

Thames Tideway Tunnel
Thames Water Utilities Limited



Application for Development Consent

Application Reference Number: WWO10001

Design and Access Statement

Doc Ref: **7.04**

Part 1

Barn Elms

APFP Regulations 2009: Regulation **5(2)(g)**

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January 2013

Thames
Tideway Tunnel 
Creating a cleaner, healthier River Thames

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Section 8

Barn Elms

8.1 Introduction

8.1.1 A worksite is required to connect the West Putney Storm Relief CSO to the main tunnel. The proposed development site is known as Barn Elms, which is located in the London Borough of Richmond upon Thames near the London Borough of Wandsworth.

8.1.2 We have agreed with the London Borough of Richmond upon Thames that some elements of the detailed design proposals would be drawn up at a later stage. The detailed design would be submitted to the local authority for approval in the form of a DCO requirement. Therefore, the majority of the images and plans in this section are for illustrative purposes only, except for the landscape plan, which is indicative.



Figure 8.1: Aerial photograph of the existing Barn Elms site with LLAU indicated

8.2 Existing site context

8.2.1 The site itself comprises greenfield land along the northern, eastern and southern borders of the Barn Elms Schools Sports Centre (BESSC) covering an area of approximately 1.9ha. The BESSC playing fields are owned and operated by the London Borough of Wandsworth. The BESSC is a separate facility to the adjacent Barn Elms Playing Fields to the west, which is owned and operated by the London Borough of Richmond upon Thames.

8.2.2 The overall Barn Elms sports grounds (including the BESSC and the Barn Elms Playing Fields) are identified in the London Borough of Richmond upon Thames's Saved Unitary Development Plan (UDP) as site B5, Barn Elms Sports Ground. The area is allocated for the rationalisation of sports use, including providing a public indoor sports hall, upgrading sports pitches and enhancing the landscape. A planning application (LPA ref: 10/1729/FUL) to enhance the Barn Elms Playing Fields was granted planning permission in December 2010 and the associated works are now complete.

8.2.3 At the time of writing there were no extant planning permissions or pending applications within the site boundary or its immediate vicinity.

8.2.4 As defined in the London Borough of Richmond upon Thames Core Strategy and Development Management Plan, the site falls within Metropolitan Open Land.

8.2.5 The majority of the site falls within the locally designated Barnes Common Archaeological Priority Area, which includes the alluvial floodplain and foreshore of the River Thames to the east of the site. There are no listed buildings on or adjacent to the site.

8.2.6 The site is bounded to the north by the pedestrian section of Queen Elizabeth Walk, to the east by a line of mature trees and the Thames Path, to the southeast and south by Beverley Brook (approximately 15m from the site), and to the west by the BESSC.

8.2.7 The surrounding area comprises a combination of open space and residential

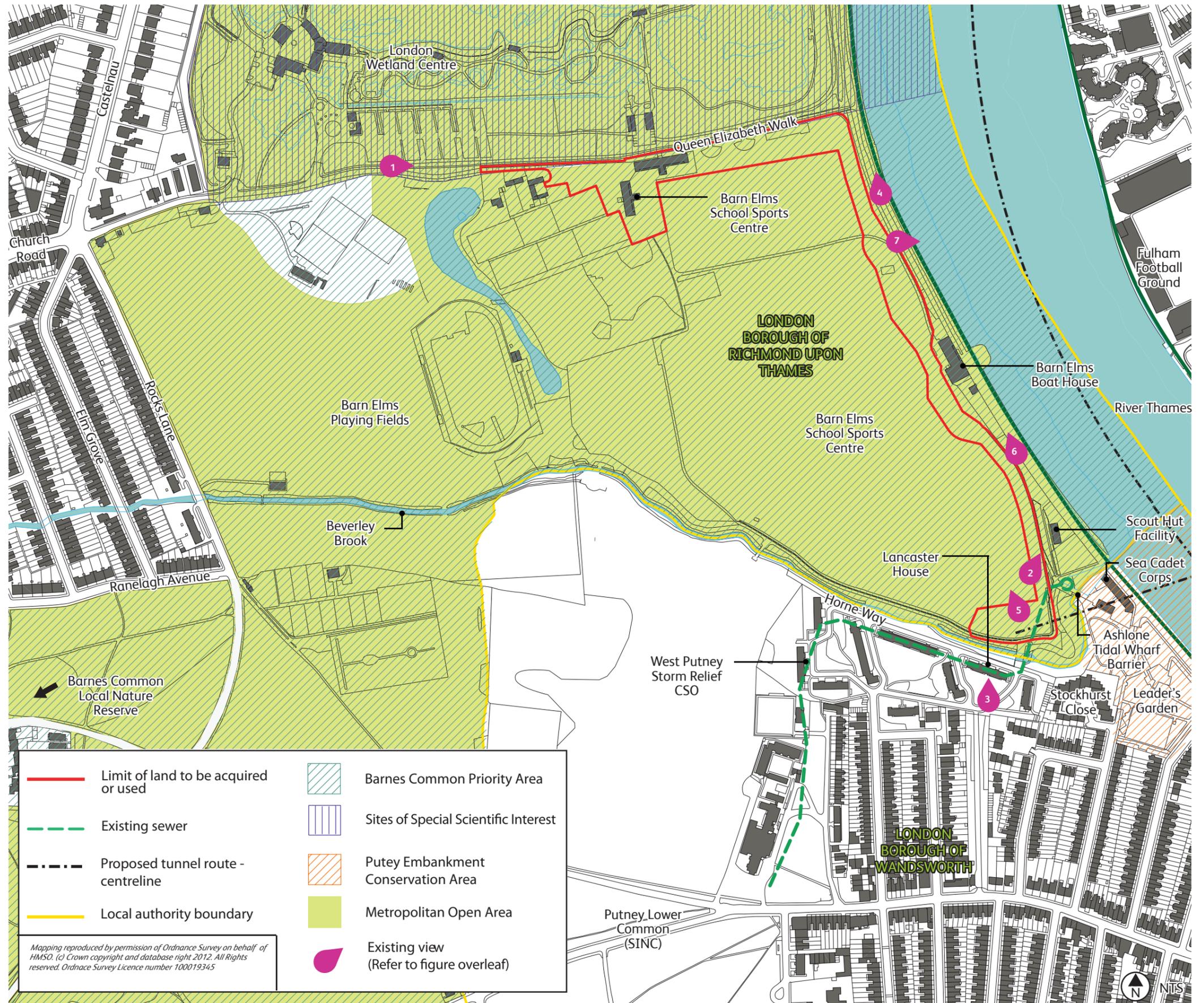


Figure 8.2: Existing site plan



Figure 8.3: Entrance into the BESSC from Queen Elizabeth Walk



Figure 8.4: View of the scout hut beyond the stumpery



Figure 8.5: View from the footpath towards Lancaster House

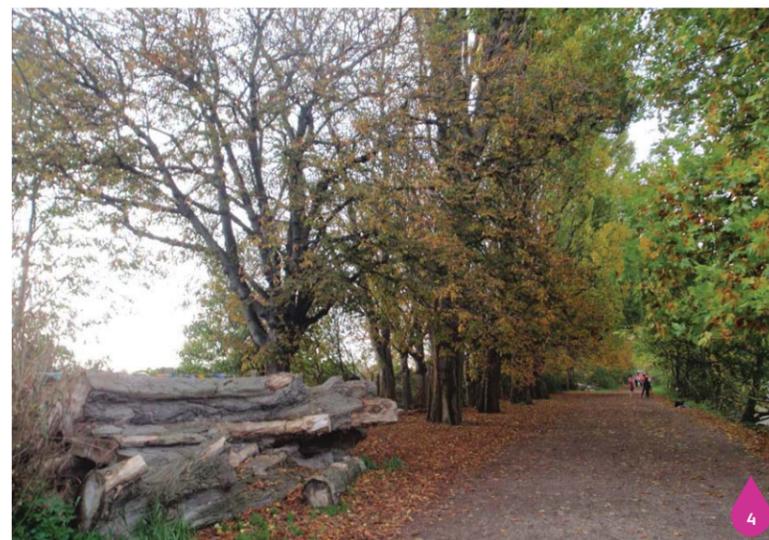


Figure 8.6: View north along the Thames Path



Figure 8.7: View north from the southeast corner of the site



Figure 8.8: View north of the sailing club and boathouse from the Thames Path

and community facilities. The London Wetland Centre, a Site of Special Scientific Interest, lies to the north of the site.

8.2.8 The site lies approximately 35m from the River Thames and the River Thames and Tidal Tributaries Site of Importance for Nature Conservation (SINC). The Barn Elms Boat House, an existing council-run rowing club and the South Bank Sailing Club are located on the eastern boundary of the site. The access route to the boat house runs from the BESSC car park eastwards across the BESSC playing fields along a path lined with Lime trees. On the opposite bank of the river are residential properties, the Fulham Football Club and Bishop's Park.

8.2.9 To the southeast lie an existing scout hut, a learning disability centre, and the confluence of the River Thames and Beverley Brook. On the far side of the confluence are the Wandsworth Sea Cadet Corps building and Leader's Gardens, a public park. Leader's Gardens falls within the wider Putney Embankment Conservation Area to the southeast.

8.2.10 The Ashlone Wharf Tidal Barrier is also located to the southeast of the site. In late 2011, the Environment Agency undertook repair works to the flood defence barrier. In order to undertake these works, a compound was set up next to the BESSC and an access track created along the edge of the playing

fields parallel to the River Thames. This access track was reinstated as grassland on completion of the works.

