

Landmark Trees

ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR:

Cox's Walk Footbridge

Sydenham Hill Wood

Sydenham

London

INSTRUCTING PARTY:

Save the Footbridge Oaks Campaign

REPORT PREPARED BY

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Ref: SFO/CWF/AIA/01b

Date: 23rd June 2020

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PART 1: MAIN TEXT

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DOCUMENT HISTORY

Revision	Status	Comments	Date
Rev 0	Approved		19/05/20
Rev A	Approved	Amended following client comments	15/6/20
Rev B	Approved	Amended following client comments	23/6/20

1. SUMMARY

- 1.1 This report relates to the proposed repair works to the Cox's Walk footbridge within Sydenham Hill Woods. The proposals for the repair currently adopted by the London Borough of Southwark require the removal of 2 oak trees standing either side of the bridge's western abutment. This report considers a third-party design that would allow the retention of the trees.
- 1.2 The subject trees are both mature English oaks independently assessed as being of high and moderate quality. The trees form part of an Ancient Semi-Natural Woodland. The London Borough of Southwark has already granted planning permission for proposals that require the removal of the trees.
- 1.3 The report has assessed the impacts of the third-party design and concludes that whilst there are some modest Root Protection Area* (RPA) encroachments that could not be avoided in the design of the scheme, it nonetheless allows for the retention of the subject trees and is therefore of significantly less impact than the London Borough of Southwark's preferred option. The report has demonstrated that the trees can remain viable and that the area lost to encroachment can be compensated for elsewhere, contiguous with the RPA; the report also proposes a series of mitigation measures to minimise impact to the trees. Net impacts are assessed therefore as being low.
- 1.4 Notwithstanding the above assurances, the report sets out a series of recommendations prior and during construction that will ensure impacts to trees are minimised. These are detailed in sections 5.2 and 7 of this report.
- 1.5 In conclusion, the proposal, through following the above recommendations, will very limited impact on the existing trees and is therefore recommended above the London Borough of Southwark's currently preferred option.

* British Standards Institute: Trees in relation to design, demolition and construction BS 5837: 2012 HMSO, London

2. INTRODUCTION

2.1 Terms of Reference

- 2.1.1 This Arboricultural Impact Assessment report has been prepared by Landmark Trees (LT) on behalf of the Save the Footbridge Oaks Campaign, to support a representation made to the London Borough of Southwark ('LBS').
- 2.1.2 The representation relates to the submission of an alternative design for the repair of the Cox's Walk footbridge which would allow for the retention of 2 oak trees standing at its west abutment.
- 2.1.3 As Landmark Trees' (LT) arboricultural consultant, I visited the site on the 12th of May 2020, in order to confirm the findings of the previous third-party survey.

2.2 Information Supplied

- 2.2.1 I have been provided with, and rely on the following documents:
- INDEPENDENT CONSULTING ENGINEERS TECHNICAL ADVISERS Proposed bridge design drawings 001_GENERAL ARRANGEMENTS_P2, 002_ELEVATON_P2, 003_DETAILS_P2 and 004_3D VIEWS_P2** upon which the assessments made herein are based
- ConwayAECOM Technical Note 60493385-C0347-TEC-0003-0** which details the revised design proposals for the rebuilding of the bridge which includes **AECOM Arboricultural Technical Note 60493385** which assesses the 2 oak trees, implications upon them of works within their RPAs and potential protection methods required

