitoring and assessment would therefore allow adaptive management of the SSSI. Monitoring will be designed to help ensure that the MEMP, LMP and Operational Management Plan are effective management tools in the face of dynamic change. This will be particularly important as the effects of climate change on the Broadwater Lake intensify and will help ensure the Applicant achieve their objectives of conserving and enhancing the value of the SSSI, its designated features in the long-term. Details of the monitoring programme will be further developed in consultation with key stakeholders.

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# References

[i] HM Government. High Speed Rail (London - West Midlands) Act 2017 (c. 7).