

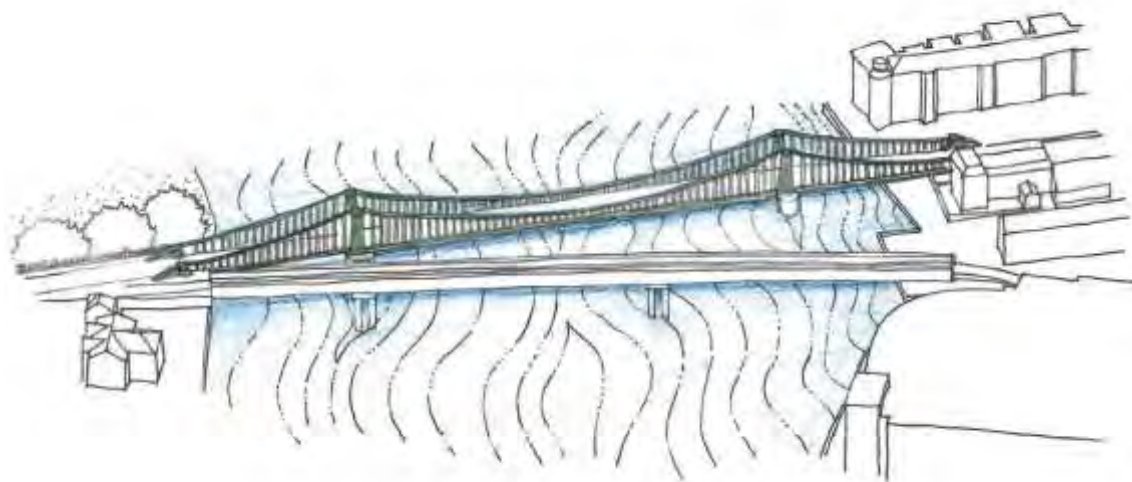


**Transport
for London**

Temporary Pedestrian and Cycle Bridge

Arboricultural Survey Report

P e l l F r i s c h m a n n



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- Appendix A** Description of Structure and Design Working Life
- Appendix B** Tree Survey Schedule
- Appendix C** Tree Constraints Plan

1 Introduction

Pell Frischmann have been commissioned by Transport for London (TfL) to undertake an Arboricultural Assessment on site required for the delivery of a Temporary Pedestrian and Cycle Bridge adjacent to the Hammersmith Bridge, London (hereafter, referred to as the Site). This temporary bridge will be in use during the refurbishment works of Hammersmith Bridge, and once that works are completed the bridge will be removed.

This report aims to inform the proposed design scheme regarding impacts on trees.

1.1 Objectives and Scope

The objectives of this Arboricultural Assessment are to evaluate the overall condition of the trees on, and adjacent to the site. We have considered the arboricultural impacts of both the construction and operational phases of the scheme. We have also considered potential impacts to trees which may be affected by construction or access works which may be located some distance from the actual site boundary.

A Tree Constraints Plan has been produced to inform the Proposed Development. A full impact assessment and Tree Protection Plan can be produced once a finalised development and construction plan has been issued.

The arboricultural survey aims to assess the following:

- the suitability of trees for retention as categorised in accordance with BS 5837: 2012 'Trees in relation to design, demolition and construction – Recommendations';
- the constraints presented by the trees;
- impacts of the scheme development in relation to any retained trees;
- the arboricultural impacts of the proposed scheme; and
- the requirements for tree management where appropriate.

British Standard (BS) 5837: 2012 '*Trees in relation to design, demolition and construction – Recommendations*' requires that information on the constraints associated with retained trees be sent to the project designers. This information is detailed in a Tree Constraints Plan. The constraints, which are covered by BS 5837, are associated with issues relating to retained trees both above and below ground, and the necessary measures to ensure their safe retention.

1.2 Site Location and Description

The Site is located immediately to the east of Hammersmith Suspension Bridge (TQ229780), a Grade II* listed structure across the River Thames, London. The bridge is approximately 223m in length and links the north and south banks of the river between the London Borough of Hammersmith and Fulham to the north, and the London Borough of Richmond to the south. The wider area is built up and urban, with the River Thames running from West to East below the bridge and mudflats present at low tide.

The study area consists of the Site as described above and the potential ecological zone of influence. The study area is shown below in Figure 1.

Figure 1 Site Location Plan and Study Area



Ordnance Survey Maps - License Number 100004912

1.3 Proposed Development

The Temporary Pedestrian and Cycle Bridge will be located on the east side of Hammersmith Bridge and it is required to provide safe access for pedestrians and cyclists over the River Thames whilst the Hammersmith Bridge is refurbished.

The need for a temporary bridge has been determined due to the significant distance between other pedestrian crossing points at Chiswick Bridge approximately 3.8km to the west and Putney Bridge approximately 3km to the east of the Site.

A detailed description of the structure and design working life is included in Appendix A. The approximate location of the proposed temporary bridge is presented in Figure 2.

Figure 2 Approximate location of the Bridge



2 National Policy and Legislation

2.1 Legislation

2.1.1 Town and Country Planning Act

Tree Preservation Orders and Conservation Areas

Under the Town and Country Planning Act 1990, local planning authorities (LPA's) have a duty to make provision for the preservation and planting of trees when granting permission for new developments.

The Town and Country Planning Act affords LPA's with the power to make Tree Preservation Orders (TPO) where it is practical. This will usually be in the interests of amenity and enable the LPA to make provision for the preservation of trees and woodlands.

TPOs are used to protect specific trees, groups of trees and woodlands where removal would result in a significant adverse effect to the local amenity.

A TPO should not be used to prevent development, or the removal of trees in order to impede a development. However, a TPO does prevent unauthorised removal or works, and ensures that trees, groups of trees or woodlands are fully considered within the planning process.

Conservation Areas are areas which have been designated due to its special architectural or historic interest which is considered desirable to preserve or enhance. Trees, groups of trees, or woodland within a conservation area are considered to positively contribute towards the character, appearance and general amenity of a conservation area. Trees within a conservation area, if not protected by a tree preservation order, are protected by the provisions in section 211 of the Town and Country Planning Act 1990.

TPO's and Conservation Areas (under Section 211 of the Town and Country Planning Act 1990) makes it a statutory offence to carry out any of the following works to trees without the formal consent of the LPA (for TPO's) or without first providing the LPA with six weeks' notice of intent (for conservation areas) -

- Cutting down;
- Topping;
- Lopping;
- Uprooting;
- Wilful damage; and
- Wilful destruction.

Certain exemptions apply for works to trees within conservation areas and therefore can bypass the usual six weeks' notice of intent to carry out work to trees. These include, but are not limited to -

- The making safe of dangerous trees where there is an immediate risk of serious harm;

- The removal of dead wood or dead trees;
- Work necessary to abate an actionable legal nuisance; and
- Where work is necessary to implement a grant of full planning consent.

2.1.2 Forestry Act 1967

The Forestry Act 1967 sets out the requirements for the felling of growing trees and states when trees can and cannot be felled. Exemptions that apply are outlined under Section 9 (4)(d) of the Act which allows developers to legally fell trees which:

“...is immediately required for the purpose of carrying out development authorised by planning permission granted or deemed to be granted under the Town and Country Planning Act 1990 or the enactments replaced by that Act”.

2.1.3 Natural Environment and Rural Communities Act 2006

LPA's and government departments are required to have regard for the conservation of biodiversity when exercising their normal functions under Section 40 of the Natural Environment and Rural Communities Act (NERC) 2006. This includes communities and habitats formed by animals and plants, as well as fungi and micro-organisms.

Trees are considered to be integral elements of the natural environment. This may be due to their rarity (e.g. Common Juniper (*Juniperus communis*)), their part of an important habitat (e.g. ancient woodland) or because they directly support another species (e.g. a bat roost or nesting bird). Widespread, common or even non-native tree species are also important as they contribute towards a sustainable natural environment.

Trees and their biodiversity value must be considered during all development activities. Trees should be retained wherever practicable and opportunities taken to maintain and enhance their environmental contribution.

2.1.4 Trees on Third-Party Land

Roots and branches which cross property boundaries and encroach onto neighbouring land are deemed to be a nuisance under Common Law as they have the potential to affect the owner/occupier's use of their own land. The landowner can legally decrease this nuisance by cutting back encroaching roots or branches to the edge of their property if required.

However, the following considerations must be followed:

- No duty to give notice to the tree owner is required – however it is considered courteous to provide some notice;
- All work must be undertaken without trespass onto the neighbouring property unless agreed otherwise with the landowner;
- All arisings from tree works remain the property of the tree owner – these should be offered back to the landowner and only disposed of with their permission; and
- All work must be undertaken with reasonable skill and in accordance with any relevant best practice guidance.

The potential for future nuisance must be considered when undertaking new tree planting within development landscape schemes. This includes the likely effects of encroaching roots and branches onto neighbouring land. Sufficient room for future growth and movement due to wind must be considered within the landscape planting scheme to avoid the possibility of direct damage to boundary walls, fences and properties.

2.2 Planning Policy

2.2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF 2019) paragraphs 170 to 177 set out the Government's policies on protection of biodiversity through the planning system. These policies are expected to be incorporated into development planning documents at regional and local scales and are also of material worth in considering individual planning applications.