2.3 Background Information

- 2.3.1 The LBS website states that the *“Cox’s Walk footbridge was built around 1865, so that people could cross over the railway line which is in a cutting beneath. The bridge was fully restored to its original design, using teak and iron, in 1906. The railway line was decommissioned in 1954, and the bridge subsequently fell into disrepair.”* It also states that *“Cox’s Walk footpath and the bridge form part of the formal adopted public highway network”*. LBS comment that this means they *“have a formal legal duty to keep the footbridge open as far as reasonably practicable whilst allowing for our duty of ensuring the public are kept safe.”*
- 2.3.2 In 2018, LBS identified the footbridge as being in a hazardous condition due to there being a risk of failure of the abutments at either end. A further inspection identified additional safety issues with the bridge’s timber parapets and handrails with these issues in combination with the defective supporting walls leading to the closure of the bridge.
- 2.3.3 I understand that LBS initially proposed a design for the repair of the bridge that necessitated the removal of the 2 oak trees standing either side of the western abutment. These proposals met with considerable resistance from the community and LBS subsequently commissioned ConwayAECOM to undertake design of the remedial measures necessary that allowed for the retention of the trees. This process was cognisant of the findings of the AECOM Arboricultural Technical Note which classified one tree as being of high quality as per BS5837: 2012 and the other as being of moderate quality and employed the CAVAT system to value the trees, recording a figure in excess of £240,000 for them both. Notwithstanding the findings of the Arboricultural Technical Note, the ConwayAECOM report recommended a design that requires the removal of the oak trees.
- 2.3.4 The Save the Footbridge Oaks Campaign was subsequently approached by an independent engineer who provided a design for the rebuilding of the bridge which allowed for the retention of the trees, it is this design that this report will assess.

3.0 SITE CHARACTERISTICS

3.1 Property Description & Planning Context



Photograph 1: Cox's Walk Footbridge

- | | |
|-------|---|
| 3.1.1 | The bridge is located within Sydenham Hill Wood and provides pedestrian access across the railway cutting beneath. |
| 3.1.2 | We are not aware of the existence of any Tree Preservation Orders, but understand the site stands within the Dulwich Wood Conservation Area, which will affect the subject trees: it is a criminal offence to prune, damage or fell such trees without permission from the local authority. DEFRA's Magic mapping system indicates that the woodland either side of the cutting is classified as Ancient Semi-Natural Woodland. |
| 3.1.4 | Relevant local planning policies comprise Policy 7.21 of the London Plan 2016 and Strategic Policy 11 'Open Spaces and Wildlife' of the Core Strategy, saved policies 3.1 'Environmental Effects', 3.2 'Protection of amenity', 3.13 'Urban design', 3.16 'Conservation areas' and 3.28 'Biodiversity' of The Southwark Plan [UDP] 2007. |
| 3.1.5 | The London Borough of Southwark has granted consent to remove the subject trees under planning permission 18/AP/4034. |

3.2 Subject Trees

- 3.2.1 Both subject trees are English oaks (*Quercus robur*). I would concur with the findings of the AECOM Arboricultural Technical Note with regard to their quality and that document's assessment of their age.
- 3.2.2 During my site visit I observed that each tree's gross buttress architecture and visible rooting was predominantly away from the existing abutment (see Photographs below). This would correspond with the relative age of the structure and trees and indicates that the area beneath the existing abutment is not being used significantly by either tree.



Photograph 2: Root architecture trending away from abutment with surface root running parallel to it



Photograph 3: Root architecture again trending away from abutment

4.0 DEVELOPMENT CONSTRAINTS

4.1 Primary Constraints

- 4.1.1 A tree's primary constraint on development is the physical space it occupies or requires above and below ground on a given site both now and in the future. With regard to root spread, 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.
- 4.1.2 In this instance, the bridge, and by extension any repair works, are so close to the subject trees, it is clear they are within the relative RPA's, or rather the notional radius of that RPA, based on a circular protection zone. The prescribed radius is 12-x stem diameter at 1.5m above ground level, except where composite formulae are used in the case of multi-stemmed trees.
- 4.1.3 Circular RPA's are appropriate for individual specimen trees grown freely, but where there is ground disturbance, the morphology of the RPA can be modified to an alternative polygon, as shown in the diagram below (Figure 2). Alternatively, one need principally remember that RPA's are area-based and not linear – notional rather than fixed entities.