8.2.11 The Beverley Brook watercourse runs along the southern perimeter of the BESSC and the Barn Elms Playing Fields. The nearest residential properties are located beyond Beverley Brook on Stockhurst Close. There are also five and six-storey blocks of flats on Horne Way, which are separated from the southern boundary of the site by Beverley Brook, the associated footpath and a narrow area of woodland.

8.2.12 The Putney Lower Common SINC lies to the southwest of the site and the Barnes Common Local Nature Reserve lies beyond.

8.2.13 Barn Elms Playing Fields to the west of the BESSC forms the Barn Elms Playing Fields SINC. The playing fields feature numerous corridors of mature trees. Local facilities include marked sports pitches, an athletics track, a fishing lake and a number of tennis courts.

8.2.14 A number of residential properties and other amenity facilities are situated along Queen Elizabeth Walk.



Figure 8.9: View of the Thames foreshore close to the Barn Elms proposed site

Existing site access and movement

8.2.15 Vehicle access to the site is via Queen Elizabeth Walk at its junction with Rocks Lane.

Highways

8.2.16 Queen Elizabeth Walk serves the London Wetland Centre, the BESSC, Barn Elms Playing Fields, residential properties and other facilities. It joins the Strategic Road Network at Rocks Lane (A306) at the junction between Rocks Lane/Queen Elizabeth Walk/Castelnau (A306)/Church Road (A3003)/Elm Grove Road.

8.2.17 Rocks Lane is part of the Strategic Road Network and links to Hammersmith Bridge.

Car parking

8.2.18 A private car park associated with the BESSC is located at the eastern end of Queen Elizabeth Walk.

8.2.19 Car parking bays are available on the western side of Rocks Lane.

8.2.20 A car club parking space operated by City Car Club is available on Kintson Road approximately 910m from the site.

Public transport

8.2.21 There are no London Underground stations in the immediate vicinity of the site. The nearest station is Hammersmith, which is approximately 2.5km to the northeast of the site and serves the District, Piccadilly, Circle, and Hammersmith and City lines.

8.2.22 The closest National Rail station is Barnes, approximately 1.8km to the south of the site.

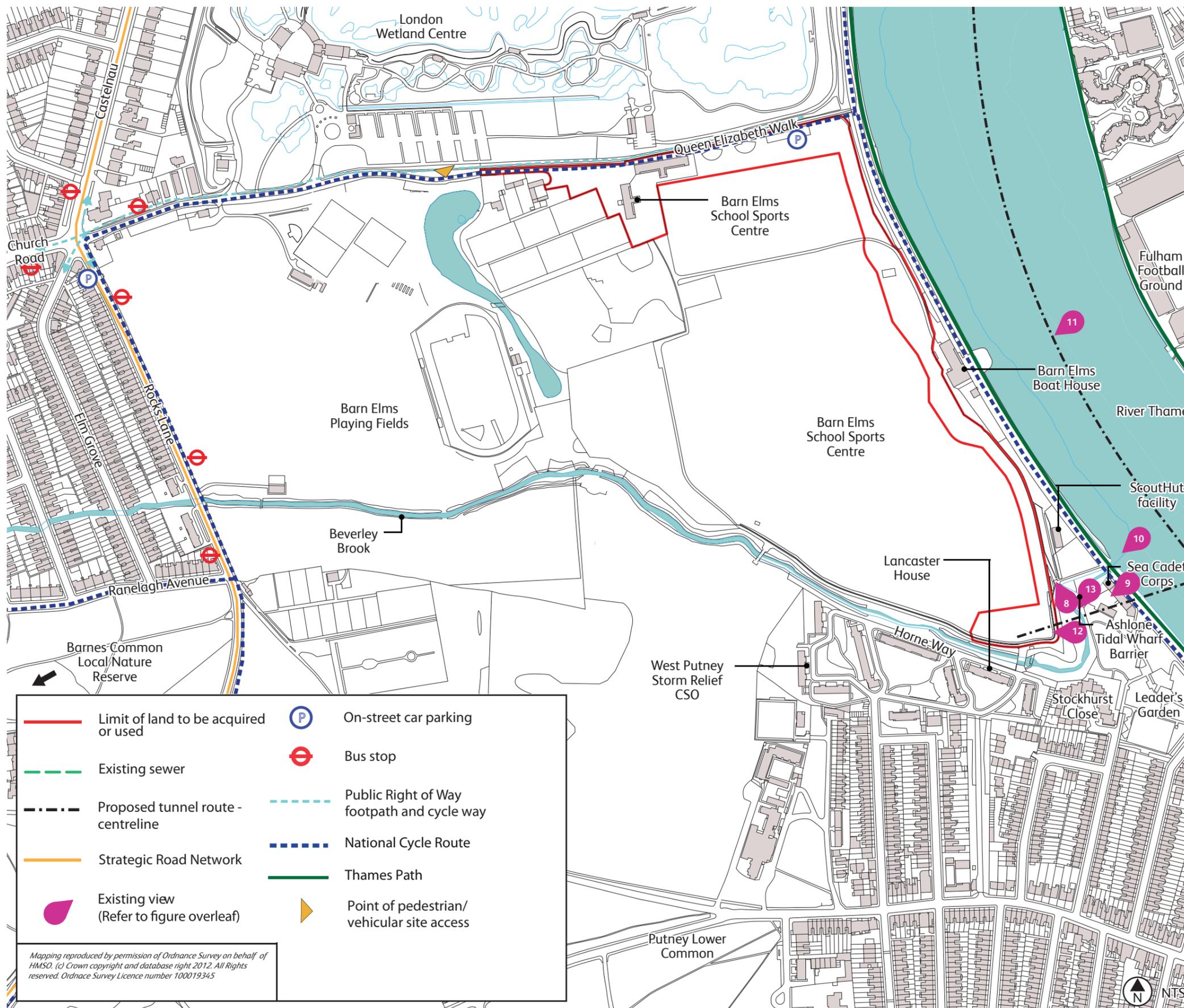


Figure 8.10: Existing site analysis



Figure 8.11: View of playing fields looking North



Figure 8.12: View of the Ashlone Wharf Tidal Barrier from Putney Embankment



Figure 8.13: View of the Beverey Brook at its confluence with the river Thames



Figure 8.14: View of the boat club from the river



Figure 8.15: View of the site showing the overgrown perimeter



Figure 8.16: View south from Ashlone Wharf Tidal barrier

8.2.23 Six daytime bus routes and two night bus routes operate within 750m of the site on Rocks Lane/Castelnau and Church Road that serve local destinations in Putney and Hammersmith.

Cycle routes

8.2.24 The main cycle route in the area is National Cycle Network Route 4, which runs along Rocks Lane and Queen Elizabeth Walk until it reaches the Thames Path, where it divides north and south along the river bank. The route also runs west from Rocks Lane along Ranelagh Avenue.

8.2.25 The closest cycle parking facilities to the site are three cycle stands located at the Rocks Lane/Queen Elizabeth Walk/Castelnau/Church Road/Elm Grove Road junction.

Pedestrian routes

8.2.26 Rocks Lane is part of a north-south connection between Upper Richmond Road (A205), Hammersmith Bridge and the Hammersmith gyratory.

8.2.27 Queen Elizabeth Walk provides access to the BESSC, the London Wetland Centre and other local facilities. It connects to Rocks Lane, Church Road, Castelnau and Elm Grove Road at a signalised junction.

8.2.28 Footpaths are in place on both sides of Queen Elizabeth Walk, which are approximately 2.2m wide on the southern side and 2.0m wide on the northern side.

8.2.29 There is no direct access to the Thames Path from within the Barn Elms site. A fence along the eastern side of the BESSC separates the site from the path and the River Thames. The boat house and the rowing club are accessible from the BESSC playing fields.

Historical context

8.2.30 Finds and features dating from the Palaeolithic era to the late Bronze Age have been discovered in the assessment area including: a possible Neolithic flint-working area to the southeast of the site; localised Mesolithic activity to the south of Beverley Brook; and Bronze Age artefacts from the River Thames/Beverley Brook confluence and the foreshore to the northeast of the site. Iron Age activity, evidenced by various structures and finds, was concentrated within Barn Elms Playing Fields, the BESSC (including the site) and the surrounding area, and the present area of foreshore to the southeast.

8.2.31 Roman activity (AD 43 to 410) is evidenced by finds of pottery, tiles and a coin to the south of the site, although the main Roman settlement probably lay 900m further south, immediately to the west of Putney Bridge.

8.2.32 The site fell within the manor of Barnes in the early medieval (Saxon) period (AD 410 to 1066), although the main settlement in the manor probably centred around the medieval village beside the Church of St Mary, 375m to the northwest of the site.

8.2.33 Throughout the later medieval period (AD 1066 to 1485), the site remained outside the main settlements. A system of farming large open fields was established in Barnes and Mortlake in the 11th and 13th centuries. Historic maps from the mid-17th century show ponds that may have originated as medieval fish ponds.

8.2.34 During the post-medieval period (AD 1485 to the present day), the site remained in a reclaimed flood meadow some distance from the settlements of Barnes, Putney and Mortlake.

8.2.35 By the mid-19th century, Barn Elms Park contained a number of formal landscape features, including extensions of the original ponds, a lake and garden paths. Late 19th and early 20th century maps show that the ponds were gradually filled in, various pavilions constructed and outbuildings converted or demolished. Barn Elms Manor House was destroyed by fire in 1954 and subsequently demolished. By the 1960s, the site had largely assumed its modern layout and all former structures had been removed.