Paragraph 170(b) states - *recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*

Paragraph 175(c) states – *development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists;*

2.2.2 Local Planning Policy

London Borough of Hammersmith and Fulham Local Plan

The London Borough of Hammersmith and Fulham Local Plan (2018) covers Green and Public Open Space in Section 10 and Environmental Sustainability in Section 13:

- Policy OS4 addresses Nature Conservation and states that areas of green corridors will be protected from development that would likely cause harm to their ecological (habitats and species) value. In these areas, development will only be granted if the proposed development would provide qualitative gain for the local community and provision is made for the replacement of nature conservation in equal or greater value;
- Policy OS5 states that the borough will enhance biodiversity through the 'greening of streets and public realm' and planting as part of new development; and
- Policy CC2 states that design and construction measures in major developments will conserve and promote biodiversity and the natural environment.

London Borough of Richmond Upon Thames Local Plan

The London Borough of Richmond Upon Thames Local Plan (2018) covers Green Infrastructure and Biodiversity:

- Policy LP12 addresses Green Infrastructure and the importance of maintaining and enhancing the integrity of green spaces and features as part of the wider green network;

- Policy LP15 addresses biodiversity and states that the council will protect and enhance the biodiversity within the borough, including sites designated for their nature conservation value and the biodiversity within adjacent habitats. Enhancement measures to biodiversity and ensuring that new biodiversity features or habitats should be considered to connect to the wider environment existing networks; and
- Policy LP16 addresses trees, woodland and landscape and states that the council will require the '*protection of existing trees and the provision of new trees, shrubs and other vegetation of landscape significance*'.

The London Plan

The London Plan (2016) covers London's Living Spaces and Places in Chapter 7, including biodiversity, trees and the River Thames. Objective 5 of the London Plan is '*a city that becomes a world leader in improving the environment*':

- Policy 7.19 addresses biodiversity and access to nature and states that protection will be given Sites of Importance to Nature Conservation and that proposals should avoid adverse impacts to biodiversity interest by following the mitigation hierarchy of avoid, mitigate and compensate.
- Policy 7.21 addresses trees and woodlands and states that trees should be protected, maintained and enhanced. Planning decisions are therefore advised that existing trees of value should be retained and that replacement tree planting should adopt the policy of 'right place, right tree'.
- Policy 7.29 addresses the River Thames and states that '*The River Thames is a strategically important and iconic feature of London. This role should be protected and promoted*'.

The Draft New London Plan

The Draft New London Plan was published in August 2018 and runs from 2019 to 2041 and once adopted replaces all previous versions, including the above-mentioned London Plan (2016). Chapter 8 covers Green Infrastructure and Natural Environment. In particular the following policies should be considered within this project:

- Policy G6 addresses Biodiversity and Access to Nature and states that Sites of Importance for Nature Conservation (SINCs) should be protected and avoidance measures taken where possible. Policy G6 also states that biodiversity enhancements should be considered from the onset of a development, as well as seeking new or improved habitats that result in a positive gain for biodiversity.
- Policy G7 addresses Trees and Woodlands and states trees should be protected, and where new trees are planted this should be in appropriate locations. Therefore developments should aim to protect trees where possible and if this is not possible, adequate replacements are required.

The Mayor's Transport Strategy

Policy 8 of the Mayors Transport Strategy (2018) aims to enhance London's natural and built environment. This will be done most notably by '*ensuring that transport schemes protect existing green infrastructure where possible, or – if there is a loss – providing new green infrastructure in order to deliver a net gain in biodiversity*' and '*Monitoring and protecting designated spaces on transport land, such as Sites of Importance for Nature Conservation*'.

London Environment Strategy

The London Environment Strategy (2018) focusses on a range of actions to improve the environment across London to create a '*better future*'.

Objective 5.2 addresses the aim of Conserving and Enhancing Wildlife and Natural Habitats through Policy 5.2.1 which aims to protect a core network of nature conservation sites and ensure a net gain in biodiversity. This will be done by –

- Proposal 5.2.1.a The London Plan includes policies on the protection of Sites of Importance for Nature Conservation (SINCs) and Regionally Important Geological Sites (RIGS)
- Proposal 5.2.1.b The Mayor will develop a biodiversity net gain approach for London, and promote wildlife-friendly landscaping in new developments and regeneration projects
- Proposal 5.2.1.c The Mayor will provide guidance and support on the management and creation of priority habitats, the conservation of priority species, and the establishment of wildlife corridors

2.3 Guidance and Standards

2.3.1 British Standard BS 5837:2012

British Standard BS 5837:2012 is the standard for 'Trees in Relation to Design, Demolition and Construction. The standard sets out the principles and procedures to be applied during the design and construction process to ensure a positive relationship is achieved between trees and structures. BS5837 is applicable whether or not planning consent is required for a development.

2.3.2 Ancient Woodland and Veteran Trees

Ancient semi natural woodland consists of any wooded area which has been wooded continuously since at least 1600 AD and has protection under the NPPF. Ancient Woodlands are described as irreplaceable habitats as per Natural England's standing advice which states that LPA '*should refuse planning permission if development will result in the loss or deterioration of ancient woodland, ancient trees and veteran trees unless:*

- *there are wholly exceptional reasons*
- *there's a suitable compensation strategy in place*

To protect Ancient Woodland and Veteran Trees during development, The Forestry Commission and Natural England have published guidance (known as 'standing advice'). This standing

advice is a material consideration during the planning process and should therefore be considered when making decisions on relevant planning applications. This standing advice was last updated in November 2018 and states the following:

- *'For ancient woodlands, you should have a buffer zone of at least 15 metres to avoid root damage. Where assessment shows other impacts are likely to extend beyond this distance, you're likely to need a larger buffer zone. For example, the effect of air pollution from development that results in a significant increase in traffic.'*
- *'A buffer zone around an ancient or veteran tree should be at least 15 times larger than the diameter of the tree. The buffer zone should be 5m from the edge of the tree's canopy if that area is larger than 15 times the tree's diameter.'*

3 Methodology

The arboricultural survey was undertaken by suitably qualified surveyors from Pell Frischmann on the 20th November 2019. The weather was fine and visibility was good.

The survey area is shown in Figure 1. Several trees which are adjacent to the site may also be affected by the proposed development and have also been considered. Access to measure these trees has not always been possible.

Trees were photographed and measured for height, crown spread, and stem diameter. The physical and structural condition of each tree, or group of trees, was noted and recommendations made for tree work or on-going maintenance requirements are detailed in the Tree Survey Schedule presented as Appendix B.

Trees were recorded using Otiss BS5837 software. Survey data is shown on the Tree Survey Schedule (Appendix B) and Tree Constraints Plan (Appendix C).

3.1 Principal Trees: Age Classification

The following classification has been employed:

- Young: Saplings and young trees under 10 years of age.
- Semi-Mature: Trees older than 10 years but less than one third of the life expectancy of their species, normally making substantial extension growth.
- Mature: Trees between one third and two thirds of the life expectancy of their species. Approximately full height and girth, increasing only slowly over time.
- Over mature: Trees beyond two thirds of the life expectancy of their species. No significant extension growth. Crown starting to break up and decrease in size.
- Veteran Trees are beyond the over mature stage but because of their size and age are significant features within the landscape and which can be rejuvenated and conserved by appropriate management.

3.2 Tree Survey and Tree Condition

The surveyor assessed the individual condition of the trees identified within the area. The assessment of condition is based on a visual inspection only.

Each tree was assessed by consideration of the following:

- any visible structural defects,
- the size and form and the suitability of its position,
- the location with regard to the position of other relevant features.

3.3 Categories for Tree Constraints Plan

Individual trees are assessed and then placed into one of four categories as detailed below. For tree numbers please refer to the appended Tree Constraints Plan in Appendix C.

- **Category A** (marked Green on the Tree Constraints Plan). Trees which are significant, and which must be retained, wherever possible, within the layout. Category A trees which are particularly good examples of their species or are essential components of a group (e.g. the dominant and/or principal trees within an avenue).
- **Category B** (marked Mid Blue on the Tree Constraints Plan). These trees should be retained, wherever possible, within any development proposals. These trees have been downgraded due to impaired condition, such that they are unlikely to be suitable for retention beyond 40 years.
- **Category C** (marked in Grey on the Tree Constraints Plan). Trees which do not have sufficient arboricultural merit to constrain development proposals.
- **Category U** (marked in Red on Tree Constraints Plan). Trees which will not remain safe features beyond the short term and should be removed as part of any development proposals.

BS5837 requires that trees are further identified according to any particular merits defined as:

- Arboricultural specimens – subdivision 1
- Trees of landscape importance – subdivision 2
- Trees with ecological, historical or cultural significance – subdivision 3

The design layout should allow for the retention of Category A and B trees where possible. Category C trees should only be retained in locations where they will not over constrain development proposals or present additional amenity issues.

Mitigation will be required for the loss of any trees, or groups of trees, which have been classified as Category A or B.

3.4 Root Protection Area

BS5837 defines the Root Protection Area (RPA) as a “*layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree’s viability, and where the protection of the roots and soil structure is treated as a priority*”.