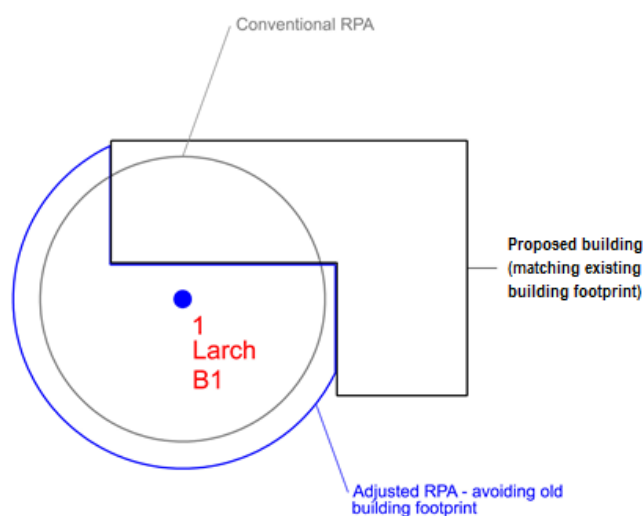


Figure 3– Generic BS 5837 RPA Adjustments (for fictitious site)

- 4.1.4 In BS5837, paragraph 4.6.2 states that RPA's should reflect the morphology and disposition of the roots; where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area should be produced. Modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution.

4.1.5 **No *a priori* modifications have been made in this instance, though our working hypothesis is that the soil beneath the existing abutments is not a priority area to protect.**

4.1.6 In addition to these quantitative assessments, the quality of trees should also be a consideration: Category U trees are discounted from the planning process in view of their limited service life. Again, Category C trees would not normally prevent development individually, unless they provide some particular (screening) function. Nonetheless, they remain material constraints.

4.1.7 Only moderate quality trees and above are significant material constraints on development. This, in this instance, the quality of the subject trees means that they should have posed significant constraints in planning terms. The Ancient Semi-Natural Woodland designation further increases the constraints the trees pose.

5.0 ARBORICULTURAL IMPLICATIONS

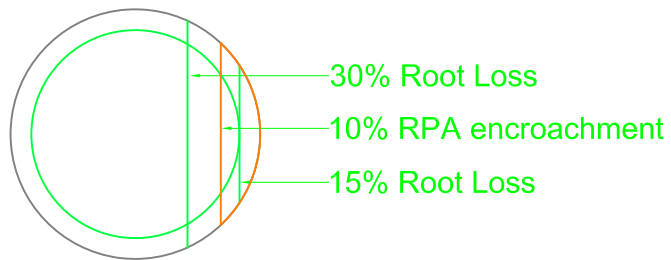
5.1 Rating of Primary Impacts

5.1.1 The design provided to the Save the Footbridge Oaks Campaign proposes to replace the western abutment with 2 reinforced concrete ground beams supported by 76mm diameter screw piles. These ground beams are located entirely within the footprint of the existing abutment with flexibility of pile placement incorporated into the design. This means that only excavation of the abutment's backfill is required and given my previous observations on the root morphology of both trees, is highly unlikely to encounter roots significant to the health or stability of either tree. The use of narrow diameter screw piles that can be flexibly located further reduces the potential impact to the trees.

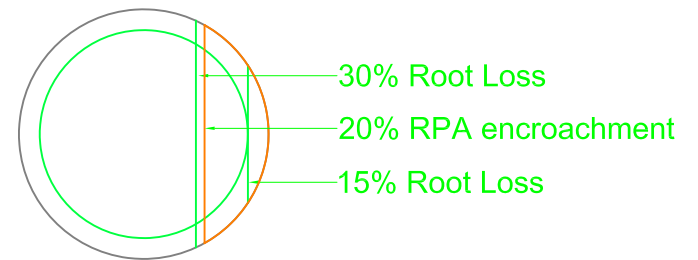
5.1.2 In our view, the trees are of a species, age and condition sufficient to remain viable in the circumstances, given that the area lost to encroachment can be compensated for elsewhere, contiguous with the RPA, and provided the series of mitigation measures outlined below are followed to both reduce the immediate impact of working methods and to reduce loading on the trees' roots. Supervision and monitoring of such measures will also be essential. Subject to these provisos the net impacts are assessed as being low.

