

4 Alternatives

Preface

This chapter has been updated throughout to reflect the revised proposals and updates to the Alternative Sites Assessment (ASA). The ASA now includes a wider search area and considers a number of additional sites. Comments from LBH and statutory bodies on the 2023 ES relevant to the consideration of reasonable alternatives are also addressed.

4.1 Introduction

4.1.1 In accordance with the EIA Regulations, this chapter describes the reasonable alternatives to the Proposed Development considered by the Applicant, prior to the selection of the final design and provides a description of the main reasons for the choice made, including a comparison of the environmental effects if available.

4.1.2 The chapter is structured as follows:

- Section 4.2: 'Do Nothing' Scenario
- Section 4.3: Former HOAC Facility
- Section 4.4: Other Alternative Sites
- Section 4.5: Split Operations
- Section 4.6: Development Location
- Section 4.7: Development Layout, Land Reclamation and Dredging
- Section 4.8: Built Form
- Section 4.9: Uses and Activities
- Section 4.10: Operation and User Assumptions
- Section 4.11: Access, Car Parking and Boat Storage

4.1.3 This chapter is accompanied by:

- Appendix 4.1: Alternative Sites Assessment; and
- Appendix 4.2: Alternative Peninsula Layouts.

4.2 Do Nothing Scenario

4.2.1 The Proposed Development is designed to provide a replacement water sports and outdoor activity facility to one which formerly operated on approximately 18.2ha of land at Dews Lane, Harefield, UB9 6JN which also used the adjacent Harefield Number 2 Lake. This facility was formerly operated as Hillingdon Outdoor Activity Centre (HOAC) by a registered youth educational charity. LBH owns the former HOAC facility, which the Colne Valley Youth & Community Association managed under a partnership agreement. Further background to the Proposed Development is provided in Chapter 1: Introduction.

- 4.2.2 A legal agreement between HS2 Ltd, the Secretary of State for Transport and LBH was reached in 2017 which requires that LBH will use reasonable endeavours, working together with HS2 Ltd to design and implement a scheme for the relocation of the former HOAC facility to a suitable site(s) to be agreed with HS2 Ltd, the Association and the relevant local authorities.
- 4.2.3 A scenario where a replacement to the former HOAC facility is not provided is not considered to be a reasonable alternative.
- 4.2.4 However, in line with good practice, the Do Nothing scenario, where the Proposed Development would not proceed at the Site, is considered. This would mean that the baseline and future baseline conditions for the Site and the associated environmental effects of the Proposed Development set out Chapters 7 – 10 of the ES are likely to prevail. These are not repeated here.
- 4.2.5 The Applicant's aims for the Proposed Development are set out in paragraph 5.3.4 (Chapter 5: Description of the Development) and include delivering social and health benefits to the local community, access to nature and to conserve and enhance the special features of the Mid Colne Valley SSSI and Broadwater Lake as a waterbody, in accordance with planning policy and its 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 Outline MEMP (Appendix 7.9).
- 4.2.6 Section 7.5 of Chapter 7: Biodiversity provides commentary on the current and future management of the Site in the absence of the Proposed Development which is relevant to the 'Do Nothing Scenario'. This demonstrates that the Site is not being actively managed to enhance the condition of the Broadwater Lake SSSI unit which is currently in unfavourable condition. Over 50 years with the same or additional interventions, it is considered that biodiversity at the lake may remain at a similar level; a loss of biodiversity is also a likely scenario as climate change is likely to have an initial negative impact before habitats and species recover longer-term.
- 4.2.7 Section 8.5 of Chapter 8: Water Resources and Flood Risk demonstrates that there are also current and future challenges to the water environment of Broadwater Lake due to climate change. In the absence of active management and intervention, water availability, morphology and water quality (and hydroecology) may deteriorate further. The lake has limited bathymetric (topographic) variation, is mainly hard clay and has steeply banked sides with minimal shallow areas close to the banks. These conditions do not support good numbers of plants and invertebrates and means that variations in water volume have a more profound effect on marginal water levels with only limited lake shore habitat present.
- 4.2.8 The water is somewhat enriched with nutrients, due in part to large numbers of waterfowl. This further restricts plant growth below the surface. The lack of plants, algae and water temperatures (which are likely to worsen with climate change in the future) also adversely affects water quality. In the absence of lake management, such as aeration, and habitat creation, these issues may adversely affect the lake's potential to support breeding and wintering birds in the future.

- 4.2.9 In line with its statutory duty as a public body, the Applicant is committed to conserve and enhance this part of the Mid Colne Valley SSSI through a package of mitigation and enhancement measures included in the Outline MEMP. The HWSFAC provides a sustainable source of funding for the Applicant to secure the long-term active management of the Site in accordance with its statutory duty and to address current and future challenges. with its statutory duty. It is considered unlikely that active management of the Site to enhance its condition would occur in the absence of sustainable funding.
- 4.2.10 The Proposed Development will deliver a replacement facility for a community asset which has not been able to operate since 2020. It would provide a broad range of outdoor and environmental educational activities for the communities of Hillingdon, West London and districts west of London, providing young people, youth organisations, disadvantaged and / or disabled groups, and families access to safe, outdoor and environmental educational facilities.
- 4.2.11 The social benefits of the Proposed Development can be summarised as follows:
- Provision of an outdoor activity centre for a wider range of user groups such as schools and education establishments, children, young people and adults with additional needs, guides, scouts and cadets, other educational establishments, BSC members, families and emergency services.
 - Outdoor activity health and wellbeing benefits.
 - The teaching and learning of lifelong skills.
 - Volunteering opportunities.
- 4.2.12 The economic benefits of the Proposed Development can be summarised as follows:
- The creation of jobs and apprenticeship opportunities.
 - The creation of transferable skills.
 - Attraction of visitors which many stimulate the growth of local businesses and drive sales in the local and broader economy.
- 4.2.13 The above benefits for users of the facility would not be delivered in the absence of the Proposed Development.

4.3 Former HOAC Facility

- 4.3.1 This section considers whether re-use of the former HOAC facility at the Dews Lane site is a reasonable alternative. The former HOAC facility operated between 1992 and October 2020 and included:
- A range of land-based activities, including archery, a giant swing, woodland activity area, low and high ropes, caving, climbing / bouldering, pedal karting, BBQ area and a campsite;
 - Accommodation, including three seasonal staff accommodation chalets, log cabin waterfront office / storeroom, a wood shelter race hut, lecture room, centre office and

staff room, classroom, Workshop to allow for maintenance of the facilities and assets, equipment storage areas / shelters;

- A range of water-based activities including windsurfing, canoeing, power boating, dinghy sailing as well as floating / rowing pontoons and a slipway for launching boats;
- A main office and reception, toilets and changing rooms, Workshop, waterfront office and race hut, outbuildings and stores; and
- Open hardstanding for parking (both vehicles and boats).

4.3.2 Once complete, the HS2 Colne Valley Viaduct will cross the former HOAC facility and the Harefield No. 2 Lake (Figure 4.1). Construction of the viaduct necessitated demolition of three of the buildings at the former HOAC facility and construction of piers within its operating area, including approximately 10 in the adjoining 18ha Harefield No. 2 Lake, where water-based activities took place. The former HOAC facility was subject to a Compulsory Purchase Order (CPO) to facilitate construction of HS2 and has been under the control of HS2 Ltd since 2020.

Figure 4.1: Aerial image of the Colne Valley Viaduct with Harefield No. 2 Lake on the Right



4.3.3 In relation to the possible re-use of the former HOAC facility once HS2 is complete, the HS2 Phase One ES (HS2 ES, Volume 5: Technical Appendices, Colne Valley Community data section 2.3, Table 3)¹ concluded the following:

'The construction of the Colne Valley viaduct will require placement of piers in the 18ha Harefield No 2 Lake where HOAC water based activities take place. The introduction of piers in the lake will constrain water based activities being allocated to the most appropriate part of the lake. This allocation of these water based activities is influenced by the weather conditions (primarily wind conditions) which will be affected by the new structures in the lake. The numbers of groups, ability of groups and types of activities also determine which parts of the lake are used. HOAC advises that the introduction of the viaduct in the lake will affect the flow of the wind which has implications for sailing, as well as affecting visibility, which they believe could restrict the areas of the lake that are available for use. It is

considered that the use of part of this community resource will be impaired during the operation of the Proposed Scheme.

The piers for the viaduct will also be placed on land that is part of the HOAC site and will require the demolition of three buildings. The area is currently used for land-based outdoor activities at HOAC.

The land required permanently to construct the Proposed Scheme is considered to result in both the current water-based and land-based operations of HOAC being impaired. It is therefore considered to be a major adverse effect and is significant.'