For each tree the RPA has been calculated. For single stems trees, the RPA is calculated as an area equivalent to a circle with a radius 12 times the stem diameter. For trees with more than one stem, the RPA has been calculated using the Helliwell Method with each stem being measured at 1.5m above ground level to calculate the basal area in m². The shape and position of the RPA may be adjusted by the arboriculturalist to take into consideration site factors such as soil type and depth, prevailing wind, slope and drainage or built structures such as roads or footings. The overall size of the RPA cannot be changed.

3.5 Key for the Tree Survey Schedule

Table 1 Key for the Tree Survey Schedule	
Height	Measured with clinometer in metres
Stem Diameter	Diameter measured at 1.5 m from ground level with tape in mm
Spread area (N,S,E,W)	Crown spread measured in metres at the points on the compass
Height of Crown Clearance	In metres to inform on ground clearance, shading and crown to stem ratio.
Age Class	Y-Young, SM – Semi-mature, M-Mature, OM-Over mature, V-Veteran
Physiological Conditions	Good, Fair, Poor, Dead
Structural Condition	Visual evidence of the presence of decay or danger of collapse
Category Grading	A-good, B-Moderate, C-Poor, U-Dead or dangerous

4 Survey Results

The survey results are shown in the Tree Survey Schedule presented in Appendix B. The layout and root protection areas are shown in the Tree Constraints Plan presented in Appendix C. Trees have been assessed individually or in groups where several similar trees form a single management unit.

4.1 Desktop Study

Information obtained from the Hammersmith and Fulham Council Planning Department and the Richmond and Wandsworth Council Trees and Park Department indicates that there are Conservation Areas within the Site and immediately adjacent.

These include –

- The Mall Conservation Area – covers the area including and immediately adjacent to the west of the Site
- Fulham Reach Conservation Area - covers the area including and immediately adjacent to the east of the Site
- Castelnau Conservation Area – covers the area to the south and south-east of the Site

This information can be found online at <https://www.lbhf.gov.uk/planning/urban-design-and-conservation/conservation-areas> and https://www.richmond.gov.uk/conservation_areas.

4.2 General Site Description and Recorded Trees

Thirty-eight individual trees were recorded and three groups of trees. Ten species of tree were recorded including:

- | | |
|------------------|-------------------------------|
| • Apple | <i>Malus spp.</i> |
| • Ash | <i>Fraxinus excelsior</i> |
| • Common lime | <i>Tilia × europaea</i> |
| • Elder | <i>Sambucus nigra</i> |
| • Hawthorn | <i>Crataegus monogyna</i> |
| • Horse chestnut | <i>Aesculus hippocastanum</i> |
| • London plane | <i>Platanus x hispanica</i> |
| • Black poplar | <i>Populus nigra</i> |
| • Silver maple | <i>Acer saccharinum</i> |
| • White willow | <i>Salix alba</i> |

The Site consists of Hammersmith Bridge, the River Thames and the areas of hardstanding to the north and south of the bridge. To the north, the tree planting is fairly uniform with semi-mature lime and London plane trees alongside the roads. Young lime tree planting is present within Queen Caroline Street, most likely as mitigation for the recently constructed office building and updated Thames Path. To the south of the river, the tree planting is all mature and forms the boundary between the Thames Path and adjacent private property. Some semi-mature trees are present on the embankments of the River Thames and are leaning to the north. A selection of photographs taken during the arboricultural survey are included in Figure 3.

Figure 3 Site Survey Photographs



Category B lime and London planes trees to the north-east of the Hammersmith Bridge provide high landscape value



T16 poplar and T18 London plane to the south-west of the Hammersmith Bridge



Category C T24 is unlikely to reach maturity before becoming unstable



Category B trees along Queen Caroline Street provide landscape value if allowed to grow to maturity

4.3 Classification

Of the individual trees, 2 have been placed in Category A, 27 in Category B, and 9 in Category C. Of the Groups of trees, all 3 have been placed in Category C. No trees or groups of trees have been placed into Category U.

4.4 Individual Trees

4.4.1 Category A

Two large mature London plane trees have been identified as Category A due to their landscape value.

T18 (London plane) is located on the boundary of the Thames path and St Paul's School playing fields and is a significant feature within the landscape. This tree appears to be in good health and should live for at least another 50 years if not damaged.

T26 is within a private garden and could not be surveyed in detail. However, based on the crown spread of this tree, it is likely that the RPA spreads into Castelnau and the road to the south of Hammersmith Bridge.

4.4.2 Category B

Trees have been identified as Category B for their landscape value within the survey area. These consist of semi-mature lime and London plane trees lining the pavement to the north-west of Hammersmith Bridge, T2, T3 and T20 (semi-mature pollarded lime), and ash, poplar, horse chestnut, London plane and a silver maple to the south of Hammersmith Bridge.

Trees along Queen Caroline Street include young lime, wild cherry and London plane. These trees were most likely planted as part of the mitigation scheme for the recently built building on the corner of the Thames Path and Queen Caroline Street to the east of the street.

Although T2, T3 and T20 have been heavily pollarded at the time of survey, these trees continue to provide landscape value within the Site.

4.4.3 Category C

These trees are generally young or in poorer condition than the other trees surveyed within the Site.

T24 is a London plane tree growing on the river edge and leaning severely north. This tree is at risk of falling into the Thames, however, is not considered to cause risk at this stage and therefore has not been placed into Category U (dead, dying or dangerous).

Trees T36 – T38 are within the garden area of the Queen Caroline Estate flats. Approximately 8 newly planted trees also occur here and are planted within tree guards. These trees have not been included within this survey due to their small size of under 80cm DBH and species were not determined at the time of initial survey.

4.4.4 Category U

No trees have been assessed as Category U.

4.5 Groups of Trees

The term 'Group' is intended to identify any trees that form cohesive arboricultural features, either aerodynamically, visually or culturally (including for biodiversity). A number of groups of even aged trees were identified which should also be managed as a single unit.

4.5.1 Category A

No groups have been assessed as Category A.

4.5.2 Category B

No groups have been assessed as Category B.

4.5.3 Category C

Three groups of trees were recorded during the survey and both have been assessed as Category C as they do not hold any significant arboricultural, landscape or ecological value within the Site. These groups appear to be of self-seeded origin in contrast to the individual trees which have been planted in specific locations. Due to the lack of management these groups are only in fair form.

G1 includes willow, sycamore saplings, buddleja and ash growing on the mudflat to the north-east of the Hammersmith Bridge. G21 is a group of elder, lime and ash growing on the river embankment to the south-east of the Hammersmith Bridge. This group could not reach maturity due to its location. G30 is a group of cherry and elder forming part of the boundary between the Thames Path and St Pauls School playing fields to the south-west of Hammersmith Bridge.

4.5.4 Category U

No groups have been assessed as Category U.

5 Likely Impacts

The arboricultural survey has identified trees and groups of trees of ecological and landscape value within the Site.

Current proposals for the Site include the construction of a temporary pedestrian bridge adjacent to the current structure.

The impact assessment will be updated once detailed development plans are available and is currently aimed to inform the design team only.

5.1 Arboricultural Impacts

There will likely be impacts to trees during the construction of the Temporary Bridge, these impacts include –

- Removal of trees to facilitate the temporary Bridge – to be confirmed
- Impacts to the RPA of mature trees – to be confirmed but likely to include trees that may be within the construction footprint; trees which may be damaged by construction equipment being manoeuvred within the Site; and trees which need protection during construction.

5.2 Ecological Impacts in Relation to Trees

Trees are considered to be of value to nesting birds. Any construction or clearance works impacting on these areas should be completed outside of the breeding bird season (March-September).

As well as roosting in buildings, bats can use trees to rest, give birth, raise young and/or hibernate. Trees within the Site were surveyed from ground level for bat roosting features. These are detailed within the tree Survey Schedule in Appendix B where they have been identified.

Removal of mature trees within the southern section of the Site also has the potential to impact on green corridors and infrastructure within the Site and local landscape.

6 Recommendations

6.1 Mitigation Measures

The Proposed Development should take the RPA of trees and groups of trees into consideration.

If avoidance or suitable protection measures cannot be adopted, there is potential for there to be adverse impacts on Category B trees. Under BS5837:2012 the Scheme design should be informed by the presence of any notable trees (such as those in Category B) and steps taken to avoid adverse impacts wherever possible.

Only in circumstances where impacts cannot be avoided should Category A or B trees or Category A or B groups be removed. In these cases, BS5837:2012 requires that adequate mitigation be put in place for their replacement on a 'like-for-like basis' taking into consideration maturity, longevity and biodiversity value of the original tree.

Replacement tree planting should also be within the same locations as those removed. Where possible the existing planting and landscaping could be improved and enhanced.

It is therefore a requirement under the standard for the Scheme designers to consider ways in which the Category B trees can be safely retained during both the construction and operational phases. Suitable tree protection measures are outlined in Section 7.

Some provisional mitigation measures have been outlined below and will require updating once the final development plans are available.