5.1.3 There is no set RPA encroachment that is immediately permissible. However, at para 5.3.a of BS5837, the project arboriculturist is charged with demonstrating that the trees will remain viable in the instance of RPA encroachment. Whilst there is little research on RPA encroachment itself, there have been various commonly cited studies of root severance (see overleaf). Whilst the RPA is not coextensive with the wider root system, one can make some correlations after Thomas (2014): in average (sic) conditions, a straight line tangential with a tree's canopy would transect 15% of the root system, for another mid-way to the trunk that figure would be 30%. In the current case, **the impacts are more discrete and would therefore be considerably below the lower of these two parameters**. There is no precise correlation between % RPA and root impairment or loss. However, in our experience, most RPA tend to exceed the free-grown canopy spread a little (c. x 1.2 -1.5), suggesting by reference to both Thomas and Fig. 5a - 5c overleaf, RPA encroachments marginally understate the percentage root loss. The informal 20% RPA threshold may equate to c. 30% root loss, and 10% RPA encroachment to c. 20% root loss. The assumptions made here are relatively crude and apply more to open grown trees but are nonetheless illustrative.

RPA: 5m



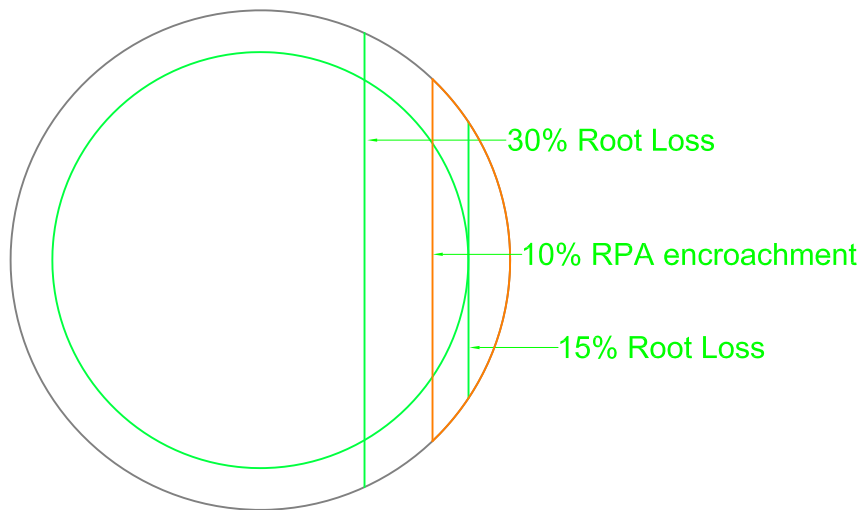
Area 7.98 sq.m. (10.0%)



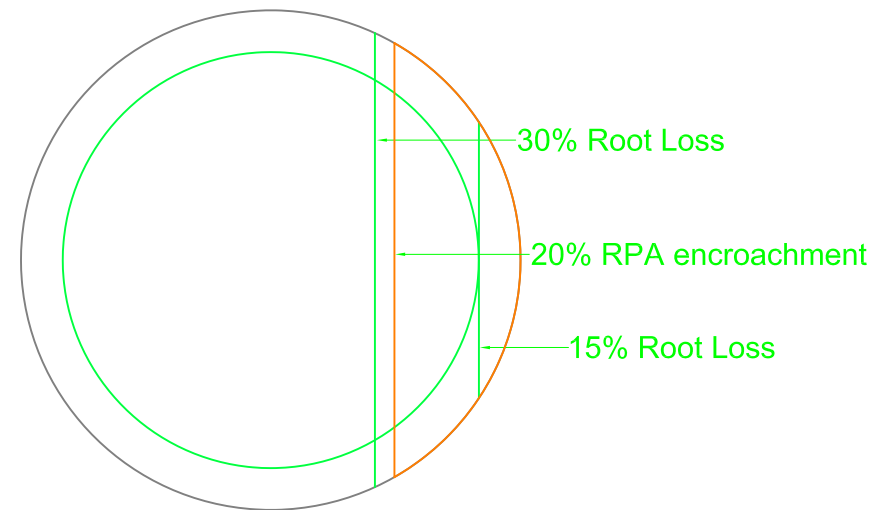
Area 15.96 sq.m. (20.0%)

Figure 5a: approximate correlation between RPA encroachment and actual root loss on a free-grown tree of 5m RPA radius (after Thomas (2014))