- 4.3.4 The presence of the Colne Valley Viaduct requires a safety buffer zone either side of the railway. The remaining portions of the lake would be too small and inadequate for future watersports activities to be conducted safely. In addition, once HS2 is operational, the Applicant considers that noise and vibration from the high-speed trains would result in an unsafe environment for future users as there would be difficulty hearing and following instructions, creating a safety risk for children and young adults in particular.
- 4.3.5 The Applicant is therefore of the view that the lake at the Dews Lane is not suitable for water-based activities in the future following completion of HS2 and therefore this alternative was discounted.

4.4 Other Alternative Sites

- 4.4.1 An Alternative Sites Assessment (ASA) has been prepared by the Applicant and is provided as Appendix 4.1. The ASA assesses whether there are other any alternative sites available for delivery of a replacement to the former HOAC facility. The ASA draws on published information, including a Lake Options Report² prepared on behalf of HS2 in 2015 (the 'HS2 Lake Options Report') which is included as Appendix 1 to the ASA, other available data sets, and site surveys. The ASA considers re-use of the former HOAC facility at Dews Lane, although the reasons for discounting this alternative are included in Section 4.3 above.
- 4.4.2 The HS2 Lake Options Report provided a summary assessment of HS2's review of lakes which could be suitable for a replacement facility and appraised them against a set of recreational criteria. Due to the time that has elapsed since the HS2 Lake Options Report was prepared, potential alternative sites have been re-appraised by the Applicant within the ASA. Since preparation of the ASA in 2023, it has been updated to include a larger search radius (which includes more lakes than previously considered) and revisions to the assessment criteria.
- 4.4.3 The ASA identifies a 'Long List' of potential alternative sites based on a Search Area defined by an area that is within a reasonable distance to the former HOAC facility. This Search Area was defined as a 20km radius from the former HOAC facility to ensure that the replacement facility remains accessible to the communities that previously used the facility. This Search Area now encompasses the majority of lakes within the Colne Valley and a small number of sites beyond this were also included. Figure 4.2 shows the Search Area and the Long List of alternative sites considered in the ASA.

- 4.4.4 The Applicant has defined the minimum requirements for the replacement facility ('Proposed Facility') to enable it to maintain safe and accessible water and land-based activities in line with the previous offer at the former HOAC facility. These minimum requirements are defined by the Applicant as 'recreational criteria' and are defined in Table 4.1:

Table 4.1: Stage 1 Site Assessment Criteria

Criteria	Considerations
Lake Surface Area	<p>The lake at the former HOAC facility measured at approximately 18.9 hectares and the sailing area measured at approximately 16.1 hectares. The Association have advised that on a peak day, the lake would be near to capacity in terms of the spatial requirements for each water-based activity and ensuring the safety of the users.</p> <p>A minimum lake surface area of 7 hectares is considered to be required for the Proposed Facility to operate, without a reduction in the average number of users and the extent of the activities that were provided at the former HOAC facility. This minimum lake surface area would also ensure the safety of users.</p> <p>The requirement of 7 hectares is also significantly less than the scheme approved under planning permission ref. CM/22/16.</p> <p>For all water-based activities to take place, there must be direct access to the lake.</p>
Land Surface Area	<p>The land at the former HOAC facility measures at two hectares. The Association have advised that on a peak day, the land would be near to capacity in terms of the spatial requirements for each land-based activity and ensuring the safety of the users.</p> <p>A minimum lake surface area of two hectares is considered to be required for the Proposed Facility to operate, without a reduction in the average number of users and the extent of the activities that were provided at the former HOAC facility. This minimum land surface area would also ensure the safety of users.</p> <p>For all the land-based activities to take place, the land must not require the significant loss of vegetation and habitat.</p>
Accessibility	<p>Vehicular access to the site must not have weight or height restrictions. Minibuses typically weigh at a maximum of 3.5 tonnes and a typical school bus (single-decker) weighs at a maximum of 16 tonnes.</p> <p>The site must be able to provide appropriate vehicle access as most users are anticipated to travel by vehicle modes to the site. The site must also be accessible for HGVs and emergency vehicles.</p>

Criteria	Considerations
	<p>There must be an appropriate pedestrian route to the vicinity of the site, including footway provision and crossing points. The former HOAC facility could be accessed via two Public Right of Ways (PRoW) (ref. DEN/22/1 and DEN/24/1). PRoWs should not go into the site, for site security purposes.</p> <p>Cycle routes should be available within the vicinity of the site to encourage sustainable travel to the site. The former HOAC facility did not have cycle routes into the site, which may have restricted some users from travelling sustainably to the facility.</p> <p>The site must be located within an appropriate distance to public transport services such as bus stops and rail stations, to provide opportunity for sustainable transport. Transport for London's Public Accessibility Level (PTAL) methodology will be applied from the main access point (from the local highway network) given the rural nature of the potential alternative sites. The calculation assumes that people will walk up to 640 metres (approximately eight minutes) to a bus service and up to 960 metres (approximately 12 minutes) to a Rail or Tube Service. The former HOAC facility was not well served by public transport, save for a bus stop located 1.6 kilometres from the site access.</p>
Site Availability	<p>The site should be owned by LB Hillingdon, or available to purchase by LB Hillingdon. The agreement to replace the former HOAC facility (dated August 2017) was agreed between HS2 Ltd, the Department for Transport and LB Hillingdon. LB Hillingdon require full ownership of the Proposed Facility to guarantee its operation and management.</p> <p>Where a site has an existing use that is expected to continue for the long-term, then the site has been assessed as <u>not available</u>. The exception to this is where there are existing water and land-based activities on a site, which could operate in tandem or be re-provided as part of the Proposed Facility.</p> <p>Where a site has no existing use or the existing use is due to cease in the short-term, the site has been assessed as available, as there may be the opportunity to purchase the site.</p> <p>Local authorities can use their compulsory purchase powers (CPO) for land within their administrative boundary, where it is expedient to do so and where there is a compelling case in the public interest to make a CPO application.</p>
Designated Sites	<p>The site must not be in an internationally or European protected site such a special area of conservation (SAC), special protection area (SPA), Ramsar wetland, or potential SPA, possible SAC or proposed Ramsar wetland.</p>

Criteria	Considerations
Intersected by HS2, other railway lines or in close proximity to noisy infrastructure and activities	<p>The site should not be intersected or in very close proximity to HS2, other railway lines or key road networks, or in close proximity to noisy infrastructure or activities.</p> <p>The HS2 Phase One Environmental Statement, reports that the location of the HS2 railway line at the former HOAC facility means that the site is now not suitable for some of its coaching and camping activities, as these require tranquillity and due to the fact that there will be a maximum of 18 trains per hour¹ running through the site. The HS2 Environmental Statement (November 2013) states in its non-technical summary² that if the former HOAC facility continued to operate in its current location, the users will experience noise and visual effects.</p> <p>The noise and vibration of HS2, along with other railway lines, noisy infrastructure or activities could pose a safety risk for future users of the site, particularly those from SEN organisations. A noisy facility is not suitable for some students with disabilities such as Autism Spectrum Disorder (ASD), sensory processing disorder or ADHD as being located close to a noise-generating facility or activity can be highly problematic. A noisy environment can interfere with the ability to focus, listen and process information. This can be particularly challenging for students who already face difficulties with cognitive processing, speech or auditory problems.</p> <p>Publicly available sources of noise mapping data in GIS software have been used to evaluate noise constraints. Data sources include DEFRA Round 4 Strategic Noise Mapping (road traffic and railway noise)³ and Heathrow Noise Contours⁴.</p> <p><u>Upper screening criteria</u> – an initial screening criterion of 55 dB $L_{Aeq,16hr}$ has been adopted in relation to the main waterbody having regard to safety in respect of verbal communication from instructors etc.</p> <p><u>Lower screening criteria</u> – for sites which are predominately below 55 dB $L_{Aeq,16hr}$, further consideration was given to the provision of a reasonably sized area below 50 $L_{Aeq,16hr}$ for outdoor teaching and communication purposes, as well as any specific hearing-related sensitivities. Consideration has also been given to adjacent land areas however ownership and other constraints has not been taken into account.</p> <p>These criteria generally accord with the Acoustics of Schools: A Design Guide which states “noise levels in unoccupied playgrounds,</p>

¹ <https://www.gov.uk/government/publications/high-speed-two-an-engine-for-growth/high-speed-two-an-engine-for-growth>

² Page 81. The HS2 Environmental Statement (November 2013)