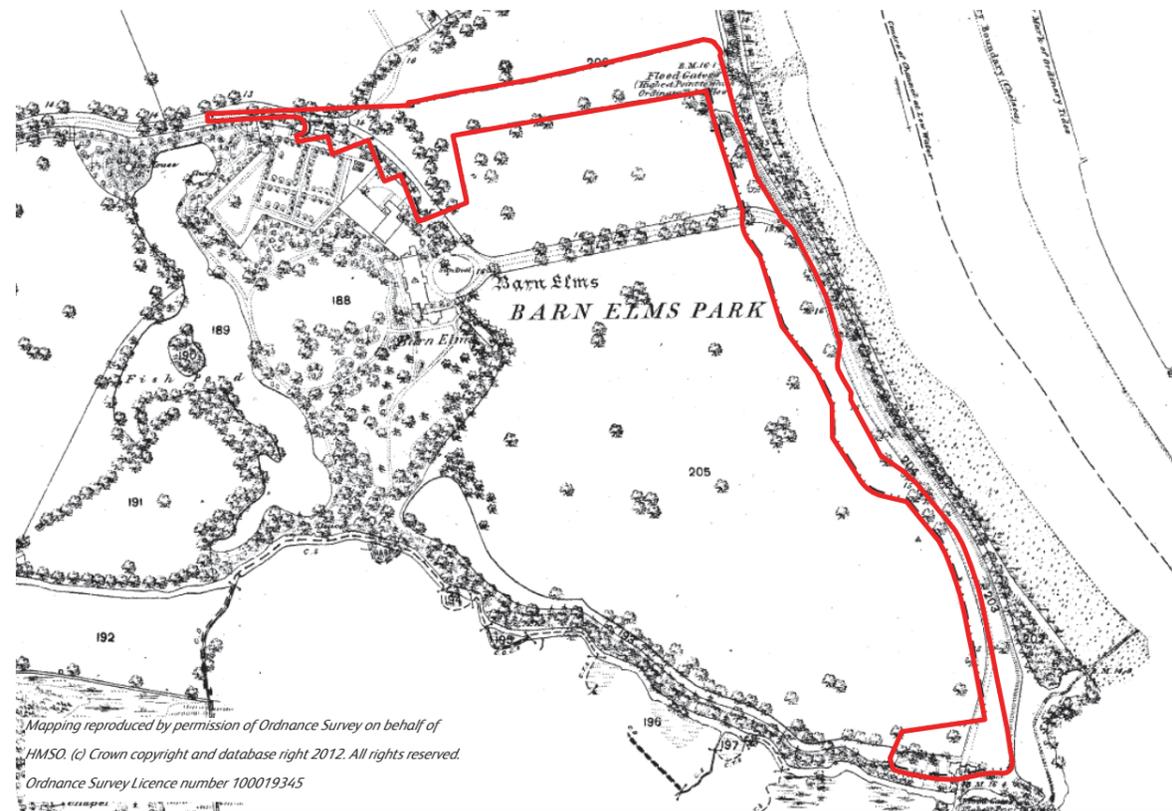


Figure 8.17: Historic map of Barn Elms park 1868-1869

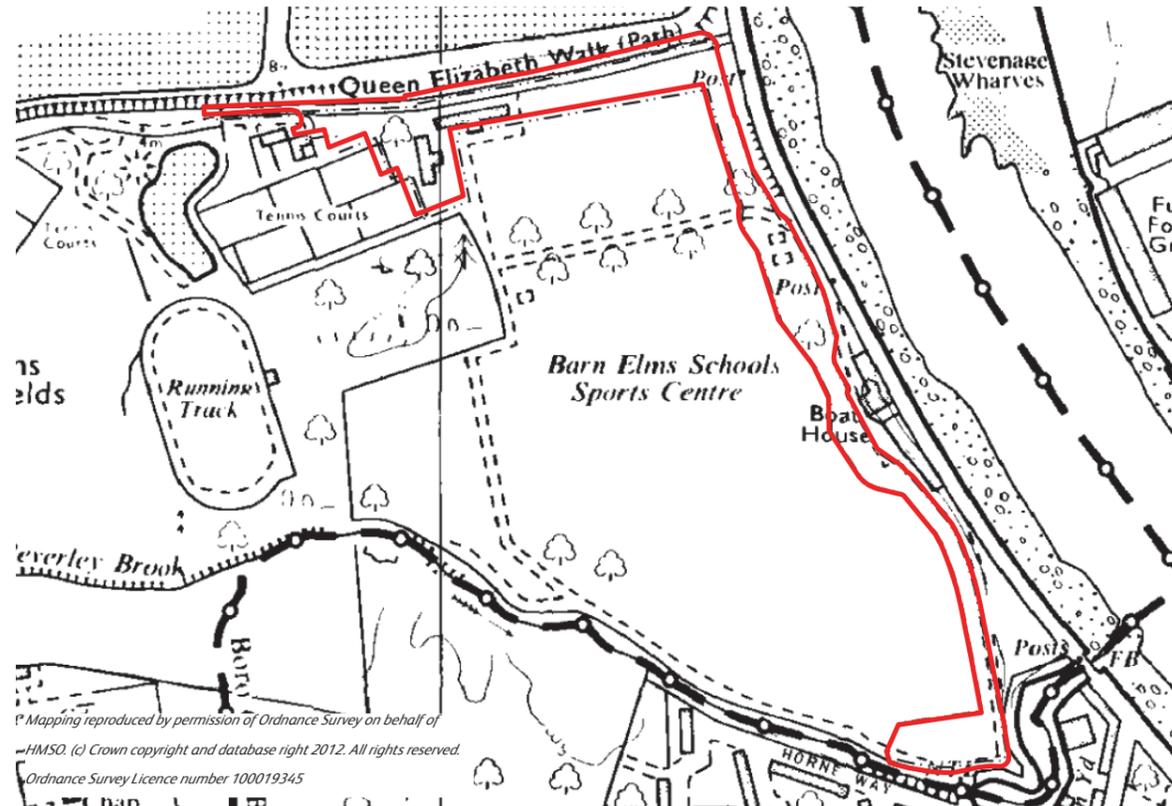


Figure 8.18: Historic map of Barn Elms 1976-1988

Site analysis: Opportunities and constraints

The site-specific design opportunities included:

- a. Protect and improve the open character of the Metropolitan Open Land through a high standard of design and improved access and facilities.
- b. Provide a replacement changing room facility.
- c. Incorporate sustainable elements into the design to preserve and enhance biodiversity. This could also include a planted brown roof and habitat enclosure to help accommodate Sustainable Drainage Systems for the site.

The site-specific design constraints included:

- a. The site is designated Metropolitan Open Land.
- b. The design must minimise any loss of land from the playing fields.
- c. The site is in close proximity to sensitive receptors, notably the flats on Horne Way and properties in Stockhurst Close.
- d. A major high pressure gas main is located in close proximity to the north of the area in which the permanent works would be located.
- e. Footpath access, including the Thames Path and Beverley Brook footpath, must not be disrupted.
- f. The site is in close proximity to ecological resources, including Beverley Brook.
- g. Access to the Barn Elms Boat House and other facilities in the BESSC must be maintained.
- h. The site is prone to flooding.
- i. There is no direct vehicle access to the location of the permanent works.