RPA: 10m



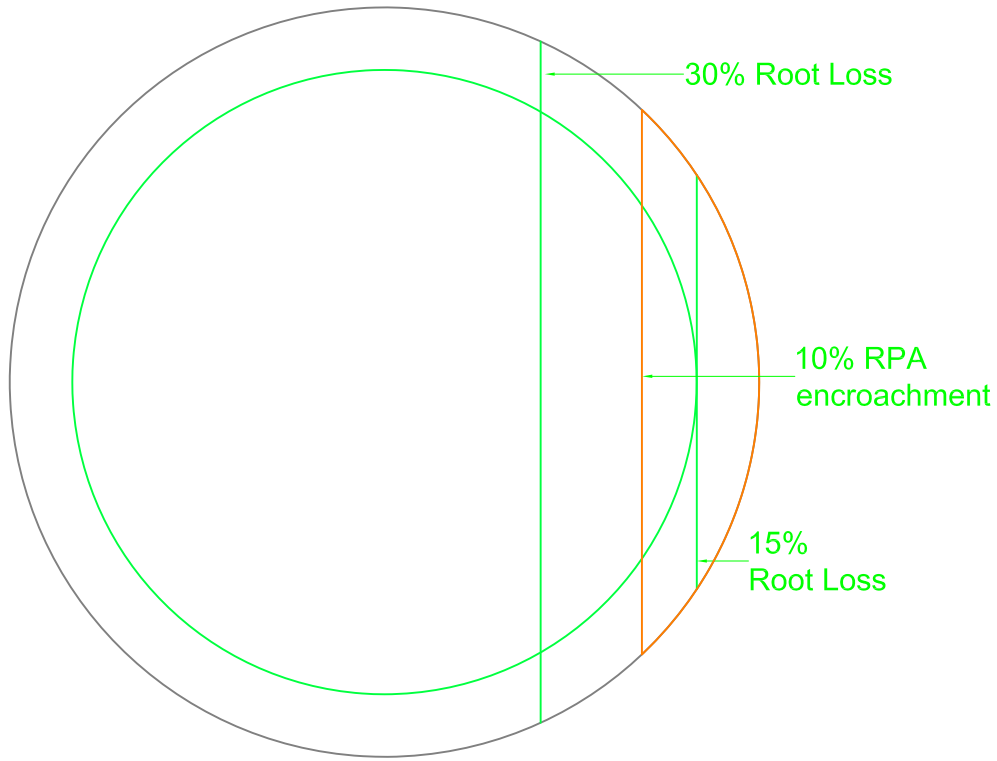
Area 31.17 sq.m. (10.0%)



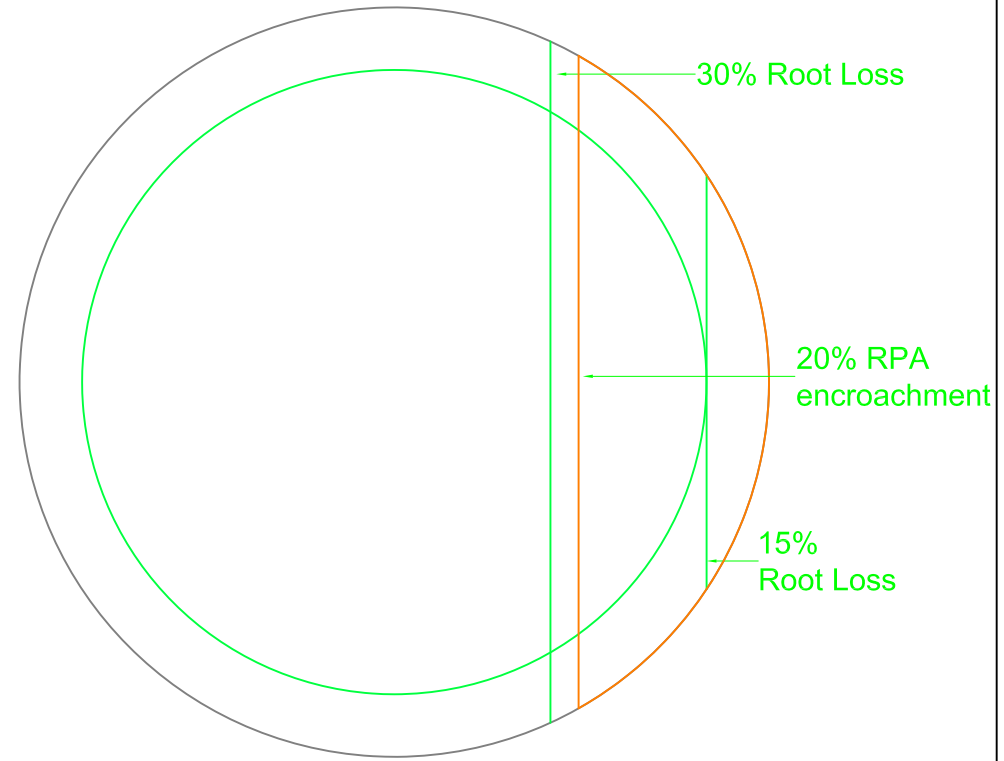
Area 62.33 sq.m. (20%)