6.1.1 Works within the Conservation Areas

The Site is within Conservation Area's and therefore all tree work proposals must be applied for in writing to the Local Planning Authority (London Borough of Hammersmith and Fulham and London Borough of Richmond Upon Thames).

A 6-week consultation period is required prior to permission being granted for any works to take place.

6.1.2 Tree Works

All remedial tree works should be undertaken to BS 3998: 2010 Tree Work – Recommendations.

Crown clearance heights must be taken into account during construction to prevent damage to overhanging limbs.

Full details should be incorporated into an Arboricultural Method Statement.

6.1.3 Replacement Tree Planting

Where replacement tree planting is required, it should have two main objectives –

- Planting within the Conservation Areas to replace trees which have been felled to facilitate construction.

- To provide replacement tree planting and permanent mitigation around the Site to assimilate the temporary bridge into the surrounding landscape and provide a visual barrier for private residents to the south for its duration.

To allow for replacement tree planting around the temporary bridge, the following scenarios should be considered –

- Replacement tree planting must be located in positions so they can be fully protected when the temporary bridge is removed in approximately 3 years. The RPA and crown growth of the trees in 3 years' time must therefore be considered to ensure no damage is caused.
- Where this is not possible (eg restricting access required for the dismantling of the temporary bridge), tree planting should be deferred to after the removal of the temporary bridge.

The appropriateness of this mitigation should be reassessed upon receipt of the final design scheme.

Tree planting must include native species similar to those already present. Lime and London plane will grow to maturity and therefore must be placed in areas that will allow full growth without damaging existing infrastructure. The use of porous membrane around the tree will assist with this. A full arboricultural method statement should be prepared at detailed design stage.

As a temporary measure, green wall screening could be used such as those available at <https://www.hederascreeens.co.uk/> to assimilate the temporary bridge into the local environment, in particular within the southern section of the Site. Breeding Birds

Trees and other structures, including the Hammersmith Bridge, have the potential to support breeding birds. Any construction or clearance works impacting on these areas should be completed outside of the breeding bird season (March- September).

If this is not possible then the works will require an ecological watching brief to ensure that the trees and shrubs are clear of nests. If any active nests are located, then works will be required to stop until a 5m radius around the nest has been screened off from construction. Any works within this area will only be permitted to continue after the chicks have fledged.

Mitigation for the loss of trees and introduced shrub will be provided for through the landscaping plan for the Proposed Development. Due to the time taken for trees and shrubs to reach maturity, it will be necessary to provide nest boxes for breeding birds. These boxes will provide temporary nesting sites until the trees and shrubs are sufficiently mature to provide adequate mitigation (full details are provided in the Preliminary Ecological Appraisal).

6.1.4 Bats

If trees to the south of the rover are scheduled to be removed, it is recommended that emergence re-entry surveys are conducted during the survey season that the tree is scheduled to be removed.

In the case that no roosting bats are found during these surveys, a climbing tree inspection should be completed by a suitably licenced bat ecologist prior to these trees being removed. This survey can be completed alongside the tree removal as part of a soft felling technique.

In the event that roosting bats are identified during the soft felling, a Mitigation Licence for a European Protected Species Licence (EPSL) will be required from Natural England prior to tree removal being completed.

7 Tree Protection Measures

BS 5837 specifies that a Tree Protection Plan (TPP) should be prepared to show the impact of the proposed development on existing trees at the site. This will be prepared once draft development plans area available.

The draft TPP will show the location of protective fencing (see section 7.2) and other protection measures based on the design plan.

The final TPP will then be prepared when the design layout has been finalised and an accurate Construction Exclusion Zone (CEZ) can be calculated. Other areas of land; where soil will need to be protected from compaction or contamination, will also be identified.

Information from the TPP should then be incorporated into subsequent drawings and method statements to ensure that all interested parties are fully aware of the areas in which access and works may and may not take place.

The following protection measures have been recommended for all construction works where excavation or other activities could impact on retained trees.

7.1 Construction Exclusion Zone (CEZ)

During construction, care must be taken to ensure that the existing ground levels around trees are maintained as trees are sensitive to any changes in water level or factors which alter the aeration of the root system.

As a general guide, the full root protection area (RPA) should be observed, and BS 5837 adhered to (see the Tree Constraints Plan in Appendix C).

BS 5837 states that all retained trees or groups of trees should be protected by RPAs marked by the erection of a protective barrier. The Tree Constraints Plan and the Tree Survey Schedule shows the RPA for each tree or group of trees.

BS 5837 specifies the minimum RPA in square metres rather than a radial distance; the final barrier position will be shown on the TPP, which will be produced once the development layout has been finalised.

BS 5837 enables the professional arborist to make small changes to the shape (but not the area) of the RPA to fit with local conditions.

The TPP should also detail routes for services and site facilities.

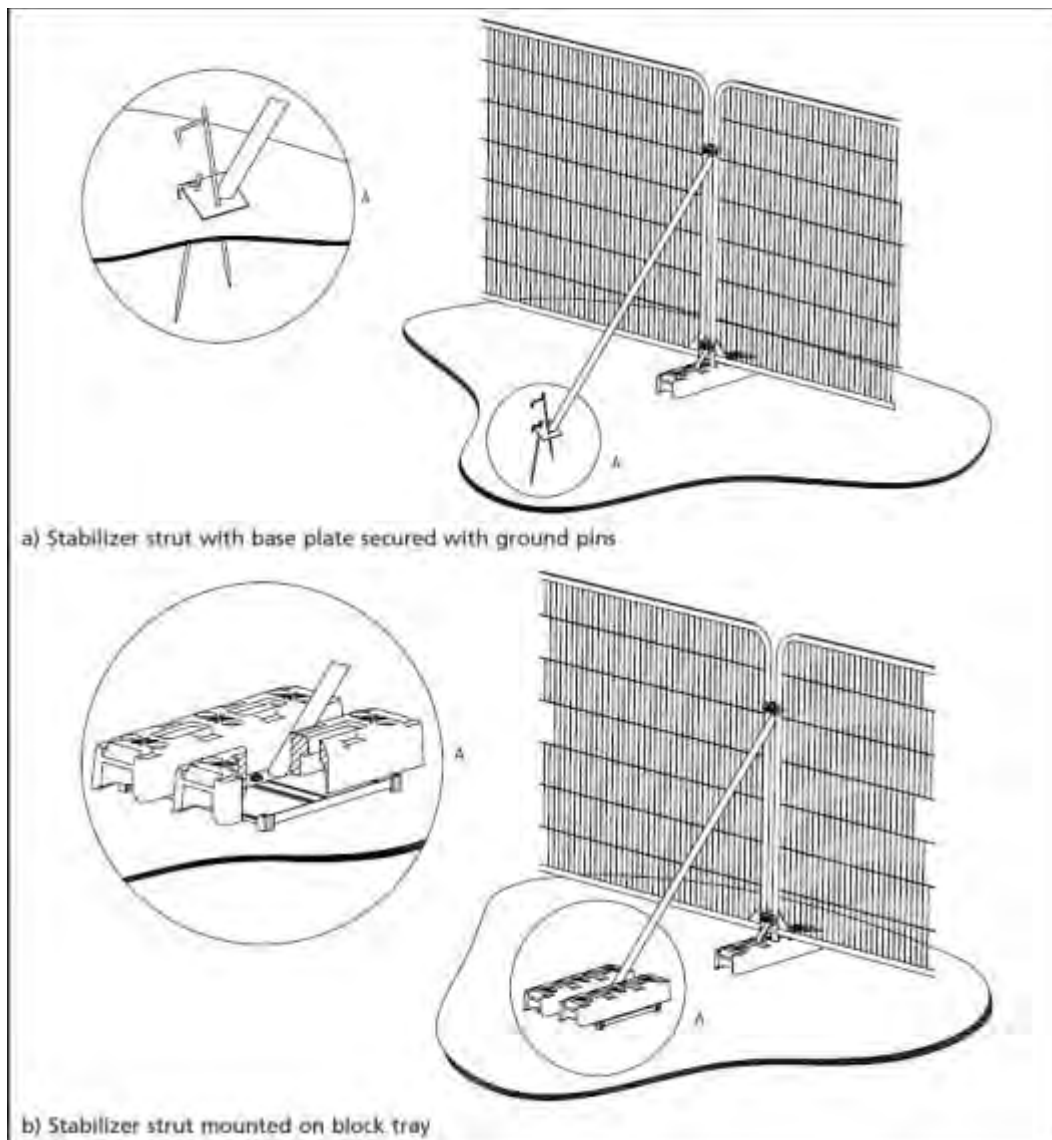
If services need to pass through the CEZ, directional drilling or thrust boring techniques must be employed at a suitable depth (≥ 1 metre) under the trees. This will minimise damage to tree roots. Any works which need to take place within the CEZ must be notified to the project arborist in advance. The project arborist should produce a suitable arboricultural method statement for the works and may recommend that the work is undertaken under a professional watching brief.

7.2 Protection Measures for Retained Trees

Retained trees will require ground protection around their RPA using a combination of barriers and ground protection.

All barriers should conform to the standard specified in BS 5837:2012 and are shown in Figure 4 below.