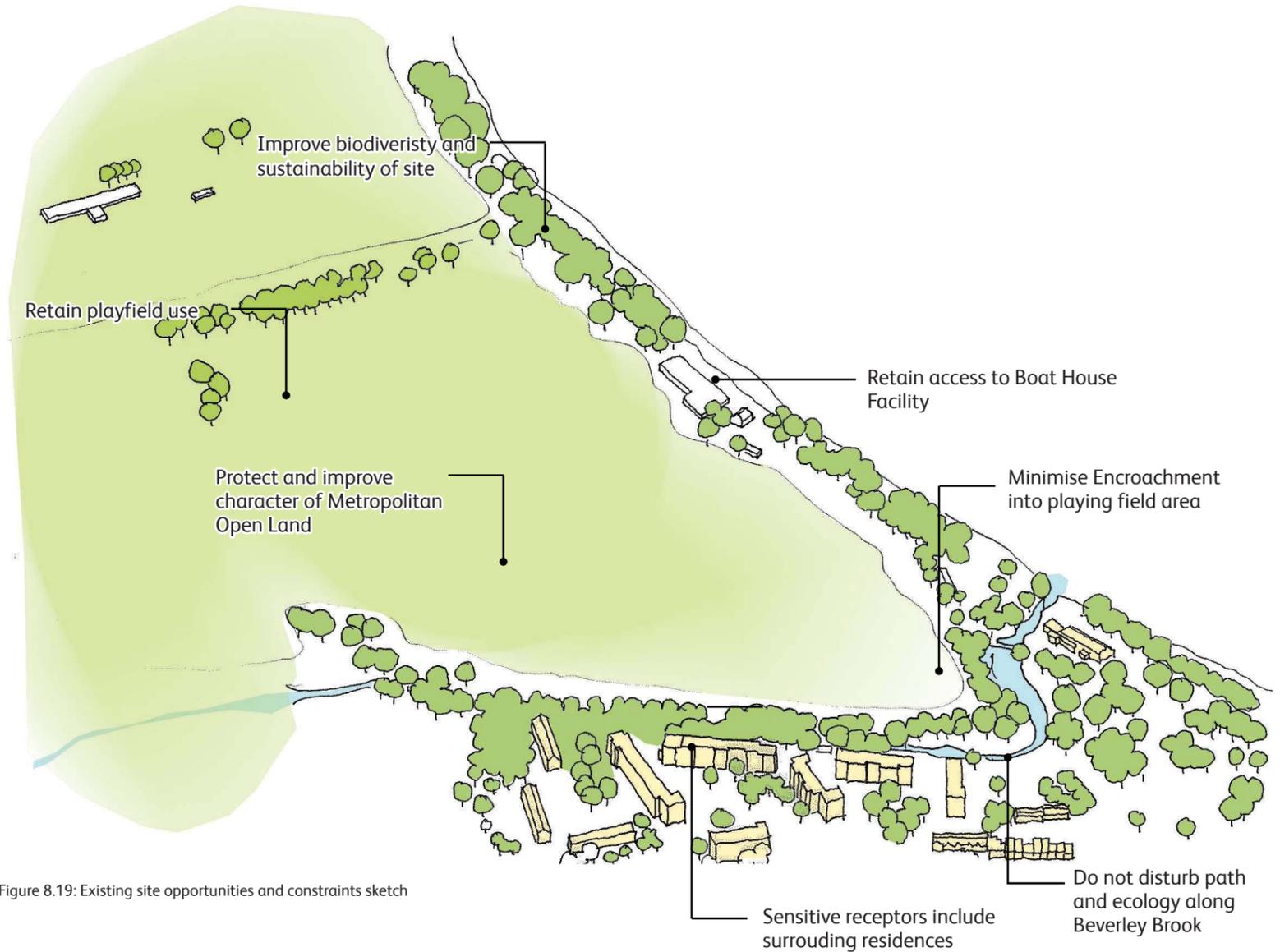


Figure 8.19: Existing site opportunities and constraints sketch

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8.3 Design evolution and alternatives

8.3.1 As the majority of the infrastructure for the project would be below ground, the key design objective for the permanent above-ground works was to integrate the functional components into the surroundings. The site-specific design objective at Barn Elms was to successfully integrate the proposed works and access route in order to minimise the visual impact on Metropolitan Open Land and the impingement on the use of the playing fields.

8.3.2 The design of our proposals at Barn Elms was also significantly influenced by an extensive process of stakeholder engagement and design review. In order to ensure design quality, we undertook two rounds of review hosted by the Design Council CABE. We also held various pre-application meetings with the London Borough of Richmond upon Thames, the London Borough of Wandsworth and other strategic stakeholders. More information on our public consultation process is provided in the *Consultation Report*, which accompanies the application.

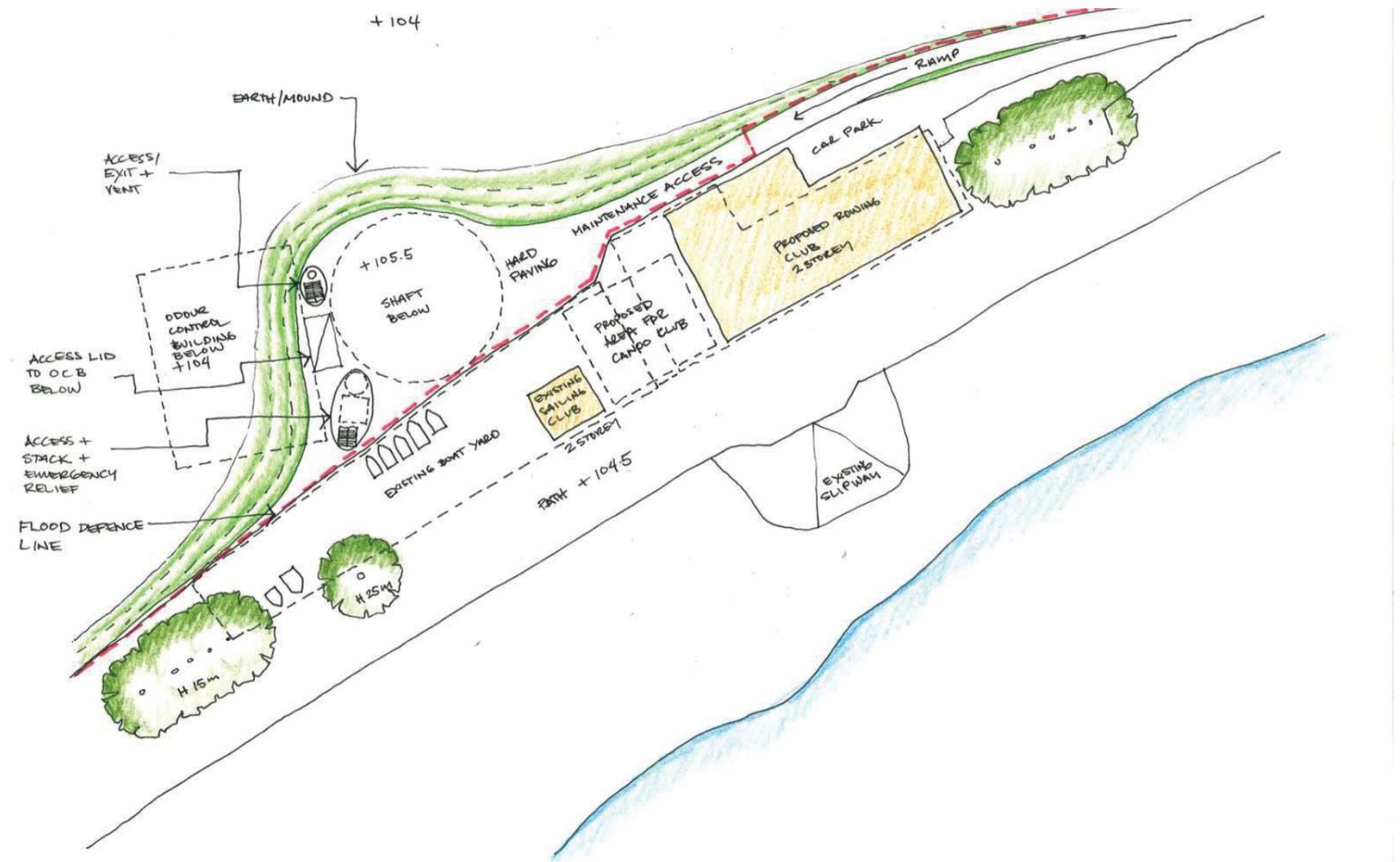


Figure 8.20: Design development diagram showing how the impact of the main tunnel works could be minimised

October 2010

Phase one consultation

8.3.3 At phase one consultation, the Barn Elms site was presented as our preferred site to intercept the West Putney Storm Relief CSO and to drive the main tunnel sequentially in two directions, firstly to Tideway Walk and secondly to Hammersmith Pumping Station. We proposed to position the permanent site to the west of the existing Scout Hut facility.

8.3.4 At this stage, we proposed two options for the construction and permanent access route. Option 1 ran from Rocks Lane along the southern perimeter of the Barn Elms Playing Fields and the BESSC. Option 2 ran from Queen Elizabeth Walk, along the existing Barn Elms Boat House access route and then along the eastern perimeter of the BESSC. Option 2 required a local extension of the Barn Elms Boat House route between the boat house and the permanent works. A new vehicle access would be created on either Rocks Lane for Option 1, whereas Option 2 would utilise the existing access to the BESSC.

8.3.5 We received feedback from a wide range of stakeholders and members of the public. The key issues raised in relation to the permanent design included:

- the impact of the loss of green space, playing pitches and Metropolitan Open Land
- the size and scale of the above-ground structures
- disruption of access along footpaths, including the Thames Path
- the impact on the environment, the tranquillity of the area, and local biodiversity and wildlife.

8.3.6 Having considered the feedback received and on-going engineering design developments, we undertook a site selection back-check (refer to Volume 5 of the *Final Report on Site Selection Process*, which accompanies the application, for details. We re-assessed potential main tunnel sites and our tunnelling strategy and determined that Carnwath Road Riverside would be the most suitable drive site. Our reasons for this decision at this stage included the following:

- It is a brownfield site.
- It would be possible to utilise existing wharfs.
- It would enable the use of larger barges to remove excavated material during construction of the main tunnel.

d. There would be less risk of conflict with recreational users of the River Thames than at Barn Elms.

8.3.7 We then undertook a back-check and confirmed Barn Elms as our preferred site to intercept the West Putney Storm Relief CSO. The downscaling of works from a main tunnel drive site to a CSO interception site considerably reduced the required size of the permanent site, which reduced the temporary effects on the playing fields. It was no longer necessary to relocate the Scout Hut facility or divert the Thames Path. Moreover, it was not necessary to construct a temporary jetty or mooring structures, since the reduced amount of excavated material produced by a CSO site would not justify the associated disruption and cost.



Figure 8.21: Phase one consultation

April 2011

CABE sketch review

8.3.8 We held a sketch review based on our initial assessment and sketched ideas for the site with the Design Council CABE in April 2011. We proposed two permanent above-ground structures enclosed by 'habitat walls' to house all of the permanent infrastructure: one for the CSO drop shaft, and the other for the electrical and control and ventilation equipment and associated hydraulic chambers.

8.3.9 The enclosure around the drop shaft was required because at this point it was unclear whether the site lay in the floodplain of the River Thames and Beverley Brook. In order to protect the drop shaft from flooding, we raised the level of the slab to flood defence level, which is approximately 1.8m above the surrounding ground. The habitat walls would prevent personnel falling from the drop shaft structure during maintenance activities and provide a natural finish to the structures to attract insects and small mammals.

8.3.10 We proposed to include a new area of hardstanding around the enclosures and a new access route extended from the existing boat house access.