Figure 5b: approximate correlation between RPA encroachment and actual root loss on a free-grown tree of 10m RPA radius (after Thomas (2014))

RPA: 15m



Area 70.7 sq.m. (10.0%)



Area 141.4 sq.m. (20.0%)

Figure 5c: approximate correlation between RPA encroachment and actual root loss on a free-grown tree of 15m RPA radius (after Thomas (2014))

- 5.1.4 Published references suggest healthy trees tolerating up to 30-50% root severance in general (Coder, Helliwell and Watson in CEH 2006). **“In practice 50% of roots can sometimes be removed with little problem**, provided there are vigorous roots elsewhere. Inevitably, this degree of root loss will temporarily slow canopy growth and even lead to some dieback” (Thomas 2014). Clearly, it is not the purpose of this report to sanction impacts to test a tree’s physiological tolerance, where the guidance recommends the avoidance of impact / RPA encroachment as the default position. However, it has not proved possible at the design stage to avoid such encroachment altogether, and in that regard, the project arboriculturalist has determined that the retained trees can remain viable in the scheme before planning.
- 5.1.5 The trees in question are healthy specimens of species with a good resistance to development impacts, and of an age quite capable of tolerating these limited impacts. Nor do the site characteristics suggest specific soil anomalies (e.g. heavy clay) having a bearing on such considerations, provided appropriate measures (e.g. ground protection) are taken.
- 5.1.6 As per BS5837 recommendations (at 5.3.a), the above assessment demonstrates that the trees can remain viable and it is self-evident that the area(s) lost to encroachment can be compensated for elsewhere.

5.2 Mitigation of Impacts

5.2.1 All plant and vehicles engaged in demolition works should run on a temporary surface designed to protect the underlying soil structure. The demolition of the abutment be undertaken using hand held tools only.

5.2.2 As a purely preventative measure, carrying out a modest (in the region of 2m) crown reduction to both trees would further reduce any impact of the design assessed herein.

5.2.3 The limits of excavation within RPAs will be undertaken manually; any roots encountered will be cleanly pruned back to an appropriate junction with a sharp pruning saw or secateurs. Roots larger than 25mm diameter may only be cut in consultation with an arboriculturalist.

6.0 CONCLUSION

- 6.1 The potential impacts of this design are significantly lower than ConwayAECOM's preferred design as it allows for the retention of trees standing within an Ancient Semi-Natural Woodland. Whilst the retention of the trees means there are RPA encroachments, these are of a low level. The report has demonstrated as per BS5837 paragraph 5.3.1 (a) that the trees can remain viable and that the area lost to encroachment can be compensated for elsewhere, contiguous with its RPA; the report also proposes as per paragraph 5.3.1 (b) a series of mitigation measures to minimise impacts to the trees.
- 6.2 The full potential of the impacts can thus be largely mitigated through design and precautionary measures. These measures can be elaborated in Method Statements in the discharge of planning conditions.
- 6.3 The species affected are generally tolerant of root disturbance / crown reduction and the retained trees are generally in good health and capable of sustaining these reduced impacts.
- 6.4 Therefore, the proposals will not have any significant impact on either the retained trees or wider landscape thereby allowing LBS to comply with Policy 7.21 of the London Plan 2016 and Strategic Policy 11 'Open Spaces and Wildlife' of the Core Strategy, saved policies 3.1 'Environmental Effects', 3.2 'Protection of amenity', 3.13 'Urban design', 3.16 'Conservation areas' and 3.28 'Biodiversity' of The Southwark Plan [UDP] 2007. Thus, with suitable mitigation and supervision the scheme is recommended to planning.