³ <https://www.gov.uk/government/publications/strategic-noise-mapping-2022>

⁴ <https://www.heathrow.com/company/local-community/noise/data/reports>

Criteria	Considerations
	<p><i>playing fields and other outdoor areas should not exceed 55 dB $L_{Aeq,16hr}$, and there should be at least one area suitable for outdoor teaching activities where noise levels are below 50 dB $L_{Aeq,16hr}$."</i></p>
4.4.1	<p>An assessment of the Long-List of alternative sites is set out in Table 8 in the ASA included in Appendix 4.1. Each long-listed site has been assessed against the Stage 1 Assessment Criteria in Table 4.1. The reasons for discounting the other sites are set out in in Table 8 in the ASA.</p>
4.4.2	<p>Where a site meets the recreational criteria, it is highlighted in green. Where a site does not meet the criteria, it is highlighted in red.</p>
4.4.3	<p>A total of 71 Long List sites were identified, of which five were shortlisted for further assessment as potentially suitable alternative sites including:</p> <ul style="list-style-type: none"> ▪ Broadwater Lake (Site 8); ▪ Ruislip Lido (Site 13); ▪ Bury Lake (Site 20); ▪ Aldenham Reservoir (Site 56); and ▪ Denham Quarry (also known as Summerleaze Lake and New Denham Quarry) (Site 60).
4.4.4	<p>In the event that a site met all of the Stage 1 Assessment Criteria, it formed part of a "shortlist" of sites which were assessed against the following Stage 2 Assessment Criteria:</p> <ul style="list-style-type: none"> ▪ Site Security – The site must be made secure and provide exclusive use. ▪ Depth – the lake must have a depth of 0.9 metres. ▪ Water and Land Quality – the lake must meet the minimum standards set by the Bathing Water Regulations 2013⁵. ▪ Sailing Suitability – The lake must provide good sailing conditions given that this is one of the key water-based activities to be provided at the Proposed Facility. ▪ Nature Conservation – The site must be able to be developed without having a significant impact on areas of ecological sensitivity including those of national importance, for example, Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNRs). ▪ Historic Environments and Landscape and Visual Impacts – The construction of the Proposed Facility must not result in significant harm to any built heritage on or in close proximity to the site, or any archaeological assets. The Proposed Facility must respect the landscape character, the need to protect landscapes or designated areas of national importance and localised height restrictions.

⁵ <https://www.legislation.gov.uk/uksi/2013/1675/contents/made>

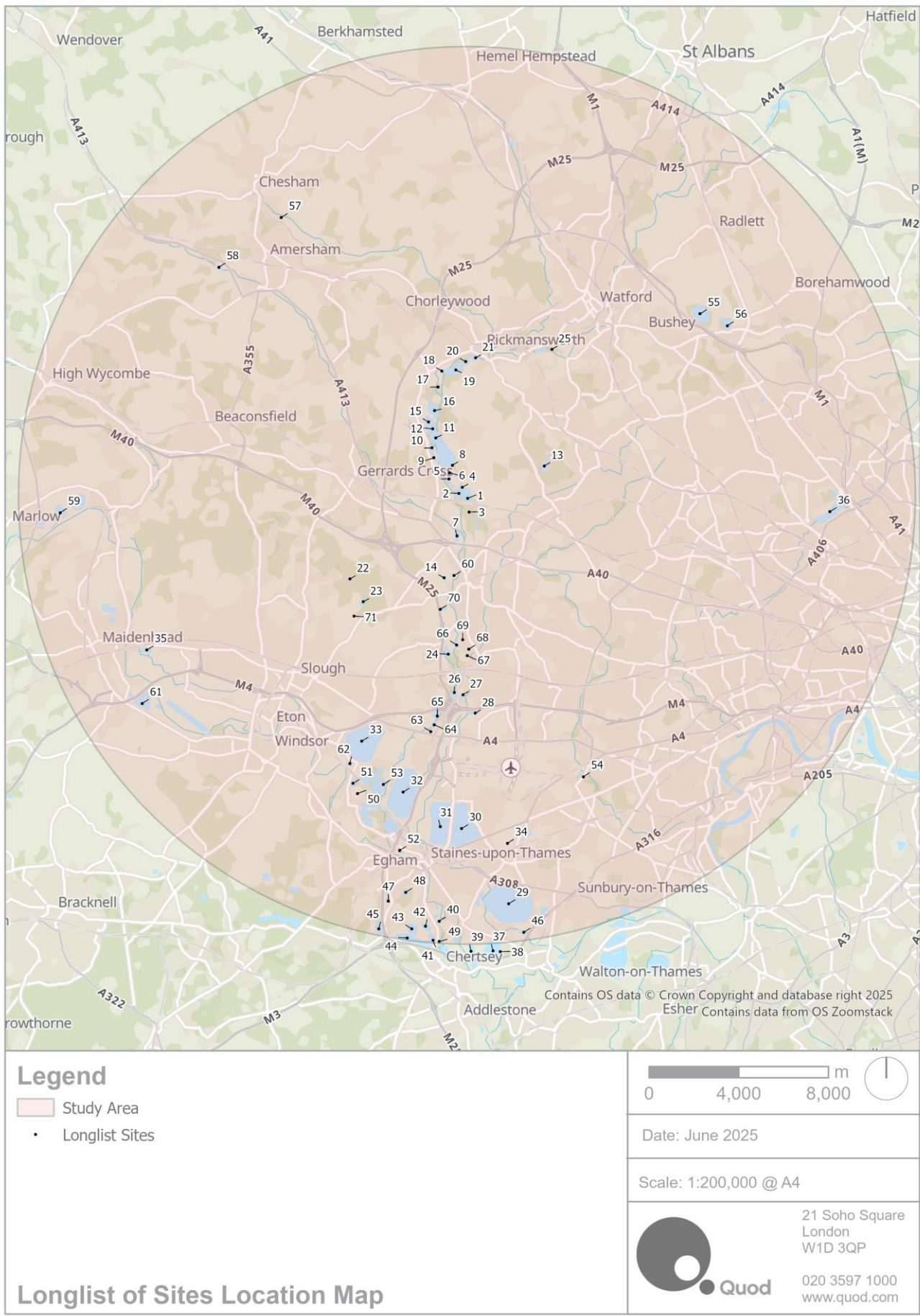
- 4.4.5 Assessment against the Stage 2 criteria is the final stage and consists of a Red, Amber, Green (RAG) Assessment. This is an approach undertaken for ASA's as set out in the Surrey County Council Alternative Site Assessment Guidance (2021)⁶. This scoring system is based on the degree of difficulty in overcoming a particular constraint by mitigation or design rather than how a constraint is measured against other constraints. The site with a high score is more appropriate than a site with a low score, however care must be taken within the interpretation of scores as the criteria are not necessarily comparable.
- 4.4.6 Following Stage 2 Assessment, Ruislip Lido was not considered suitable for Proposed Facility for the following main reasons:
- The lido is used by members of the public throughout the year which would safeguarding issues for children and young people using the Proposed Facility challenging.
 - There are a number of PRoWs surrounding Ruislip Lido (PRoWs R107, R59, R109, R110) and a trail which runs around the perimeter of the lake, which is known as the Ruislip Lido Millenium Trail. This means that it would not be possible to make the site secure and private.
 - Water sampling indicates the lake contains microscopic parasites which is one of the reasons swimming is not permitted. Water-based activities are therefore not viable.
 - The land associated with Ruislip Lido is over 2ha however large parts cannot be developed due to the presence of dam, high pressure water main, and high pressure gas main.
 - The majority of the lake does not meet the minimum depth requirements for sailing (0.9m), which is one of the key provisions for Proposed Facility.
- 4.4.7 Bury Lake was not considered suitable for the following main reasons:
- The site does not meet the requirements of the lake surface area. There is already competing demand for lake space by the existing users.
 - The site is owned and managed by Three Rivers District Council
 - Although the water quality is suitable for the Proposed Development, there is asbestos located on the surrounding land. This poses a significant risk to land based activities and future groundworks; and
 - The site is publicly accessible and not secure. There is also a PRoW (ref. 065) located at the western boundary of the site.
- 4.4.8 Aldenham Reservoir was not considered suitable for the following main reasons:
- The depth of the water level is too low for sailing activities. Sailing activities have not taken place at the site since 2020;
 - The Site is owned by Jewel of Hertsmere Limited. The Site is managed by Aldenham Renaissance Ltd; and

⁶ Surrey County Council. Alternative Site Assessment Guidance (May 2021)

- The site is publicly accessible. A series of PRow's are located around the site boundary (ref. 001#2, 005, 021, 052, 064, 065 and 095).