Figure 4 Tree Protection Fencing



The protective barriers should comprise a scaffold frame from which “heras” type fencing (or similar) should be firmly attached. The barrier must be strong enough to protect the trees from the expected level of construction activity and should be constructed so that it cannot be easily moved.

Once the exclusion zone has been protected by barriers and/or ground protection, construction work can commence. All weather notices must be erected on the barriers stating “*Construction Exclusion Zone KEEP OUT*”. It is recommended that the protective fencing is erected under the supervision of an arborist to ensure that adequate protection is provided.

The location of protective barriers will need to be shown on the TPP. Once the protective fencing is in place it should be inspected by the project arborist, who should then inform the local authority tree officer that the erection work has been completed.

7.3 Measures to Protect Roots of Retained Trees

It may be possible to incorporate walkways alongside existing trees by using “no-dig” construction techniques such as cellular confinement systems. It is possible for these systems to occupy up to 20% of the total area of a Root Protection Area of a retained tree.

Paving and other permanent surfaces should be laid onto a flexible base to allow movement and to facilitate re-laying if distortion becomes excessive. Cellular containment systems such as “Cellweb” or similar aggregate retaining products allow for root plate movement. These should be laid under the guidance of an experienced arborist to ensure that roots are fully protected. Cellular confinement systems are laid over the existing ground surface and no prior excavation should be undertaken.

It is essential that the block paving or other surfaces which are proposed are fully porous to allow water and air to reach the roots of retained trees.

Full arboricultural method statements should be produced for this type of activity and a suitably experienced arborist should be on site to supervise key operations.

7.4 Other Protection Measures

Other protection measures to be considered during construction include:

- Material which will contaminate the soil, such as concrete mixings, diesel and vehicle washings, should not be discharged within 10 metres of the tree stem.
- Notice boards, telephone cables or other services should not be attached to any part of the tree.
- Fires should not be lit within 5 metres of any tree trunk, branch or foliage.
- No materials or rubbish should be left within the CEZ.

8 Summary

The survey results are shown in the Tree Survey Schedule in Appendix B. The layout and root protection areas are shown in the Tree Constraints Plan in Appendix C.

Thirty-eight individual trees were recorded and three groups of trees. Of the individual trees, 2 have been placed in Category A, 27 in Category B, and 9 in Category C. Of the Groups of trees, all 3 have been placed in Category C. No trees or groups of trees have been placed into Category U.

No development plans area currently available however an assessment has been made of potential arboricultural impacts. General recommendations have been made for tree and root protection and mitigation for trees which will need to be removed.

A tree constraints plan has been produced to inform the design team and to avoid impacts where possible.

A draft Tree Protection Plan should be produced to provide details of tree removal and protection of retained trees. This will be produced on receipt of a draft scheme design.

9 Arboricultural Report Limitations

The information reported is based only on the interpretation of data collected during the survey undertaken on site. The condition and size of the trees is likely to change with time.

This report has been prepared by Pell Frischmann with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client.

This report does not seek to address the specific area of subsidence risk. Any discussion of soil characteristics is included only where they may affect tree or root growth. Queries regarding subsidence will require a separate specialist report to be commissioned.

This report has been prepared solely for the use of Transport for London and may not be relied upon by other parties without written consent from Pell Frischmann. In addition, it must be understood that this report does not constitute legal advice.

Pell Frischmann disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

10 References

BS 5837: 2012 'Trees in relation to design, demolition and construction – Recommendations'

BS 3998: 2010 'Tree Work - Recommendations'

National Joint Utilities Group (NJUG) Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees. Volume 4, issue 2. London:

Lonsdale D. Principles of Tree Hazard Assessment and Management. TSO London 1999

Appendix A

Description of Structure and Design Working Life

To facilitate the refurbishment works and enable repairs for Hammersmith Bridge a temporary bridge is required to provide pedestrian and cycling access over the River Thames. The temporary bridge, located to the east of Hammersmith Bridge, will provide safe access for pedestrians and cyclists to cross the River Thames.

The proposed bridge is a 3-span structure with 2 No. piers in the river. The south abutment is located near the towpath on the south riverbank and the north abutment is in the green area on the north riverbank at the south west end of Queen Caroline Street (refer to General Arrangement Drawing number A102963-PEF-BAS-ZZZ-DIA-C-00003).

The soffit levels of the centre and south span are to match the soffit level of the Hammersmith Bridge, as a minimum, but the soffit level of the north span is to be lowered. A ramp structure is to be installed at both ends of the bridge connecting the bridge to the existing highway network either side of the river.

The effective width of the segregated pedestrian and cycleway is to be a minimum of 5.50m, with an overall deck width of 7.1m. This is to accommodate the pedestrian and cyclist route for a high/very high flow category.

The bridge foundations, substructure and superstructure are to be designed to accommodate potential flooding of the river and breach of flood defence system.

As the structure is to be temporary, a fully demountable type modular structure is proposed, to enable the river crossing to be quickly installed and completely removed. All the substructure elements in the river must also be designed such that it can be decommissioned afterwards.

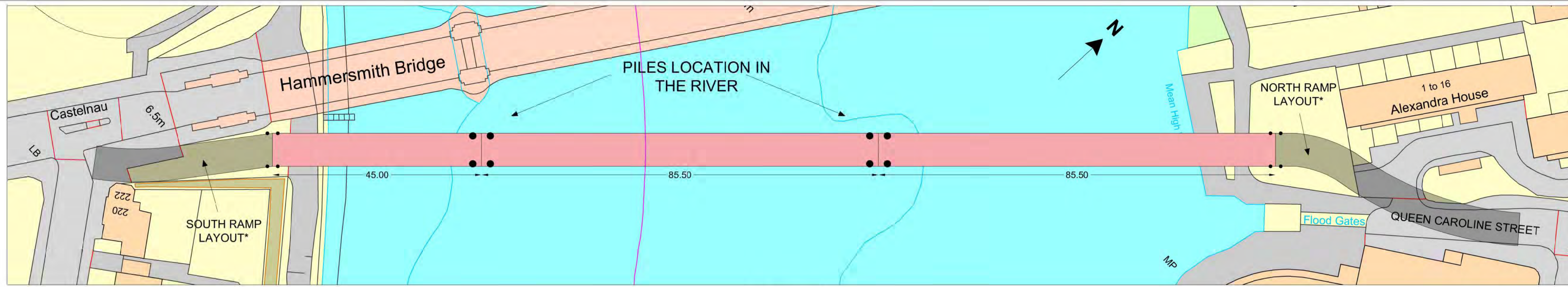
Therefore, the structure, including foundation elements, is to be fully removed once it is no longer needed.

The structure type is to be a temporary proprietary modular steel bridge. The bridge deck shall be demountable and of half through truss construction comprising structural elements put together to form the outer trusses, and transverse elements supporting a steel deck to carry the pedestrian and cycleway. The maximum distance between the outer trusses centres is to be 7.1m. The total weight of the superstructure is not to exceed 4.1 tonnes per metre span.

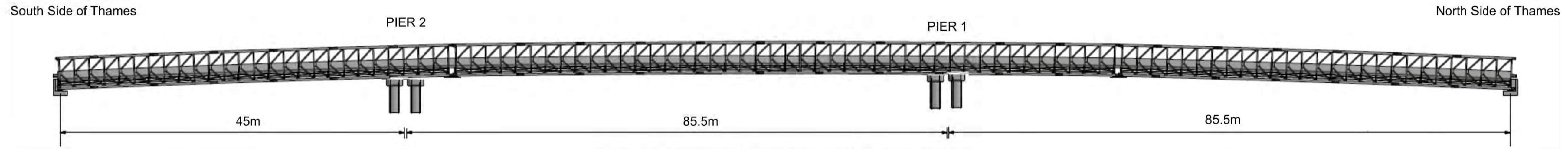
The substructure and foundation within the River Thames (piers 1 and 2) are to comprise an arrangement of 4 No. tubular socketed steel piles installed in augured shafts and braced with steel sections.

The abutments will be of reinforced concrete construction supported on augured reinforced concrete piles.