7.0 RECOMMENDATIONS

7.1 Specific Recommendations

- 7.1.1 Both trees should be reduced in height and radial spread be approximately 2m in line with good arboricultural practice by a suitably competent and insured contractor.
- 7.1.2 Excavation and construction impacts within the RPA's of the subject trees will need to be controlled by method statements specifying mitigation methods suggested above and by consultant supervision as necessary. These method statements can be provided as part of the discharge of conditions.

7.2 General Recommendations for Sites Being Developed with Trees

- 7.2.1 Any trees which are in close proximity to the proposed development should be protected with a Tree Protection Barrier (TPB). Protective barrier fencing should be installed immediately following the completion of the tree works, remaining in situ for the entire duration of the development unless otherwise agreed in writing by the Council. It should be appropriate for the intensity and proximity of the development, usually comprising steel, mesh panels 2.4m in height ('Heras') and should be mounted on a scaffolding frame (shown in Fig 2 of BS5837:2012). The position of the TPB can be shown on plan as part of the discharge of conditions, once the layout is agreed with the planning authority. The TPB should be erected prior to commencement of works, remain in its original form on-site for the duration of works and be removed only upon full completion of works.
- 7.2.2 The use of heavy plant machinery for building demolition, removal of imported materials and grading of surfaces should take place in one operation. The necessary machinery should be located above the existing grade level and work away from any retained trees. This will ensure that any spoil is removed from the RPAs. It is vital that the original soil level is not lowered as this is likely to cause damage to the shallow root systems.
- 7.2.3 Any pruning works must be in accordance with British Standard 3998:2010 Tree work [BS3998].
- 7.2.4 Numerous site activities are potentially damaging to trees e.g. parking, material storage, the use of plant machinery and all other sources of soil compaction. In operating plant, particular care is required to ensure that the operational arcs of excavation and lifting machinery, including their loads, do not physically damage trees when in use.

- 7.2.5 To enable the successful integration of the proposal with the retained trees, the following points will need to be taken into account:
- 1) Schedule of tree protection measures, including the management of harmful substances.
 - 2) Method statements for constructional variations regarding tree proximity (e.g. foundations, surfacing and scaffolding).
 - 3) Site logistics plan to include storage, plant parking/stationing and materials handling.
 - 4) Tree works: felling, required pruning and new planting. All works must be carried out by a competent arborist in accordance with BS3998.
 - 5) Site supervision: the Site Agent must be nominated to be responsible for all day-to-day arboricultural matters on site. This person must:
 - be present on site for the majority of the time;
 - be aware of the arboricultural responsibilities;
 - have the authority to stop work causing, or may cause harm to any tree;
 - ensure all site operatives are aware of their responsibilities to the trees on site and the consequences of a failure to observe these responsibilities;
 - arrange with the retained arboricultural consultant an initial pre-start briefing to inspect tree protection measures and agree a schedule of monitoring thereof on an initial monthly basis to be reviewed over the duration of works.
 - give advance notice (ideally 2 weeks) to retained arboricultural consultant to arrange for supervision of any excavation (especially for services and foundations) within RPA
 - make immediate contact with the local authority and/or a retained arboricultural consultant in the event of any tree related problems occurring.
- 7.2.6 These points can be resolved and approved through consultation with the planning authority via their Arboricultural Officer.
- 7.2.7 The sequence of works should be as follows:
- i) initial tree works: felling, stump grinding and pruning for working clearances;
 - ii) installation of TPB for demolition & construction;
 - iii) installation of ground protection;
 - iv) main construction;
 - vi) removal of TPB;
 - vii) soft landscaping.