- 4.4.9 Summerleaze Lake (New Denham Quarry) is physically suitable however it has already been demonstrated that the proposed development in this location is not viable and would cost significantly more than the £26.5 million which has been agreed between HS2 Ltd, The Secretary of State for Transport and LB Hillingdon in their legal agreement dated August 2017. This cost was primarily due to the Stage and 1 and 2 excavation works required to join the two lakes, which would still be required with the currently proposed (reduced) scheme. There are no other sources of funding likely to be available from LB Hillingdon or HS2 Ltd for the proposed scheme which would cost over double the amount of the agreed £26.5 million.
- 4.4.10 Broadwater Lake meets the area requirements for land and lake surface area. It also has good transport links and is available for the development given that it is owned and managed by LB Hillingdon.
- 4.4.11 The site is currently used by Broadwater Sailing Club who report favourable sailing conditions. Races are hosted throughout the year. From an environmental perspective, both the water and land quality are suitable for the Proposed Facility. There are also no major sensitivities with respect to landscape and heritage associated with the development at the site.
- 4.4.12 There are some risks associated with the site relating to depth, as localised dredging would be required to be undertaken to ensure that the minimum depth of 0.9 metres is achieved throughout the Sailing Area. The site is also located within the Mid Colne Valley SSSI which means it is an ecologically sensitive site. However, significant effects can be avoided by focusing disturbance in the south eastern corner of the site.
- 4.4.13 Overall both Summerleaze Lake (New Denham Quarry) and Broadwater Lake are suitable for the Proposed Facility. However it has already been demonstrated that the Proposed Facility at New Denham Quarry is not viable and would cost more than the £26.5 million. This site was ruled out by HS2 Ltd, The Secretary of State for Transport and LB Hillingdon in their legal agreement dated August 2017.

Figure 4.2: Long List of Alternative Sites Considered



Flood Risk and Sequential Test

- 4.4.14 The sequential test, as required by NPPF, was applied to each of the alternative site options as detailed in Appendix 8.2: Flood Risk, Drainage and Sequential Assessment. The sequential assessment indicates that the shortlisted sites are not sequentially preferable to the application Site in terms of flood risk.
- 4.4.15 It was concluded that there are no alternative sites at a lower risk of flooding that are available and suitable. The Proposed Development is therefore considered to be compliant with the sequential approach to site selection as set out in the NPPF.

4.5 Split Operations

- 4.5.1 In response to feedback from stakeholders on the 2023 Scheme, the Applicant considered whether it would be possible to split the Proposed Facility into two sites, i.e. operate from one base with land-based activities and operate water-based activities in a different location (off-site). This was carefully considered by the Applicant and was discounted as a reasonable alternative for the following reasons:
- Keeping all activities on one site means that children and students are not exposed to the risks associated with off-site travel such as traffic, road crossings or unfamiliar locations.
 - In an emergency, staff located on a single site can respond more quickly and effectively as they are all located nearby and familiar with the same site protocols.
 - Having the land and water based activities located on one site also means increased participation time, with more time spent on activities rather than travelling between sites. This is particularly important for schools, colleges and local organisations who are only on site for a single day and arrive after morning registration at their school or organisation and leave the facility in time for pick-up or public transport.
 - For children or students with mental or physical disabilities or additional needs, activities on the same site are generally better, as it provides familiar surroundings, reduced transition and travel times, and fewer communication issues.
 - Finally, activities located on the same site reduces transportation costs and the number of staff needed onsite which makes the facilities more affordable.

4.6 Development Location

- 4.6.1 Table 4.2 describes the alternative locations for the existing BSC use and Proposed Facility within the Site prior to the selection of the final design on the Peninsula provides a description of the main reasons for the choice made. Figure 2.2, Chapter 2: Site and Setting shows the location of BSC and the Peninsula within the Site.

Table 4.2: Alternative Development Locations within the Site

Alternative	Commentary
BSC – retain in existing location.	A high-pressure gas main bisects the existing BSC site which limits the area of land required to accommodate the Proposed Facility. . The

Alternative	Commentary
HWSFAC – co-locate at existing BSC site.	<p>presence of the gas main means that it would not be feasible to provide utility services that would be required for the Proposed Facility.</p> <p>The existing BSC storage containers are not suitable for effective maintenance and repairs, and the crew room and kitchen facilities need improvement. The existing BSC site is also not large enough to deliver and operate the Proposed Facility and associated land-based outdoor activities safely or efficiently. Safely accommodating traffic associated with the Proposed Facility would also be challenging and would impact significantly on the day-to-day operational activity.</p> <p>BSC currently provides space to its members for the storage of privately owned boats and dinghies. The BSC site is not large enough for BSC and the operator of the Proposed Facility to both store boats and other necessary equipment. This would severely hinder the ability to operate both facilities at the current BSC site.</p> <p>This alternative would lead to a significant increase in movement and vehicle traffic using the Access Road adjacent to the lake which is not desirable for reasons of safety and visual disturbance to birds.</p> <p>This alternative was discounted by the Applicant for the reasons above.</p>
BSC – retain in existing location. HWSFAC - Locate on the Peninsula	<p>The Applicant considered the alternative of BSC and the Proposed Facility both operating at Broadwater Lake, but from separate locations. This alternative was discounted in favour of a co-located facility primarily as it would significantly increase disturbance effects during the bird breeding season and limit the ability to mitigate such effects.</p> <p>Retaining the existing BSC site in operation would lead to additional landscape and visual effects through the introduction of the Proposed Facility at the Site. It would also not provide BSC with a facility which meets modern standards for accessibility and welfare.</p> <p>This alternative was discounted by the Applicant for the reasons above.</p>
Other locations within the Site	<p>No other suitable viable locations for the Proposed Facility were identified within the Site. The southern parcel was not suitable as it is waterlogged for most of the year.</p>
Proposed Development - Co-location of BSC and Proposed Facility at the Peninsula	<p>The Peninsula was selected primarily due to the presence of existing screening vegetation, ease of access to both the water and the Access Road, and as it is previously developed land with areas of hardstanding which are suitable for re-use.</p> <p>Co-locating the BSC and Proposed Facility at the Peninsula ensures efficient use of the previously developed land within the Site as facilities designed to modern safety and sustainability standards can be shared between uses. Providing access to modern shared facilities also addresses existing issues at the existing BSC site.</p>

Alternative	Commentary
	<p>Co-location of the BSC and Proposed Facility minimises the land take required for existing and proposed activities. Relocating BSC also provides an opportunity to improve existing access and parking arrangements and restore the existing BSC site for nature. The existing BSC club house is of poor visual quality and is visible in views of Broadwater Lake. Retaining the BSC clubhouse was discounted in favour of its demolition and removal of the boat storage and pontoons, thus returning this part of the lake to a natural state in views from the Old Orchard Pub.</p> <p>Co-location of the BSC and Proposed Facility also enable the Applicant to better control operational management procedures designed to mitigate environmental effects.</p>

4.7 Development Layout, Land Reclamation and Dredging

- 4.7.1 The main alternatives considered for the layout of the Proposed Facility at the Peninsula, including the extent of land reclamation involved, with reasons for the final design are described in Table 4.3.

Table 4.3: Development Layout, Land Reclamation and Dredging

Alternative Layout	Commentary
<p>Peninsula only</p> <p>A series of alternative masterplan layouts for the Proposed Facility were developed for the Peninsula that set out required components of both HWSFAC and BSC at that time. No land reclamation was proposed at this time. The alternative layouts are presented in Appendix 4.2 (Options 1 to 6C).</p>	<p>These alternative layouts were developed before detailed studies of the Peninsula had been undertaken such as topography, bathymetry, ecology and arboricultural surveys. The layouts all involved the loss of priority habitat and would have resulted in disturbance effects on all sides of the Peninsula. As such, these alternative layouts were discounted by the Applicant in favour of some land reclamation at the Peninsula which would avoid the loss of priority habitat, trees and provide safe access to the water.</p> <p>These alternative layouts were also developed before detailed analysis of the floorspace and operational requirements for the Proposed Facility was available. Individual buildings for each use were proposed and the layout also included a rowing club facility. The Applicant has since consolidated uses to minimise the ecological and visual effects of the buildings and is no longer proposing a rowing clubhouse.</p>
<p>Peninsula and Reclaimed Land (West)</p> <p>Figure 4.3 shows this alternative layout which involved a significant area of land reclamation on the western side of the Peninsula.</p>	<p>The Applicant considered this alternative to avoid the loss of wet woodland and deliver the Main Building, boat parking and habitat mitigation / enhancement.</p> <p>It was discounted primarily as it would lead to significant loss of open water habitat and would lead to visual disturbance to birds using the southern part of the lake. Activities on this part of the Peninsula would be much more visible when compared to the Proposed Development. The proposals would have also significant dredging and / or import of material which would have led to associated ecological, water environment and traffic effects, compared to the Proposed Development.</p>
<p>Peninsula and Reclaimed Land (North)</p> <p>Various options considered as shown on Figure 4.4,</p>	<p>After discounting the western shore of the Peninsula, the northern lake shore was selected as a suitable location for land reclamation as it provided space for the Main Building and avoided the loss of wet woodland. This location also provided safe access to the water. The Applicant considered various approaches to land reclamation on the northern side of the Peninsula.</p> <p>These all involved land reclamation on the north western tip of the Peninsula.</p>