8.3.11 The Design Council CABE panel welcomed the design concepts and agreed that the split form of the permanent enclosures was in keeping with the character and appearance of the area, and would maintain the openness of the space.

8.3.12 Further comments included:

- "The relationship of the two permanent structures with the landscape should be further relaxed, allowing it to envelope [sic] them over time. Their expression should be understated, rather than highly sculptured, so that they become part of the informal, wooded landscape which surrounds the playing fields."*
- "Planting around the structures should require little maintenance and encourage biodiversity to allow it to tie in with landscape around the brook; this could serve as an added security/safety function by creating a buffer zone around the buildings, removing the need for fencing or guard rails at roof level."*
- "The two permanent structures could be differentiated in size to create a more interesting relationship between the two while still maintaining their familial relationship [Letter dated 5 May 2011]."*



Figure 8.22: CABE sketch review

June 2011

CABE scheme review

8.3.13 We presented a more detailed scheme at a subsequent Design Council CABE review in June 2011. There were no significant developments in the design of the engineering components at this stage. We proposed to include a planted green roof over the electrical and control/ventilation structure and to cover the habitat wall in corten steel cladding perforated in different widths and patterns. The perforations would facilitate access to the habitat media within the structure.

8.3.14 The landscaping scheme comprised an area of natural grassland and felled logs to promote biodiversity without impinging on the BESSC.

8.3.15 We proposed to construct the maintenance vehicle access with a reinforced geo-grid system approximately 300mm above the level of the sports pitch to enable natural plant growth.

8.3.16 The Design Council CABE panel welcomed the evolution of the form of the two enclosures. However, it noted that the design team should consider how to discourage people from climbing the structures and suggested that this could be achieved by making them slightly higher.

8.3.17 The panel advised seeking an alternative to corten steel cladding, which reaches high surface temperatures in the summer heat and is not a natural choice for plant growth, bird nesting or other ecological activity.

8.3.18 The panel reiterated its suggestion to include planting around the structures to encourage biodiversity and to create a buffer zone, which would serve an added security/safety function and remove the need for fencing.



Figure 8.23: CABE scheme review

February 2012

Phase two consultation

8.3.19 At phase two consultation, we presented Barn Elms as our preferred site to intercept the West Putney Storm Relief CSO. The proposed design was similar to the scheme review design.

8.3.20 At this stage, we proposed separate options for the access route during construction and operations. The proposed temporary construction route ran from Rocks Lane along the southern perimeter of the Barn Elms Playing Fields and the BESSC. This route avoided the need to demolish any existing BESSC facilities but required the demolition of a sports pavilion on the Barn Elms Playing Fields. The proposed permanent operational access ran from Queen Elizabeth Walk, along the existing Barn Elms Boat House access route and along the eastern perimeter of the BESSC.

8.3.21 The key issues raised in relation to the permanent design included:

- a. the route of the site access road
- b. the scale and design of the permanent structures.



Figure 8.24: Phase two consultation

8.3.22 The London Borough of Wandsworth raised a concern regarding the proposed access route. It suggested a new route that would avoid the need to use the Barn Elms Boat House access, which is lined with an avenue of Lime trees. The route would “run parallel with the River Thames and then turn 90 degrees to connect with Queen Elizabeth Walk. This approach would require the redevelopment of the changing rooms and plant room [Letter dated 9 February 2012]”.

8.3.23 The council also noted that the proposed above-ground structures were elevated by 1.7m and the surrounding habitat wall by 3m to 5.5m above ground level. It stated that: “Concern has been raised about children climbing the structures, particularly as a result of the holes set into the structure to encourage birds to nest there, and the design of the structures which are considered to be intrusive to the character of the open grassed playing fields. Rather than offer the two structures as ‘showpieces’ the structures should be designed to fit in with the surrounding area. The Council would prefer a design which takes the form of grass covered mounds [Letter dated 9 February 2012]”.

8.3.24 The London Borough of Richmond upon Thames welcomed the design developments and was supportive of the proposals for this site. It also supported the London Borough of Wandsworth’s alternative access route proposal.

8.3.25 Following phase two consultation, we continued to liaise with representatives of the London boroughs of Wandsworth and Richmond upon Thames to develop the design and design principles for the site to accommodate their aspirations for the area.

Targeted consultation

8.3.26 Following phase two consultation, we considered the feedback received and decided to carry out targeted consultation in relation to the site access route. We proposed a new permanent access road to be used during both construction and operations. Vehicles would access the route from Queen Elizabeth Walk and pass along a narrow section of private road that currently serves the BESSC playing fields. The route would then run along the northern and eastern perimeters of the BESSC, which would avoid the existing Barn Elms Boat House access. The proposed route complies with the preferred route suggested by the London Borough of Wandsworth and supported by the London Borough of Richmond upon Thames at phase two consultation. The Environment Agency used a similar access arrangement for its improvement works to the Ashlone Wharf Tidal Barrier.

8.3.27 We proposed to demolish one of the existing BESSC changing rooms and replace it with a new facility. The track and field facilities would be relocated to facilitate the routing of the access road. We anticipate that alternative facilities would be provided within the BESSC grounds during site setup. A number of car parking spaces would need to be relocated. Two trees would need to be removed, which would subsequently be replaced. The scope of the targeted consultation did not include the permanent structures or the operational area of hardstanding.



Figure 8.25: Targeted consultation

Section 48 publicity

8.3.28 In response to feedback from targeted consultation and further design development, at Section 48 publicity we proposed the following changes to the above-ground structures to minimise the visual impact on the Metropolitan Open Land:

- a. lowering the height of the CSO drop shaft slab below flood defence level by approximately 1m; the reduced level difference enabled us to reconcile the operational area of hardstanding and the existing ground level with landscaping and to minimise the size of the above-ground structures
- b. combining the two above-ground structures proposed at previous phases into a single discreet enclosure around the electrical and control/ventilation structure in the southeastern corner of the permanent site
- c. reducing the height of the electrical and control/ventilation structure enclosure to between 4m (minimum) and 6m (maximum).

8.3.29 We designed the electrical and control/ventilation structure to blend into the surroundings as much as possible. Planting could potentially be included as a natural barrier between the BESSC sports pitches and the enclosure.

8.3.30 The proposed access route remained as presented at targeted consultation.



Figure 8.26: Section 48 publicity

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8.4 Proposed design

8.4.1 This section describes the amount, layout and scale of the proposed development and how the functional components would be integrated into the existing site. Details of the proposed landscaping and appearance of the site are also embedded in the description where relevant.

Fixed principles

8.4.2 The Site works parameter plan defines the zones in which the proposed works would take place. The plan indicates the general location of the CSO drop shaft the CSO interception chamber, the hydraulic chambers and the electrical and control/ventilation structure.

8.4.3 The site-specific design principles are included in the *Design Principles* document which accompanies this application. These principles establish the parameters for the above ground structures and landscaping on the site and have, where possible, been developed in consultation with the local authority. The site-specific principles should be read in conjunction with the project-wide design principles.

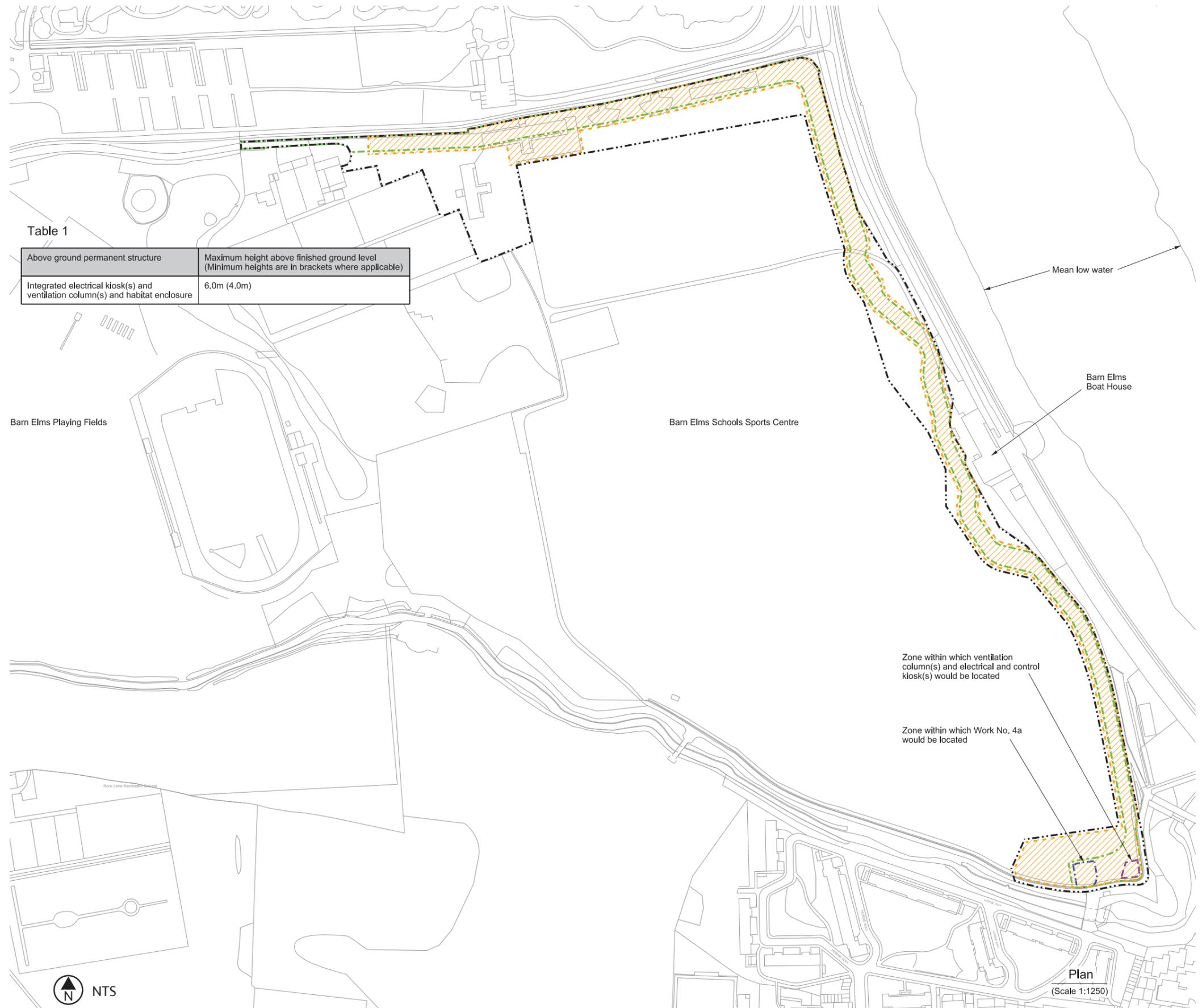


Figure 8.27: Site works parameter plan - refer to Site works parameter plan in the *Book of Plans*