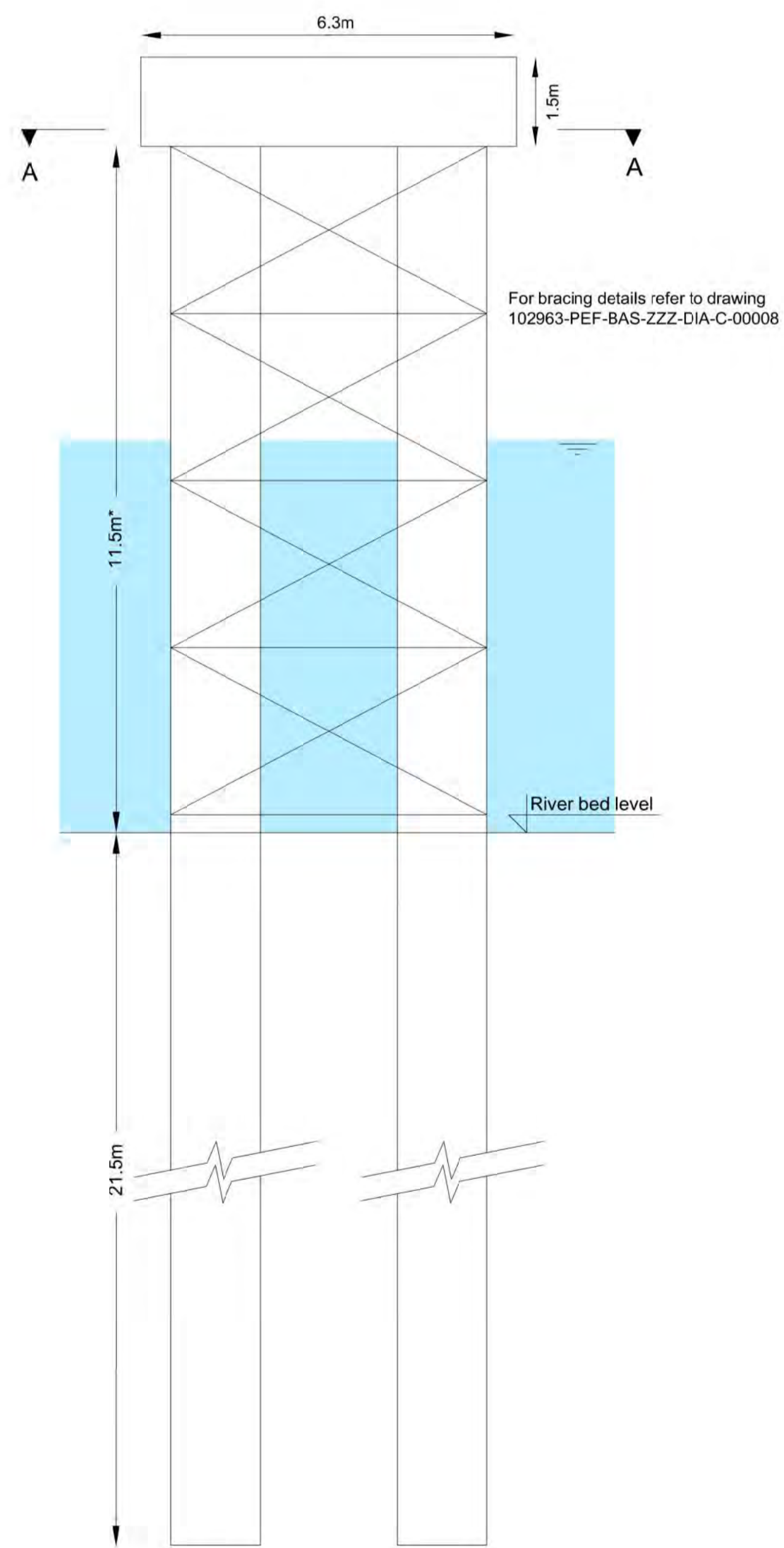
The structure is a simply supported three span deck with a total length of approx. 216m. The north and centre spans are expected to be approximately 85.5m long and the south span is expected to be approximately 45m long. The bridge will continue into a steel ramp structure, adjoining the existing highway network.



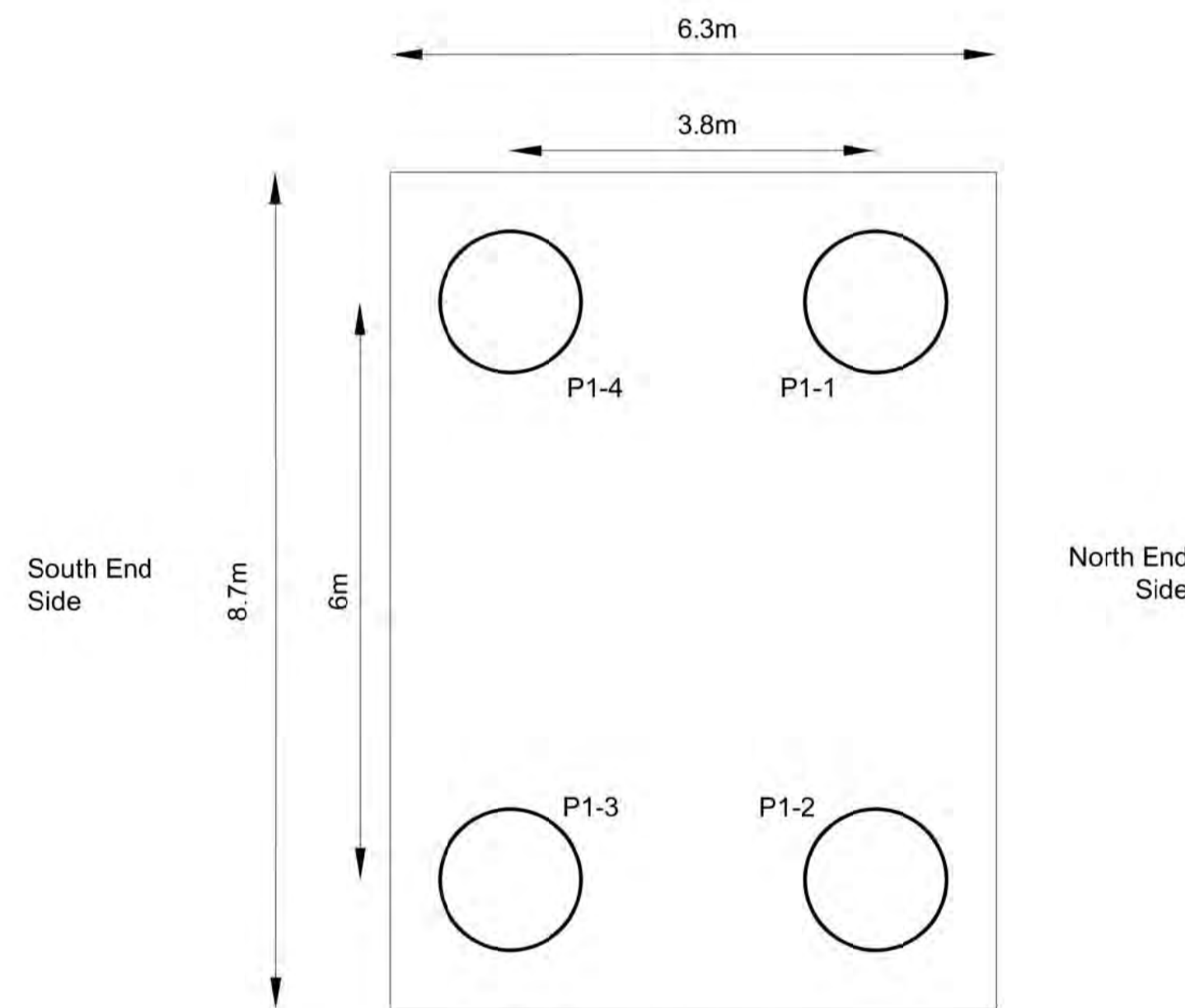
PLAN VIEW



INDICATIVE ELEVATION LOOKING NORTHWEST



PIER 1 / PIER 2
CROSS SECTION LOOKING NORTHWEST



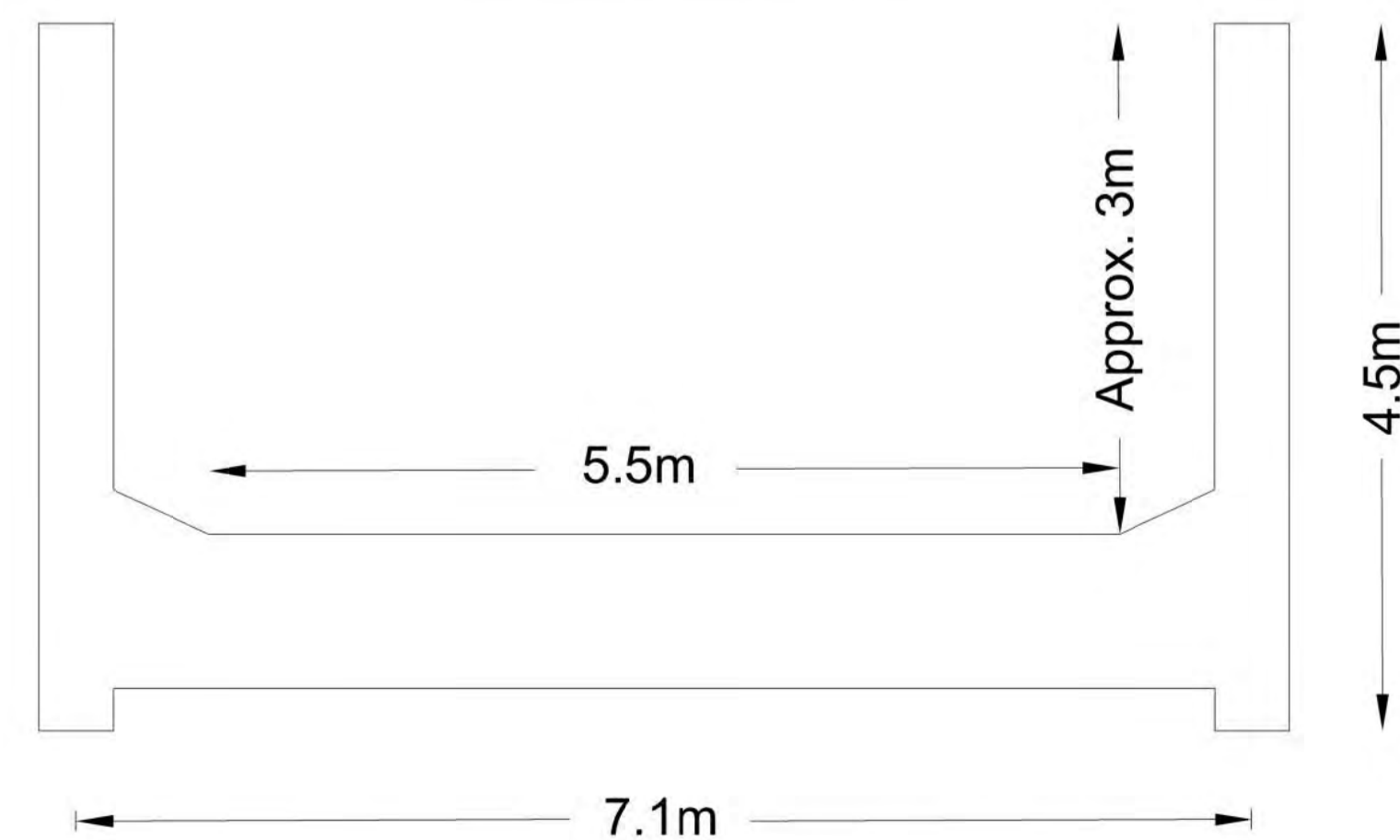
SECTION AA
PIER 1 / PIER 2 - PILES ARRANGEMENT