Alternative Layout	Commentary
including the 2023 Scheme (shown on Figure 4.6)	
2023 Scheme - Peninsula and Reclaimed Land (North) (Figure 4.6)	<p>The 2023 Scheme involved extending the Peninsula by an area of approximately 16,114m² through land reclamation on the northern western shore of the Peninsula. It would have contributed to (in combination with the creation of new islands using dredged material) a loss of 3.1% of open water at Broadwater Lake which was viewed as an unacceptable loss of open water habitat in the SSSI by Natural England.</p> <p>The 2023 Scheme involved the removal of two islands and the creation of 8 no. smaller islands using dredged materials. Figure 4.5 shows the extent of the dredging proposed.</p> <p>Concerns were also raised by the Environment Agency over land reclamation and the siting of buildings on areas of the Peninsula which could have been subject to unlicensed landfilling in the past and associated pollution risks.</p>
<p>Proposed Development (Final Design)</p> <p>Figure 4.7 shows the 2023 Scheme and the Proposed Development.</p>	<p>In response to feedback on the 2023 Scheme and further engagement with Natural England, the Environment Agency and LBH in 2024, the following changes have been made to the 2023 Scheme:</p> <ul style="list-style-type: none"> ▪ The area of reclaimed land to the north western tip of the Peninsula has been removed in order to avoid losing open water habitat and to avoid potential pollution risks associated with works to unlicensed landfill areas. ▪ A smaller area of reclaimed land is now proposed on the north eastern tip of the Peninsula for access to the lake via the Eastern Channel and boat parking. ▪ The area of land reclamation at the Peninsula has been significantly reduced in scale from 16,114 m² to 2,892m². The Proposed Development (in combination with island works) will now deliver a net gain of open water habitat (which is important for birds) of 716m² compared to a net loss associated with the 2023 Scheme of c. 13,956m². ▪ The siting of buildings has been altered so they are located on areas of hardstanding only which avoids the loss of woodland and landfilled areas. This minimises the visual effect of the buildings compared to the 2023 Scheme. ▪ The dredging and island removal volumes have decreased significantly from c. 47,356m³ in the 2023 Scheme to c. 7,094m³. The proposed area of dredging is now confined to the Eastern Channel and works to remove one island and alteration of two other islands. The island identified for removal is not

Alternative Layout	Commentary
	<p>assessed as an important ecological feature. Figure 4.6 shows the extent of the dredging now proposed compared to the 2023 Scheme.</p> <ul style="list-style-type: none"><li data-bbox="645 308 2040 451">▪ The area of land reclamation is also now more than 100m from the gravel islands proposed by HS2 which avoids risks of predators being able to access the birds. Land reclamation in this area enables use of the Eastern Channel for water-based activities to minimise the visual disturbance effects due to the presence of existing screening.

Figure 4.3: Peninsula Layout and Reclaimed Land (West)



Figure 4.4: Peninsula Layout and Reclaimed Land Alternatives (West)

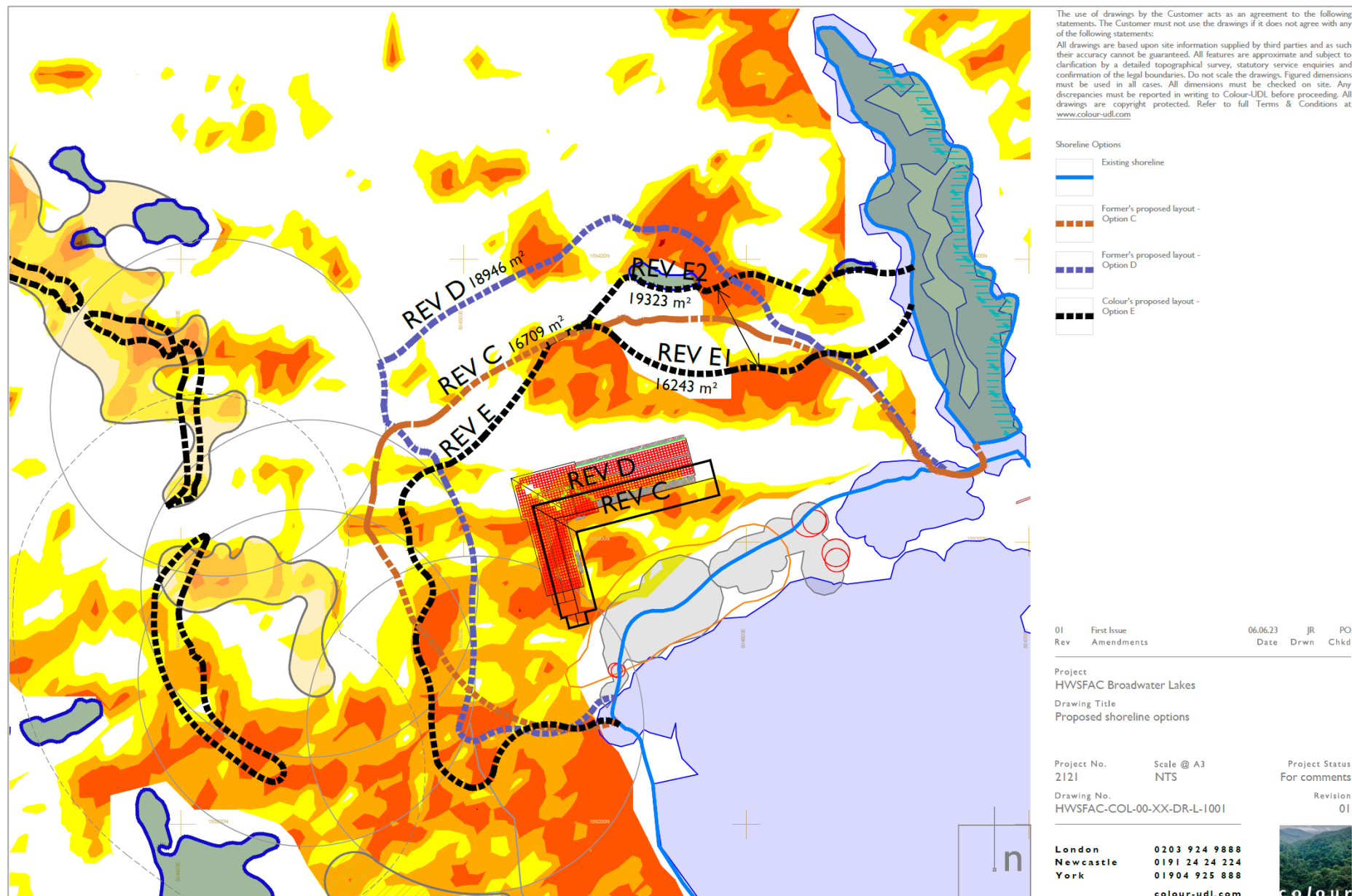


Figure 4.5: Comparison of 2023 Scheme and Proposed Development – Dredging and Land Reclamation