Design objectives

8.4.4 The main driver behind the development of the designs was to impact on the use of the BESSC playing fields as little as possible and to enhance the biodiversity of the site. We had regard to *London Plan* Policy 7.17, which seeks to protect Metropolitan Open Land from inappropriate development and retain its openness. Saved UDP Policy ENV 1, *Core Strategy* Policy CP10 and *Development Management Plan* (DMP) Policy OS 2 share similar aspirations. We also had regard to DMP policies OS 8 and OS 6, which seek to protect and enhance sports grounds and public open space respectively

Detailed description

8.4.5 We reduced the footprint and height of the two above-ground structures proposed at previous phases, and combined them in a single discreet structure in the southeastern corner of the site. The structure and associated area of hardstanding would be tied into the surroundings by means of a low-key landscape design.

8.4.6 We designed the landscape so that it would be possible to reconfigure the existing pitches around the permanent works. We introduced a 'battered' slope rising from the playing fields to the edge of the permanent site into the landscaping scheme in order to further reduce the perceived visual dominance of the enclosure around the structure. We had regard to *Core Strategy* Policy CP7, which seeks to ensure that development recognises local character and contributes to creating places of high architectural and urban design quality. A number of design features and a rich variety of planting would also enhance biodiversity and provide opportunities for learning.

8.4.7 Before constructing the permanent works, we would demolish one of the existing changing room facilities and provide an alternative facility. The exact location and specifications for this facility would be agreed with the landowner and the local authority at a later stage.

8.4.8 In addition to the permanent works, some additional work would be necessary in order to relocate certain track and field facilities to enable construction. The location and extent of these facilities would also be agreed with the landowners and the local authority at a later stage.



Figure 8.28: Proposed landscape plan

Integration of the functional components

8.4.9 The majority of the proposed works are below-ground structures, including:

- a. a CSO drop shaft
- b. a connection tunnel
- c. a CSO interception chamber
- d. a connection culvert
- e. a valve chamber
- f. an air treatment chamber
- g. associated hydraulic structures, culverts, pipes and ducts.

8.4.10 Post construction, the only structure that would be visible on the site would be an electrical and control kiosk with two integrated ventilation columns housed in a single 'habitat enclosure'.

CSO drop shaft and associated structures

8.4.11 The CSO drop shaft would be approximately 6m in internal diameter and sit at the western end of the permanent site. It would be connected to the main tunnel via a short connection tunnel. The hydraulic chambers would sit between the CSO drop shaft and the CSO interception chamber at the eastern end of the permanent site, which would be connected by the connection culvert and various ducts.

Ventilation structures

8.4.12 The number and size of the ventilation columns are determined by the air management requirements for the site. At Barn Elms, we propose to integrate two ventilation columns into the electrical and control kiosk. For this reason, they would not feature the project's 'signature' design. A ventilation outlet would be included in the roof of the combined structure.

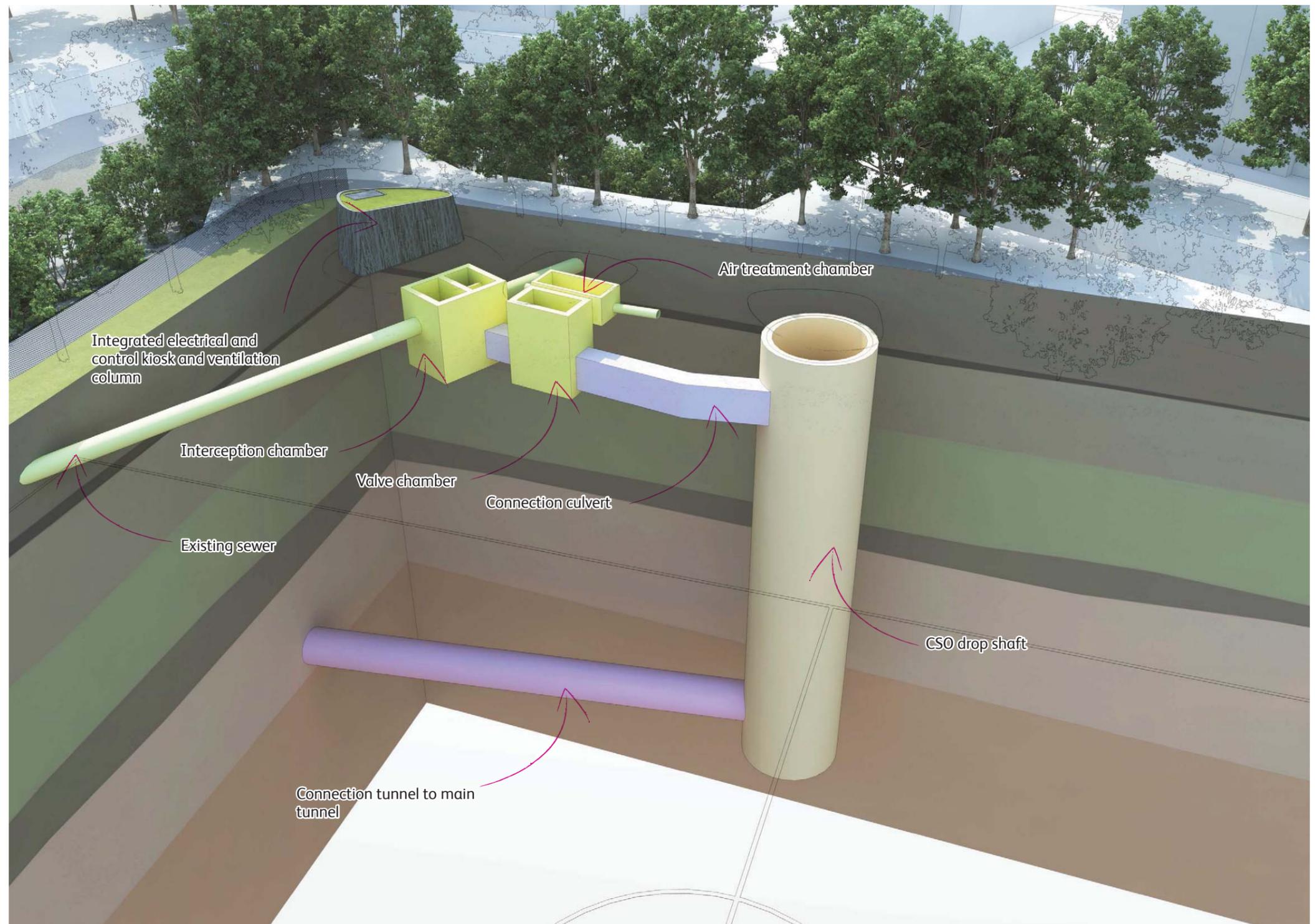


Figure 8.29: Functional components diagram: below ground view



Figure 8.30: Functional components diagram: above ground view

Habitat enclosure

8.4.13 The permanent works would be 'tucked' into the southernmost corner of the BESSC in order to reduce land take. The habitat enclosure around the electrical and control/ventilation structure would sit as close to the perimeter of the site as possible to allow the flexibility to reconfigure and relocate the BESSC sports pitches and to avoid compromising Thames Water's access and maintenance arrangements. This layout would also avoid any damage to the existing high pressure gas main located directly to the north of the permanent works.

8.4.14 The scale and design of the proposed habitat enclosure was reduced as much as possible in order to retain the openness of the Metropolitan Open Land and to preserve views across the site both from within the BESSC and from the Beverley Brook footpath. The enclosure would be 5m wide, 8m long and 4m (minimum) to 6m (maximum) high.

8.4.15 The habitat enclosure would feature a planted brown roof in accordance with our commitment to reduce rainwater run-off wherever possible and to improve the biodiversity of the site. The vertical surfaces of the structure would be finished to promote biodiversity.

Areas of hardstanding

8.4.16 The three permanent areas of hardstanding around the habitat enclosure and over the hydraulic chambers and CSO drop shaft would facilitate maintenance vehicle access and incorporate access covers to the below-ground infrastructure. The areas of hardstanding were minimised as far as practicable in order to maintain the character of the BESSC.

8.4.17 The hardstanding around the habitat enclosure would be raised approximately 700mm above the existing ground level of the BESSC sports pitches via a 'battered' slope for hydraulic reasons. .