PILE NO.	Easting	Northing
1-1	523011.5559	178090.2721
1-2	523015.9842	178086.2237
1-3	523013.4202	178083.4191
1-4	523008.9919	178087.4675

PIER 1 - APPROXIMATE PILE COORDINATES



LOCATION PLAN



DECK CROSS-SECTION
GEOMETRICAL REQUIREMENTS

- GENERAL NOTES
- DO NOT SCALE THIS DRAWING.
 - PILES DIMENSIONS:
 - SOCKETED STEEL PILES IN THE RIVER TO BE CIRCA 1.5m DIAMETER.
 - AUGURED RC PILES AT THE ABUTMENTS LOCATION TO BE CIRCA 0.75m DIAMETER.
 - ALL DIMENSIONS ARE APPROXIMATE AND MAY CHANGE DEPENDING ON THE DETAILED TOPOGRAPHICAL SURVEY AND GEOTECHNICAL INVESTIGATIONS.
 - PIERS LOCATION SUBJECT TO CONCLUSION OF NAVIGATION RISK ASSESSMENT.
 - THE EXACT LOCATION OF PILES AND ABUTMENTS TO BE CONFIRMED FOLLOWING DETAILED TOPOGRAPHICAL SURVEY AND GEOTECHNICAL INVESTIGATIONS.
 - *METALLIC RAMP LAYOUT AND EXACT LOCATION ARE INDICATIVE AND MAY CHANGE DEPENDING ON THE DETAILED TOPOGRAPHICAL SURVEY.
 - RAMPS TO BE OF METALLIC STRUCTURE. DETAILS TO BE DEVELOPED.
 - THERE ARE UTILITIES LOCATED ON EACH RIVER BANK WHERE THE ABUTMENTS AND RAMPS ARE TO BE CONSTRUCTED. THE LOCATIONS OF THESE UTILITIES WILL BE CONFIRMED AFTER THE INVESTIGATIONS ARE COMPLETE.

DRAFT

REV	DESCRIPTION	DRN	CHK	APP	DATE
P03	Minor changes	IR	AW	SM	21/02/20
P02	Changes to span arrangement	IR	AW	SM	28/11/19
P01	Draft	DK/ER/IR	SM	AW	15/11/19

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Architect/Client/Contractor

TRANSPORT FOR LONDON

Project
TEMPORARY PEDESTRIAN AND CYCLE BRIDGE

Drawing Title
TEMPORARY BRIDGE GENERAL ARRANGEMENT

Name	Date	Scale	NTS
Drawn	IR	28/11/2019	Drawing Status
Designed	DK / ER / IR	28/11/2019	FOR PRICING
Checked	AW	28/11/2019	Revision
Approved	SM	28/11/2019	P03

Drawing No. 102963-PEF-BAS-ZZZ-DIA-C-00003

Appendix B

Tree Survey Schedule

Reference	Structure	Common Name	Botanical Name	Height (m)	Num. Stems	Stem Diam (mm)	Multiple Stem diam (mm)	RPA	North	East	South	West	Life Stage	Structural Cond	Bat Habitat	General Observations	Retention Category
G1	Group	Group, mixed species	Group, mixed species	6	1			Area: 328.87 sq m.					Semi Mature	Good		willow, sycamore saplings, buddleia, ash	C
T2	Tree	Lime, Common	Tilia x vulgaris	10	1	670		Radius: 8.0m. Area: 201 sq m.	0	0	0	0	Semi Mature	Good		Heavily pollarded with no crown - still provides landscape value	B2
T3	Tree	Lime, Common	Tilia x vulgaris	10	1	700		Radius: 8.4m. Area: 222 sq m.	0	0	0	0	Semi Mature	Good		Heavily pollarded with no crown - still provides landscape value	B2
T4	Tree	Lime, Common	Tilia x vulgaris	15	1		550	Radius: 6.6m. Area: 137 sq m.	5	5	5	5	Semi Mature	Good			B2
T5	Tree	Lime, European	Tilia x europaea	11	1	390		Radius: 4.7m. Area: 69 sq m.	4	2	4	4	Semi Mature	Good			B2
T6	Tree	Plane, London	Platanus x hispanica	12	1	690		Radius: 8.3m. Area: 216 sq m.	3	3	3	3	Semi Mature	Good			B2
T7	Tree	Lime, European	Tilia x europaea	10	1	410		Radius: 4.9m. Area: 75 sq m.	3	2	3	4	Semi Mature	Good			B2
T8	Tree	Plane, London	Platanus x hispanica	12	1	720		Radius: 8.6m. Area: 232 sq m.	5	5	5	5	Semi Mature	Good			B2
T9	Tree	Plane, London	Platanus x hispanica	12	1	640		Radius: 7.7m. Area: 186 sq m.	5	3	5	3	Semi Mature	Good	Low		B2
T10	Tree	Plane, London	Platanus x hispanica	9	1	190		Radius: 2.3m. Area: 17 sq m.	3	3	3	3	Young	Good			C
T11	Tree	Plane, London	Platanus x hispanica	12	1	540		Radius: 6.5m. Area: 133 sq m.	3	1.5	3	3	Semi Mature	Good		lean to the east	B2
T12	Tree	Plane, London	Platanus x hispanica	13	1	720		Radius: 8.6m. Area: 232 sq m.	5	5	5	2	Semi Mature	Good			B2
T13	Tree	Lime, European	Tilia x europaea	12	1	450		Radius: 5.4m. Area: 92 sq m.	5	5	5	1	Young	Good			B2
T14	Tree	Lime, European	Tilia x europaea	12	1	510		Radius: 6.1m. Area: 117 sq m.	3	3	3	1	Young	Good			B2
T15	Tree	Plane, London	Platanus x hispanica	12	1	550		Radius: 6.6m. Area: 137 sq m.	5	4	5	1	Semi Mature	Good			B2
T16	Tree	Poplar	Populus sp.	15	1	700		Radius: 8.4m. Area: 222 sq m.	6	4	1	2	Semi Mature	Good	Low	lean to north	B2

Reference	Structure	Common Name	Botanical Name	Height (m)	Num. Stems	Stem Diam (mm)	Multiple Stem diam (mm)	RPA	North	East	South	West	Life Stage	Structural Cond	Bat Habitat	General Observations	Retention Category
T17	Tree	Chestnut, Horse	Aesculus hippocastanum	6	2		150, 150	Radius: 2.5m. Area: 20 sq m.	2	2	2	2	Young	Good			C
T18	Tree	Plane, London	Platanus x hispanica	15	1	1000		Radius: 12.0m. Area: 452 sq m.	7	7	7	7	Mature	Good	Low		A2
T19	Tree	Chestnut, Horse	Aesculus hippocastanum	13	1	780		Radius: 9.4m. Area: 278 sq m.	5	5	5	5	Semi Mature	Good	Low		B2
T20	Tree	Lime, Common	Tilia x vulgaris	10	1	1000		Radius: 12.0m. Area: 452 sq m.	0	0	0	0	Mature	Good		Heavily pollarded with little crown - still provides landscape value	B2
G21	Group	Group, mixed species	Group, mixed species		1			Area: 118.68 sq m.					Young	Good		elder, lime, ash	C
T22	Tree	Poplar	Populus sp.	15	1		410, 410	Radius: 7.0m. Area: 154 sq m.	2	2	2	2	Semi Mature	Good	Low		C
T23	Tree	Ash, Common	Fraxinus excelsior	12	1	300		Radius: 3.6m. Area: 41 sq m.	4	3	3	3	Young	Good	Low	lots of ivy cover	B2
T24	Tree	Plane, London	Platanus x hispanica		1	400		Radius: 4.8m. Area: 72 sq m.	3	2	2	2	Fair	Fair		small elder and hawthorn also immediately adjacent RPA estimated due to unsafe position to take a measurement	C
T25	Tree	Ash, Common	Fraxinus excelsior	12	1	600		Radius: 7.2m. Area: 163 sq m.	5	5	5	5	Semi Mature	Good	Low		B2
T26	Tree	Plane, London	Platanus x hispanica		1	800		Radius: 9.6m. Area: 290 sq m.						Good		DBH estimated as location is in private garden	A2
T27	Tree	Plane, London	Platanus x hispanica	12	1	570		Radius: 6.8m. Area: 145 sq m.	4	4	4	4	Semi Mature	Good			B2
T28	Tree	Maple, Silver	Acer saccharinum		6		250, 250, 250, 250, 250, 300,	Radius: 7.6m. Area: 181 sq m.					Young	Good		DBH estimated due to location on private land	B2
T29	Tree	Hawthorn, Common	Crataegus monogyna		1	300		Radius: 3.6m. Area: 41 sq m.					Semi Mature	Good		DBH estimated due to location on private land	C
G30	Group	Group, mixed species	Group, mixed species		1			Area: 213.77 sq m.						Good		cherry, elder	C
T31	Tree	Lime, European	Tilia x europaea	6	1	120		Radius: 1.4m. Area: 6 sq m.	1.5	1.5	1.5	1.5	Young	Good			B2
T32	Tree	Lime, European	Tilia x europaea	6	1	210		Radius: 2.5m. Area: 20 sq m.	2	2	2	2	Young	Good			B2