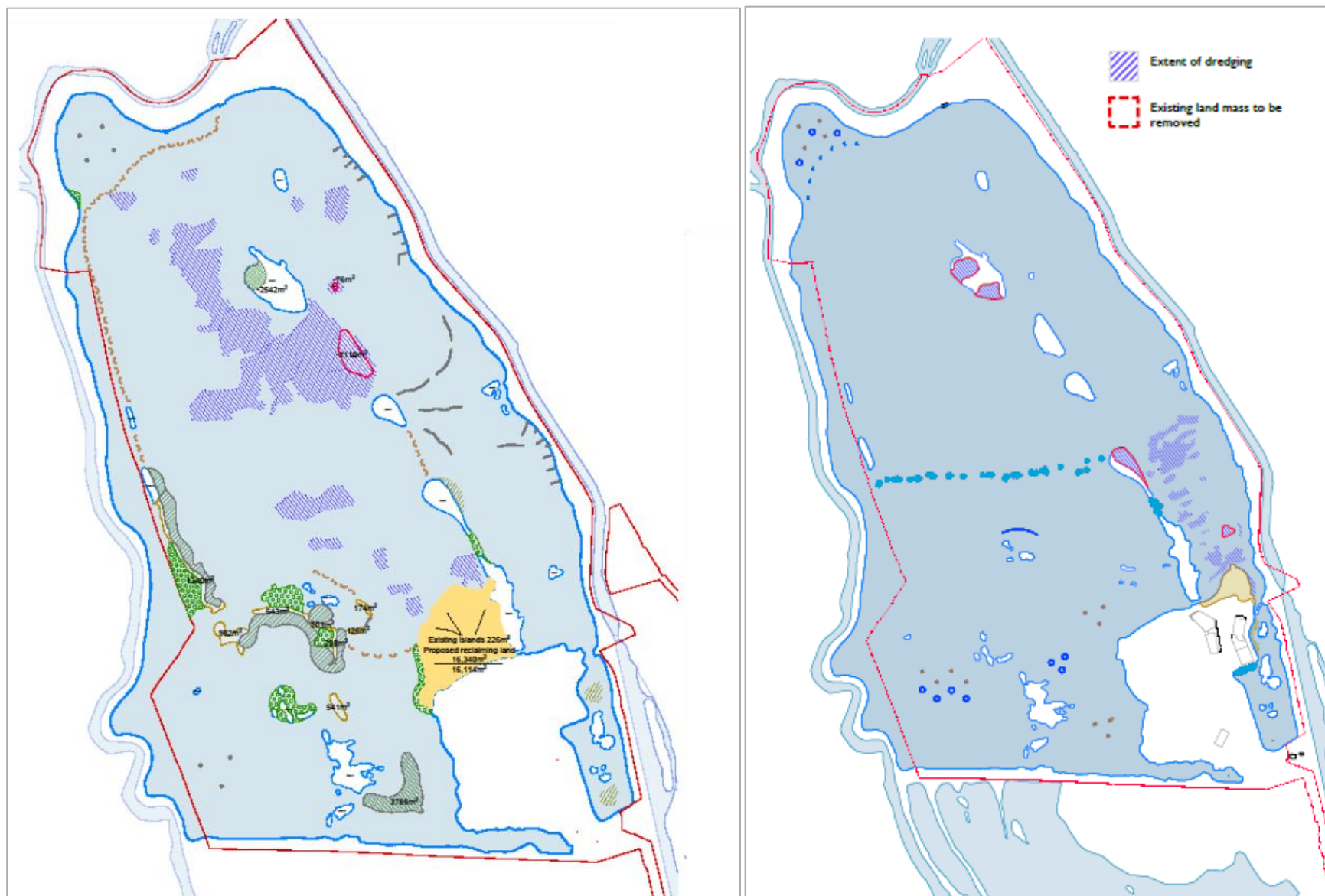
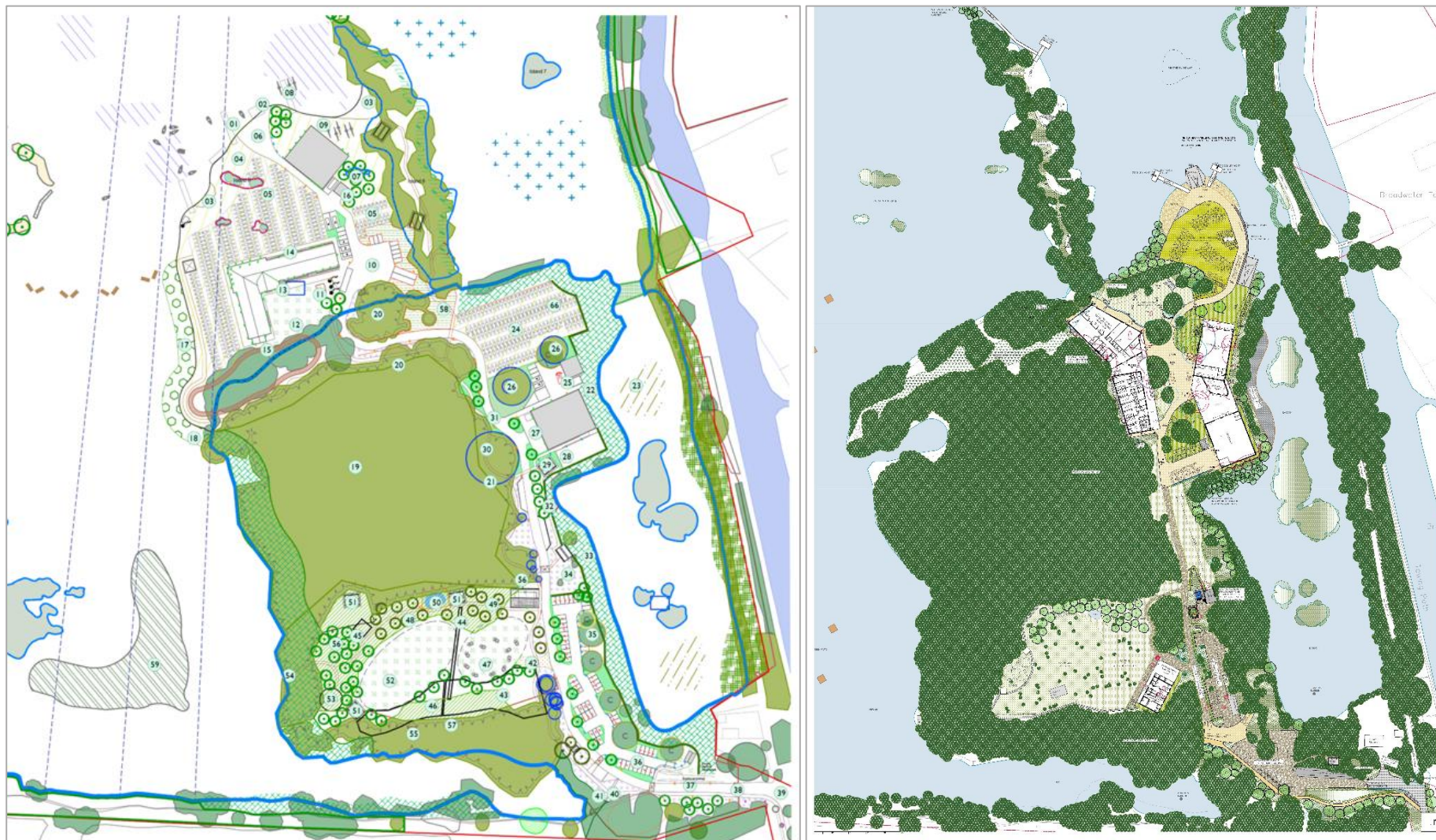


Figure 4.6: Comparison of 2023 Scheme and Proposed Development Layout



4.8 Built Form

- 4.8.1 At an early stage of the design process, the Proposed Facility was designed with separate buildings for the Proposed Facility and BSC, each with their own changing rooms, sanitary facilities, and dedicated spaces, as shown in Appendix 4.2. However, in order to reduce the visual impacts of the buildings and effect on openness of the Green Belt, the decision was made to consolidate BSC and the Proposed Facility into a single building – the Main Building.
- 4.8.2 Following submission of the 2023 Scheme and in response to comments from LBH relating to the scale and number of buildings the key changes made to the built form in the 2023 Scheme are set out in Table 4.4.

Table 4.4: Alternative Built Form (2023 Scheme and Proposed Development)

2023 Scheme	Proposed Development
Main Building – L-shaped two storey building. 2,485 ² GEA. The Main Building was a brick built structure sited on the western side of reclaimed land at the Peninsula. 10.9m to ridge. See Figure 4.8.	<p>The Main Building has been redesigned to reduce the visual prominence of the building which as fronted with boat parking. The building mass has been reduced and its siting moved further east to benefit from existing visual screening. The maximum height is approximately the same as the 2023 scheme. Only a very small portion of the roof of the Main Building will now be visible between existing vegetation from the Old Orchard Inn car park compared to the 2023 Scheme.</p> <p>The materiality of the building has been changed to soften its visual appearance in the landscape.</p>
Boat Shed – A boat shed building was proposed on reclaimed land north of the Peninsula. 5.85m to ridge.	The Boat Shed is no longer proposed. This use has been consolidated into the Equipment Store building to reduce the number of buildings at the Peninsula and the associated effects on the openness of the Green Belt / visual effects.
Workshop and activity centre storage building – sited on the eastern part of the Peninsula. 7m to ridge.	An Equipment Store and Workshop is now proposed which consolidates the Boat Shed and other uses. Its maximum height is 6m.
Other buildings - A total of 7no. activity shelters, outdoor toilet block, energy centre, angler's hut, 3no. activity shelters. Three bird hides.	<p>Nine other activity shelters (up to 50m² GEA in total) are scattered around the Peninsula. Their form varies in size and construction - from two-sided covered roof shelters to sail shades.</p> <p>A bird hide is also provided on the western shore of the Peninsula with a view of the Wildlife Refuge Zone.</p> <p>Other structures include a bicycle shelter and refuse store (approximately 50m² GEA) located in the car parking area and a storeroom and an angler's store and WC (approximately 20m² GEA) located close to the entrance gate.</p>