Landscaping and appearance

Habitat enclosure

8.4.18 The habitat enclosure is a man-made structure created from natural or recycled materials to provide habitat for a variety of insects. The 'thick wall' of the enclosure would be stacked with various media such as logs, bark, bound reeds and bamboo. The different shapes and sizes of these media would depend on the specific purpose or insect to which it would cater.

8.4.19 The habitat enclosure at Barn Elms would comprise several different sections to provide nesting areas, shelter and refuge for many types of insects – particularly during the winter. We also propose to include bird nesting openings higher up the enclosure.

8.4.20 In order to unify the enclosure's appearance, a decorative panel with openings for the habitat wall cut into it would wrap around the entire structure. This panel could be constructed of fibre-reinforced concrete or laser cut metal. The panel would continue over the access doors to the structure. Our illustrative design puts forward a possible pattern for the panels based on the criss-crossing trunks of the small trees around the perimeter of the BESSC playing fields.



Concept- Sycamore trees around the edge of the site.

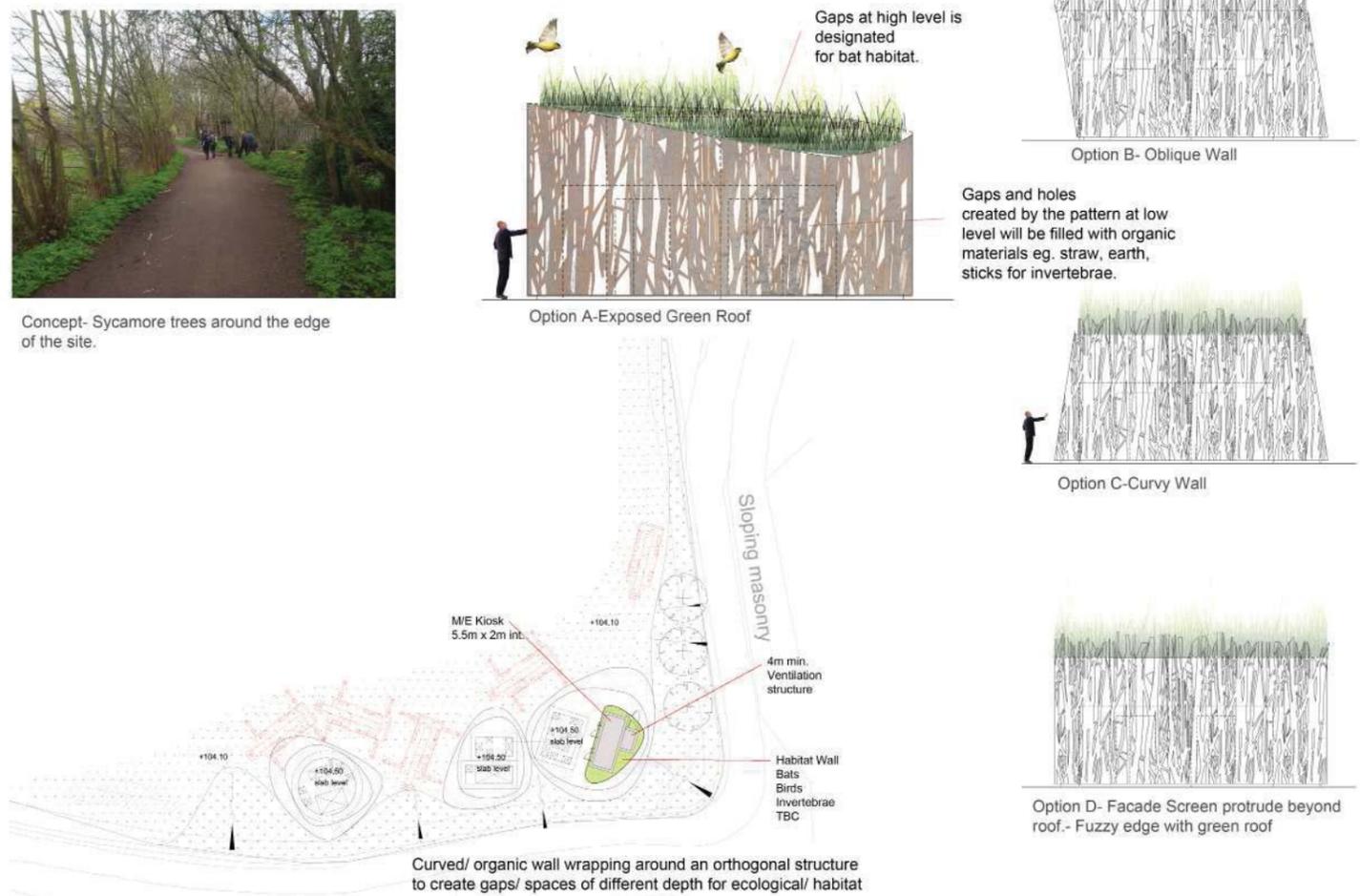


Figure 8.31: Concept sketches of the facade for the above ground structure



Figure 8.32: Fly catcher



Figure 8.33: Lady bird



Figure 8.34: Blue tit



Figure 8.35: Solitary bee



Figure 8.36: Lacewing



Figure 8.37: Tawny owl



Figure 8.38: Great tit



Figure 8.39: Soprano pipistrelle bat



Figure 8.40: Example of habitat structure at the nearby London Wetland Centre (Bat house)



Figure 8.41: Example of habitat structure at the nearby London Wetland Centre

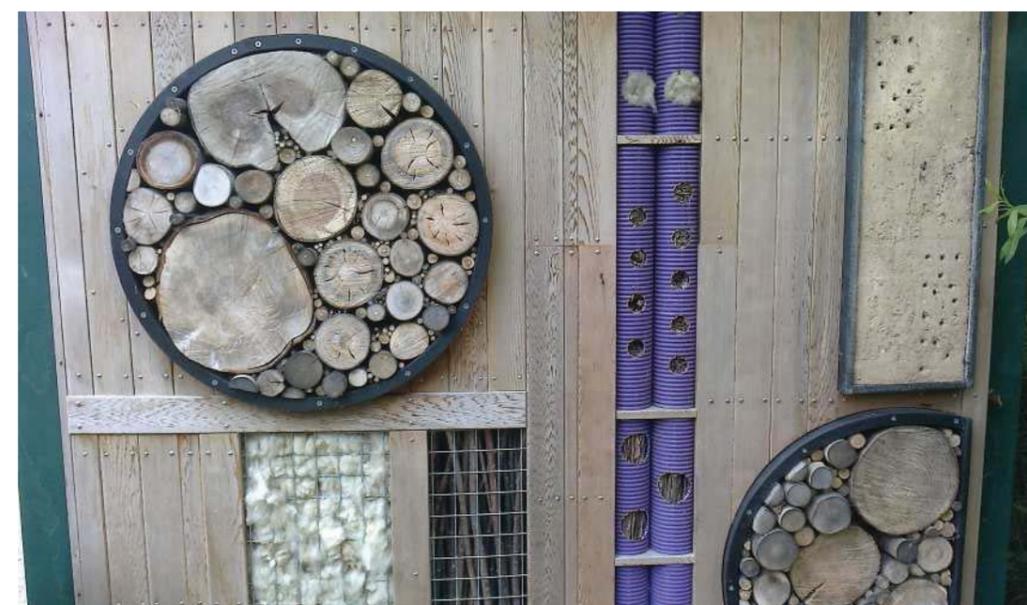


Figure 8.42: Example of habitat wall at the nearby London Wetland Centre

Landscape design

8.4.21 The key purpose of the landscape treatment around the habitat enclosure and area of hardstanding is to blend them into their surroundings. Swathes of subtly different planting would mediate the transition from the amenity grass surface of the BESSC playing fields to a wilder overgrown band at the perimeter of the permanent site.

8.4.22 The soft surfacing, including the permanent access route, would be reinforced to handle maintenance vehicle traffic. During maintenance activities, the soft surfacing would likely be cut back or crushed. This is expected and we would select resilient grass species that would re-establish quickly.

8.4.23 Other soft landscaping considerations included:

a. The gentle battered slope would be graded up from the playing fields to the raised area of hardstanding. A Sustainable Drainage System could be included to direct rainwater run-off away from the playing fields to a discreet location. We suggest the use of wet meadow planting such as Purple Loosestrife and Common Reed in this area.

b. At the top of the battered slope, we propose to include wildflower meadow planting. This is planting that would not impede maintenance access; however, it could grow high enough to generally screen the area of hardstanding area and blur its edge in front of the habitat wall. The meadow planting would be mowed at different frequencies to graduate the height of the planting from low at the junction with the playing field, to high around the southeastern perimeter of the permanent site.

c. Deciduous tree planting around the perimeter of the site would reinstate and reinforce the boundary treatment of the playing fields. Oak, White Birch, Blackthorn and Hawthorn are attractive species that could contribute to the site's biodiversity.

8.4.24 In order to further enhance biodiversity, we allowed for wood piles to be discreetly dotted around the southeastern corner of the BESSC playing fields. Such piles provide good habitat for native invertebrate species.



Figure 8.43: Access road ground reinforcement



Figure 8.44: Wet meadow - common reed



Figure 8.45: Deciduous tree planting - oak



Figure 8.46: Red berries



Figure 8.47: Access road grass reinforcement



Figure 8.48: Wildflower meadow



Figure 8.51: Deciduous tree planting - white birch



Figure 8.52: Deciduous tree planting - black poplar



Figure 8.49: Access road grass reinforcement



Figure 8.50: Wildflower meadow - yellow flag iris



Figure 8.55: Deciduous tree planting - silver birch



Figure 8.53: Wet meadow - purple loosestrife



Figure 8.54: Deciduous tree planting - blackthorn

8.5 Access and movement

8.5.1 The permanent works would be located in the southeastern corner of the BESSC and would not be fenced off. The site would remain accessible to users of the BESSC; however, the habitat enclosure itself would not be accessible.