Reference	Structure	Common Name	Botanical Name	Height (m)	Num. Stems	Stem Diam (mm)	Multiple Stem diam (mm)	RPA	North	East	South	West	Life Stage	Structural Cond	Bat Habitat	General Observations	Retention Category
T33	Tree	Cherry, wild	Prunus avium		1	210		Radius: 2.5m. Area: 20 sq m.					Young	Good		DBH estimated due to location on private land	B2
T34	Tree	Lime, European	Tilia x europaea		1	180		Radius: 2.2m. Area: 15 sq m.					Young	Good		DBH estimated due to location on private land	B2
T35	Tree	Lime, European	Tilia x europaea	5	1	200		Radius: 2.4m. Area: 18 sq m.					Young	Good		DBH estimated due to location on private land	B2
T36	Tree	Not identified	Not identified		1	310		Radius: 3.7m. Area: 43 sq m.	2	2	2	2		Good			C
T37	Tree	Not identified	Not identified		1		80, 220	Radius: 2.8m. Area: 25 sq m.	2	2	2	2		Good			C
T38	Tree	Not identified	Not identified		1	330		Radius: 4.0m. Area: 50 sq m.	2	2	2	2		Good			C
T40	Tree	Apple	Malus sp.	5	1	180		Radius: 2.2m. Area: 15 sq m.					Young	Good		DBH estimated due to location on private land	C
T41	Tree	Lime, European	Tilia x europaea		1	120		Radius: 1.4m. Area: 6 sq m.	1.5	1.5	1.5	1.5	Young	Good			B
T42	Tree	Lime, European	Tilia x europaea	5	1	210		Radius: 2.5m. Area: 20 sq m.	1.5	1.5	1.5	1.5	Young	Good			B

Appendix C

Tree Constraints Plan



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KEY:

- T8 CATEGORY A
- T11 CATEGORY B
- T9 CATEGORY C
- T3 CATEGORY U

T = SINGLE TREE
 G = GROUP OF TREES

REV	DESCRIPTION	IC	CMG	JGD	CMG	29.01.20
A	FOR INFORMATION					

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P.F. Project Nr: 102963
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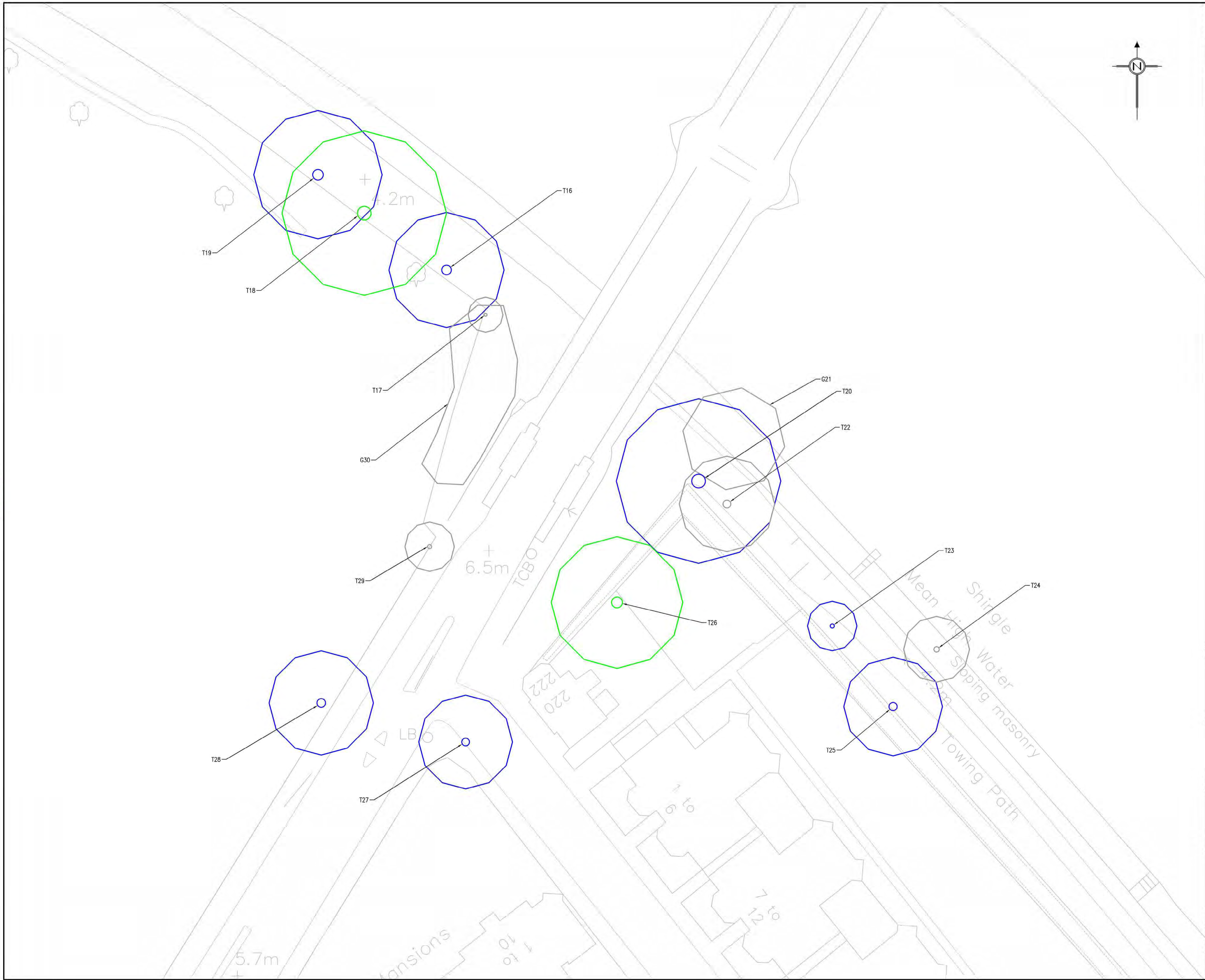
Client Project Nr: -
 Client Project Title: -

TEMPORARY PEDESTRIAN AND CYCLE BRIDGE

TREE CONSTRAINTS PLAN SHEET 1 OF 2

Drawn	Name	Date	Scale	1:250	Size
IC	IC	29.01.20			A1
Designed	CMG	29.01.20	File No.	102963-PEF-BAS-ZZZ-DRG-EN-10000.dwg	
Checked	JGD	29.01.20	Drawing Status	FOR INFORMATION	
Approved	CMG	29.01.20			

Drawing No. 102963-PEF-BAS-ZZZ-DRG-EN10000
 Revision A



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KEY:

- T8 CATEGORY A
 - T1 CATEGORY B
 - T9 CATEGORY C
 - T3 CATEGORY U
- T = SINGLE TREE
 G = GROUP OF TREES

A	FOR INFORMATION	IC	CMG	JGD	CMG	29.01.20
REV	DESCRIPTION	DRN	DES	CHK	APP	DATE

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 Architect/Client/Contractor



Client Project Nr: -
 Client Project Title: -

Project
TEMPORARY PEDESTRIAN AND CYCLE BRIDGE

Drawing Title
TREE CONSTRAINTS PLAN SHEET 2 OF 2

	Name	Date	Scale	1:250	Size
Drawn	IC	29.01.20			A1
Designed	CMG	29.01.20	File No.	102963-PEF-BAS-ZZZ-DRG-EN-10001.dwg	
Checked	JGD	29.01.20	Drawing Status	FOR INFORMATION	
Approved	CMG	29.01.20			

Drawing No. 102963-PEF-BAS-ZZZ-DRG-EN10001
 Revision A