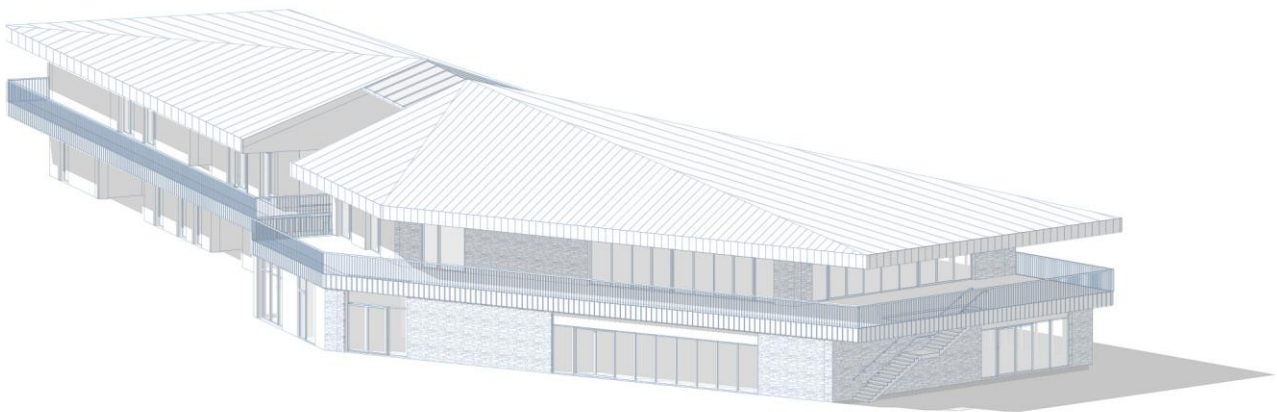
2023 Scheme	Proposed Development
2023 Scheme Floorspace:	3,452 square metres (GIA)
4,274m ² GIA	3,764 square metres (GEA)
4,644m ² GEA	

- 4.8.3 In summary, the Boat Shed has been removed and the remaining footprint of built form has been significantly reduced from that presented in the 2023 Scheme. Buildings and uses have also been consolidated where possible. The overall building footprint (GEA) has been reduced by approximately 880m² GEA from that included in the 2023 Scheme. This reduction was achieved through efficiencies in layouts, such as increased external circulation, the reduction of certain room areas, including the main activity spaces. The revised areas are still able to meet legal compliance for disability access and child safeguarding.
- 4.8.4 The siting of buildings have been relocated from the north west of the Peninsula to the existing hardstanding in the centre of the Peninsula, so that the western and most ecologically sensitive part of the lake now benefit from visual screening.
- 4.8.5 The external appearance of buildings and structures of the 2023 Scheme have been revised to respond to stakeholder feedback. These changes include elongated roofs that sit below the existing tree line and are proposed to soften the visual appearance of the Proposed Development buildings in the landscape.

Figure 4.7: 2023 Scheme: Main Building



Figure 4.8: Proposed Development Main Building



Minor Design Revisions in November 2025

- 4.8.6 Following feedback from the LBH planning department, a series of minor revisions were made to the design of the Development. These amendments were developed to enhance site functionality, improve visitor experience, and respond to detailed officer comments, without altering the fundamental design intent or layout principles established through the earlier design stage.
- 4.8.7 Within the Operation Zone, the entrance and accessible camping building were relocated further south to improve visibility for visitors arriving from the car park and coach drop-off area. A first-floor roof terrace was introduced outside the Observation Room to activate the centre of the site and provide views across the lake and slipway. The changing block was repositioned to the north, and internal layouts were reviewed for improved efficiency. A new stair and lift link were incorporated to connect the two principal buildings, enhancing circulation and framing The Hull at ground floor level. The building's ridge height was reduced by 500 mm (to 10.5 m), and the structure was shifted slightly eastwards to increase separation from the adjacent woodland; however, this adjustment required the removal of one additional Category B tree. Polycarbonate elements originally proposed were omitted.
- 4.8.8 Within the Safety Zone, the transformer was relocated outside the main building and positioned south of the zone within an open-air plant enclosure to address fire safety and access considerations. The plant rooms and energy centre were moved to the southern part of the zone, while the safety boat store was repositioned to avoid impacts on Category B trees. Polycarbonate elements were omitted. There was no change to the ridge height, and additional photovoltaic (PV) panels were proposed to achieve the 1,100 m² target.
- 4.8.9 Within the Camp Zone, the changing and WC provision was reduced to decrease the overall building footprint. The ridge height was reduced from 5 m to 4 m (subject to confirmation following elevation review), and polycarbonate elements were omitted. PV panels were also proposed in this area.
- 4.8.10 Overall, the revisions resulted in a net reduction in total floorspace of approximately 16 m². Given the minor and localised nature of these changes, there are no changes to the environmental effects identified for the previous design iteration.

- a. Revised architectural proposals leading to a lowering of the tallest point on the building roof and with a resultant reduction in the extent of visibility splay as shown by the update ZTV. This is predicted to lead to the loss of potential glimpsed views of the building from viewpoint 03, the Hillingdon Trail; and near complete avoidance of priority woodland.

4.8.11 The revisions result in a net reduction of approximately 16 m² in total floorspace and lower the tallest point of the building's roof, reducing the visibility splay. As a result, potential glimpsed views from Viewpoint 03 (the Hillingdon Trail) are removed, and priority woodland is largely avoided compared to the previous iteration.

4.9 Uses and Activities

4.9.1 Given the legal agreement in place, no alternatives to providing a facility which provides a range of watersports and other outdoor activities as a replacement to the former HOAC facility have been considered.

4.9.2 The existing facilities at the former HOAC facility had been developed on an ad-hoc basis over several decades and therefore cannot be replicated on an exact 'like for like' basis. Whilst safely operated, the former HOAC facility did not meet modern design standards or mandatory requirements with regard to safeguarding or accessibility. The former HOAC facility was also not designed to meet net zero and modern sustainability requirements. As such, an exact like-for-like replacement is not considered to be a reasonable alternative.

4.9.3 The Applicant has undertaken a detailed analysis of the operations and facilities at the former HOAC facility to inform the design brief and space requirements for the Proposed Facility and this is provided as part of the Planning Statement. Additional activities or intensification of the previous activities and uses has not been considered as a reasonable alternative. In reality, the HWSFAC will not replicate all of the range of activities offered at the former HOAC facility.

4.9.4 The following sections set out the alternatives considered in relation to the proposed water and land based activities at Broadwater Lake.

Water Based Activities

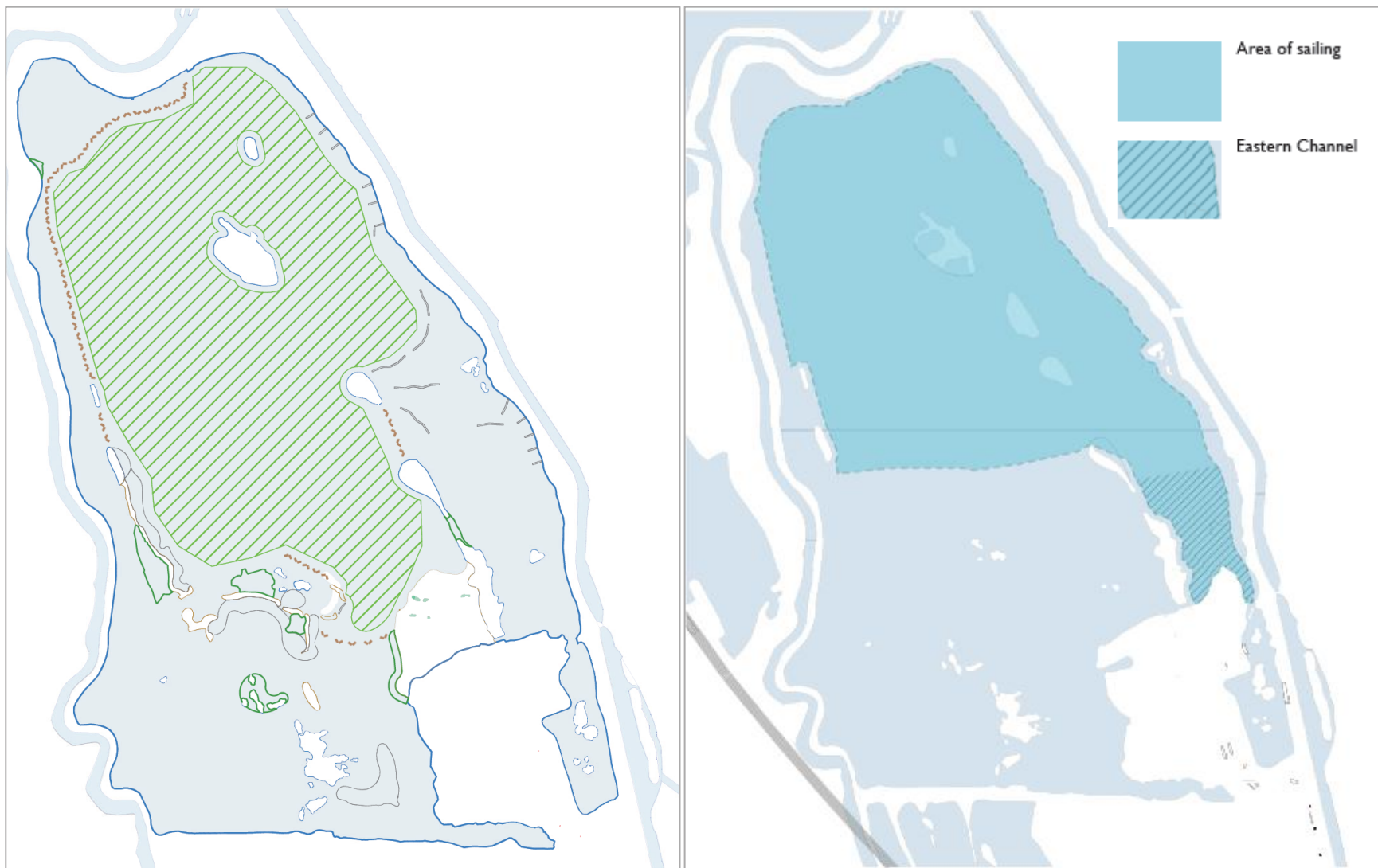
4.9.5 The alternatives considered by the Applicant in relation to location and nature of water-based activities at Broadwater Lake compared to the existing situation and 2023 Scheme are presented in Table 4.5.