8.5.2 The permanent access route would be surfaced with reinforced grass in order to support maintenance vehicles. It would be 3m wide, which is narrower than the requirement during the construction phase.

8.5.3 The site is broadly flat and there are few constraints on designing a space that is accessible to all. In line with project-wide aspirations and good practice, landscaping treatments and materials would ensure that the space meets the best standards of accessibility.

8.5.4 The Thames Path and the Beverley Brook footpath would not be affected by our works.

Thames Water access requirements

8.5.5 The permanent vehicular access route to the site would run from Queen Elizabeth Walk around the northern and eastern perimeters of the BESSC. The location and design of the route would preserve its use and character. It would comprise a reinforced substrate planted with grass and meadow wildflower species.

8.5.6 Once the project is operational, it is anticipated that Thames Water personnel would visit the site approximately every three to six months to inspect and carry out maintenance of the ventilation, electrical and control, and below-ground equipment. This would likely involve a visit by personnel in a small van during normal working hours and may take several hours.

8.5.7 It is anticipated that a major internal inspection of the tunnel system and underground structures would be required once every ten years. This process would likely require a small team of inspection staff and support crew and two mobile cranes to lower the team into the CSO drop shaft. The inspection would be carried out during normal working hours and would likely take several weeks.

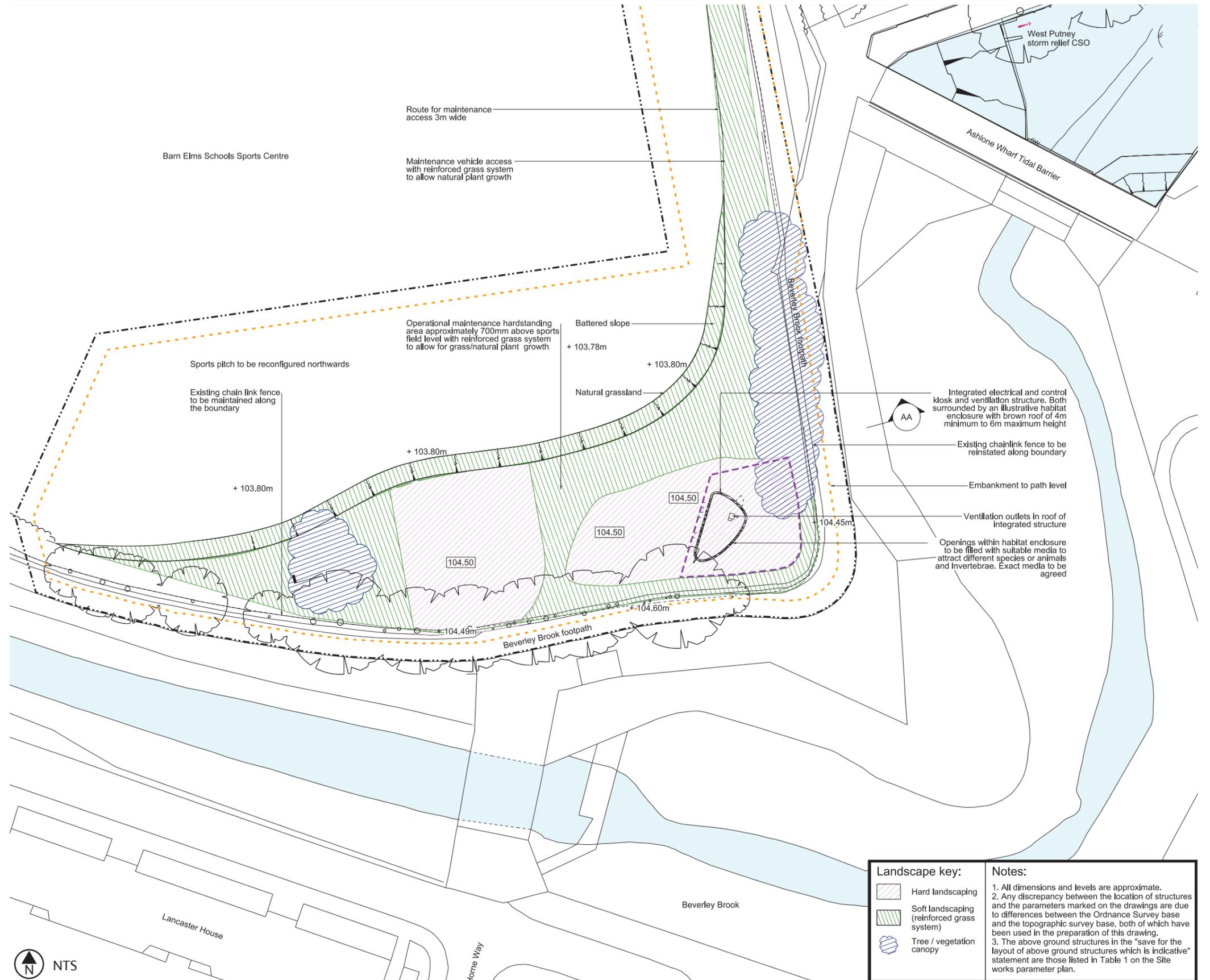


Figure 8.56: Proposed landscape plan - refer to Proposed landscape plan in the Book of Plans

8.5.8 Thames Water may also need to visit the site for unplanned maintenance or repairs, for example, in the event of a blockage or an equipment failure. Such a visit may require the use of mobile cranes and vans.

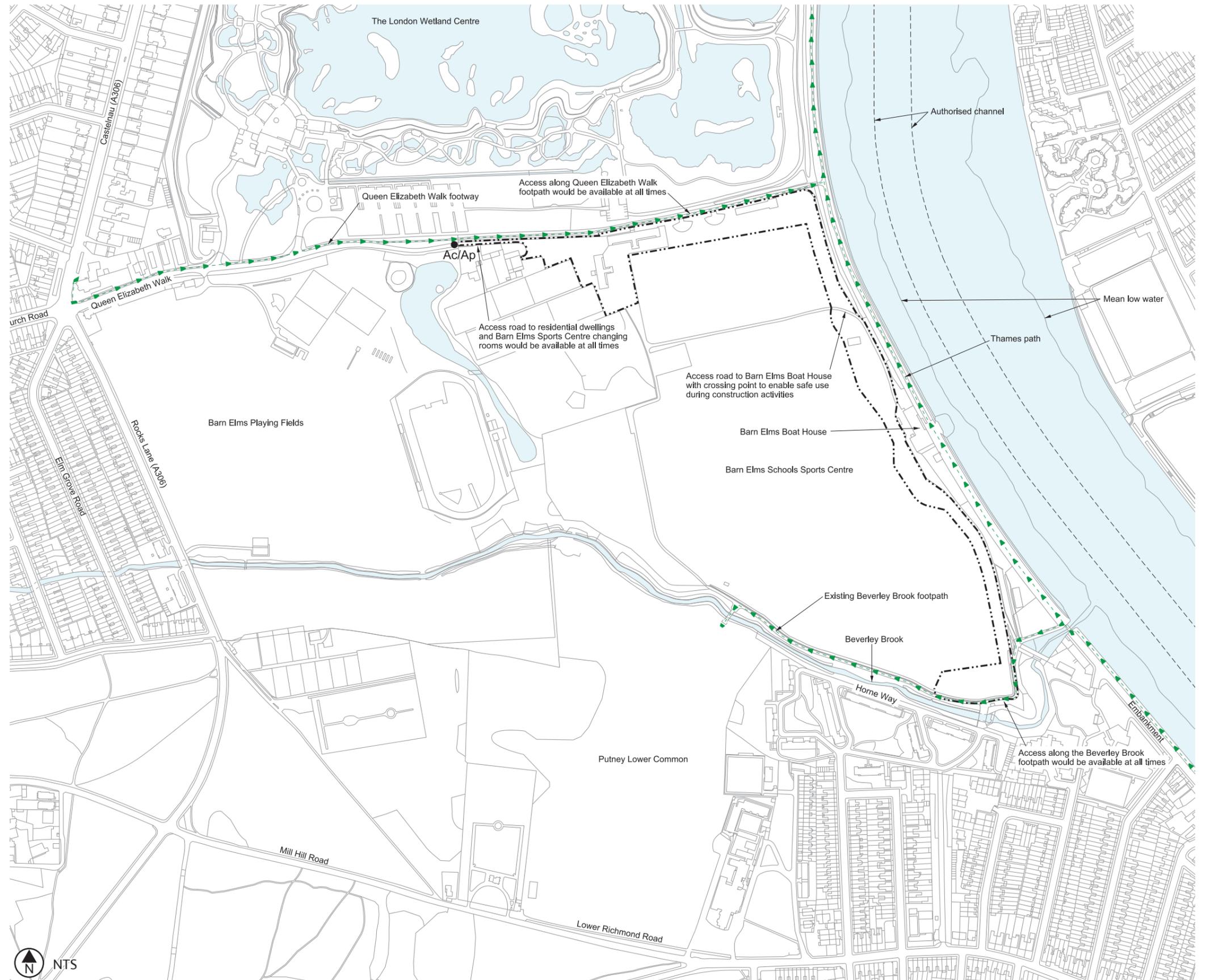


Figure 8.57: Access plan - refer to the Access plan in the *Book of Plans*

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