Table 4.5: Alternative Water Based Activities

Existing / 2023 Scheme	Proposed Development
Lake Access Existing: BSC access the lake from the northern shore. 2023 Scheme: All water-based activities would access the water from	All water-based activities (BSC and HWSFAC) will access the water from reclaimed land in the Eastern Channel on the north of the Peninsula. This location is more screened visually from the rest of the lake with opportunities for further visual screening between islands. This therefore reduces visual and

Existing / 2023 Scheme	Proposed Development
reclaimed land on the western side of the Peninsula.	noise disturbance to water-based activities from birds using the lake.
<p>Location of Activities</p> <p>Existing: The approved sailing area is 36.3ha, but in reality, the full extent is not used.</p> <p>2023 Scheme: BSC and all HWSFAC water-based activities would use the Sailing Area (as shown on Figure 4.9).</p>	<p>The southern extent of the proposed Sailing Area has been moved further north to create a refuge area for birds in the south west corner of the lake. This reduces the distance between birds using the Bird Refuge Area and the Sailing Area compared to the 2023 Scheme and allows for willow planters to be installed to create a visual screen, thus minimising visual disturbance effects.</p> <p>Only BSC users and HWSFAC dinghy's and windsurfers would be able to use the Sailing Area. All other water-based activities will only be allowed to use the Eastern Channel as shown on Figure 4.3. By focusing water-based activities in the Eastern Channel, visual disturbance to birds using the lake is reduced when compared to the 2023 Scheme.</p>
<p>Type of Activities</p> <p>Existing: BSC sailing. Angling currently occurs on all lake shores.</p> <p>2023 Scheme: the following water-based activities were proposed: dinghy sailing, kayaking / canoeing, dragon boats, rowing / sculling, stand up paddleboarding, raft building and windsurfing. No changes to angling were proposed.</p>	<p>Rowing is no longer proposed. The rowing lane up to 700m is therefore no longer required which reduces the visual disturbance associated with the proposals compared to the 2023 Scheme.</p> <p>The revised proposals restrict the use of angling from the southern shore of the lake to minimise visual disturbance associated with this activity and allow the creation of a Bird Refuge Area in the southern part of the lake.</p>

Figure 4.9: Comparison of Water Based Activities between the 2023 Scheme and Proposed Development



Land Based Activities

4.9.6 The following outdoor land based activities were proposed for the 2023 Scheme:

- Archery;
- Non-motorised pedal karting;
- Outdoor team building activities;
- Bird watching;
- Big swing, high and low ropes and zip wire;
- Camping;
- Foraging;
- Pond dipping; and
- Artificial above ground caving.

4.9.7 The archery, big swing, high and low ropes and zip wire, and pedal carting are no longer proposed as part of the Proposed Development. All outdoor activity equipment on the Peninsula will be below the woodland treeline and behind the acoustic / visual screen. This decision was made to reduce disturbance to birds using the woodland. Only one bird hide is now proposed to reduce the number of buildings on the Peninsula (reduced from 3 no.).

4.10 Operation and User Assumptions

4.10.1 In parallel with design changes, the project team undertook a further review of the operating parameters and user assumptions presented in Section 5.6, Chapter 5: Description of Development of the 2023 ES. This review was informed by annual reports and other information provided by HOAC and allowed the team to make more refined assumptions on typical average and peak operating periods as reasonable worst-case assumptions. Table 4.6 set out the changes which have been made to the operating parameters and user assumptions of the 2023 Scheme as part of the Proposed Development and this ES.

Table 4.6: Comparison of User Assumptions

User Assumptions	2023 Scheme	Proposed Development
Total Number of Users	<p>2023 ES assumed:</p> <ul style="list-style-type: none"> ▪ up to 200 children plus 20 adults at any one time on-Site (Total: 220) 	<p>Average:</p> <ul style="list-style-type: none"> ▪ 72 children plus 8 adults and staff on-Site at any one time. ▪ Users split equally between water-based and land-based activities. <p>Peak:</p> <ul style="list-style-type: none"> ▪ Up to 120 children plus 12 adults and staff on-Site at any one time (Total: 132).

User Assumptions	2023 Scheme	Proposed Development
		<ul style="list-style-type: none"> Users split equally between water-based and land-based activities.
Water-based Activities	<p>2023 ES assumed:</p> <ul style="list-style-type: none"> 100 children on the lake at any one time with adult supervision. Each water-based activity would 10-15 users to take part at once. 	<p>Sailing Area:</p> <ul style="list-style-type: none"> Average: 6 children in three dinghies, plus two adults in a silent electric safety boat at any one time. There could also be occasional windsurfing (up to three windsurfers). Peak: Up to 12 children in six dinghies, plus two adults in a silent electric safety boat. There could also be occasional windsurfing (up to six windsurfers) <p>Eastern Channel:</p> <ul style="list-style-type: none"> Average: 30 children plus five adults and HSWFAC staff. Peak: 48 children plus six adults and HSWFAC staff.
Operational Hours	<p>2023 ES assumed:</p> <p>HSWFAC would operate between 08:30 and 17:30 Monday to Friday, 1 April to 31 September with management and monitoring activities and staff training (land based) taking place all year round.</p>	<p>Land and water-based activities would only take place between 10:00 and 15:00 only (except camping).</p> <p>There would however be staff present between 08:30 and 17:30.</p>

- 4.10.2 Following analysis of the data, it was established that the assumptions made in the 2023 ES were over-stated in places and as such have been re-adjusted as reasonable worst-case assumptions for assessment purposes. Table 4.6 shows that overall, the reasonable worst case assumptions are lower than previously assumed which helps reduce the magnitude of impacts on ecological receptors at the Site.

4.11 Access, Car Parking and Boat Storage

Access

- 4.11.1 There are currently no PRowS within the Site, A Public Right of Way (PRow) (U74) runs adjacent to the eastern Site boundary along the Grand Union Canal which forms part of the Colne Valley Trail and London Loop. For security and safeguarding reasons, the Applicant

discounted providing public access within the operating HWSFAC area. This is primarily because the main user groups would be children and young adults.

- 4.11.2 The existing bridge (Bridge No. 179) over the Grand Union Canal was discounted as a viable public access as land to the east is in private ownership and not available.
- 4.11.3 Existing vehicular access to the Site is provided from Moorhall Road to the south. Vehicular access from the north adjacent to Black Jack's Mill was discounted as not being technically feasible due to the 5 tonne weight limit on the bridge over the Grand Union Canal. Access from the north would also result in potential effects to ecological receptors, residential receptors and the setting of the Gade II Black Jack's Cottage and Black Jacks and Copper Mill Lock Conservation Area.
- 4.11.4 No other alternative access points were identified given existing constraints that surround the Site including other lakes, the River Colne, Grand Union Canal, and HS2.

Car Parking

- 4.11.5 The 2023 Scheme included a total of 82 car parking spaces are provided across the Site for HOAC and BSC users.
- 4.11.6 This has been reduced to 50 spaces in the Proposed Development. This has reduced the areas required for car parking and enabled it all to be located on existing hard standing, thus making access arrangements more efficient and avoiding the need for excavation at the Site.

Boat Storage

- 4.11.7 The 2023 Scheme included open areas for boat storage in two locations north east and north west of the Peninsula, providing a total of 400 no. boat spaces. The boat yards will be cited primarily on grassland and will be shared by BSC and HOAC users.
- 4.11.8 The space requirement for boat parking has been significantly reduced through the use of triple level racking systems. Space for c. 214 boats is now provided and is split between the Equipment Store and outdoor spaces.
- 4.11.9 The reduction in the number of boat spaces requires a much smaller footprint. As such there will be much less in-lake works compared to the 2023 Scheme which results in less disturbance.

References

¹ https://webarchive.nationalarchives.gov.uk/ukgwa/20140806173331/http://assets.dft.gov.uk/hs2-environmental-statement/volume-5/community/Vol5_CFA7_Community_Community_data_CM-001-007.pdf

² HS2, 2015. HOAC Lake Options Report. Document Number: C252-ETM-EV-REP-020-0000075 P04