8.0 COMPLIANCE: Trees and the Planning System

8.1 Under the UK planning system, local authorities have a statutory duty to consider the protection and planting of trees when granting planning permission for proposed development. The potential effect of development on trees, whether statutorily protected (e.g. by a tree preservation order or by their inclusion within a conservation area) or not, is a material consideration that is taken into account in dealing with planning applications. Where trees are statutorily protected, it is important to contact the local planning authority and follow the appropriate procedures before undertaking any works that might affect the protected trees.

8.2 The nature and level of detail of information required to enable a local planning authority to properly consider the implications and effects of development proposals varies between stages and in relation to what is proposed. Table B.1 provides advice to both developers and local authorities on an appropriate amount of information. The term “minimum detail” is intended to reflect information that local authorities are expected to seek, whilst the term “additional information” identifies further details that might reasonably be sought, especially where any construction is proposed within the RPA.

8.3 This report delivers information appropriate to a full planning application and to these specific proposals as per BS5837 Table B.1 below, providing both minimum details and further additional material in the form of general tree protection recommendations and constructional variation.

Table B.1 Delivery of tree-related information into the planning system

Stage of process	Minimum detail	Additional information
Pre-application	Tree survey	Tree retention/removal plan (draft)
Planning application	Tree survey (in the absence of pre-application discussions) Tree retention/removal plan (finalized) Retained trees and RPAs shown on proposed layout Strategic hard and soft landscape design, including species and location of new tree planting Arboricultural impact assessment	Existing and proposed finished levels Tree protection plan Arboricultural method statement – heads of terms Details for all special engineering within the RPA and other relevant construction details
Reserved matters/ planning conditions	Alignment of utility apparatus (including drainage), where outside the RPA or where installed using a trenchless method Dimensioned tree protection plan Arboricultural method statement – detailed Schedule of works to retained trees, e.g. access facilitation pruning Detailed hard and soft landscape design	Arboricultural site monitoring schedule Tree and landscape management plan Post-construction remedial works Landscape maintenance schedule

9.0 REFERENCES

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Landmark Trees

Caveats

This report is primarily an arboricultural report. Whilst comments relating to matters involving built structures or soil data may appear, any opinion thus expressed should be viewed as qualified, and confirmation from an appropriately qualified professional sought. Such points are usually clearly identified within the body of the report. It is not a full safety survey or subsidence risk assessment survey. These services can be provided but a further fee would be payable. Where matters of tree condition with a safety implication are noted during a survey they will of course appear in the report.

A tree survey is generally considered invalid in planning terms after 2 years, but changes in tree condition may occur at any time, particularly after acute (e.g. storm events) or prolonged (e.g. drought) environmental stresses or injuries (e.g. root severance). Routine surveys at different times of the year and within two - three years of each other (subject to the incidence of the above stresses) are recommended for the health and safety management of trees remote from highways or busy access routes. Annual surveys are recommended for the latter.

Tree works recommendations are found in the Appendices to this report. It is assumed, unless otherwise stated ("ASAP" or "Option to") that all husbandry recommendations will be carried out within 6 months of the report's first issue. Clearly, works required to facilitate development will not be required if the application is shelved or refused. However, necessary husbandry work should not be shelved with the application and should be brought to the attention of the person responsible, by the applicant, if different. Under the Occupiers Liability Act of 1957, the owner (or his agent) of a tree is charged with the due care of protecting persons and property from foreseeable damage and injury.' He is responsible for damage and/or nuisance arising from all parts of the tree, including roots and branches, regardless of the property on which they occur. He also has a duty under The Health and Safety at Work Act 1974 to provide a safe place of work, during construction. Tree works should only be carried out with local authority consent, where applicable.

Inherent in a tree survey is assessment of the risk associated with trees close to people and their property. Most human activities involve a degree of risk, such risks being commonly accepted if the associated benefits are perceived to be commensurate.

Risks associated with trees tend to increase with the age of the trees concerned, but so do many of the benefits. It will be appreciated, and deemed to be accepted by the client, that the formulation of recommendations for all management of trees will be guided by the cost-benefit analysis (in terms of amenity), of tree work that would remove all risk of tree related damage.

Prior to the commencement of any tree works, an ecological assessment of specific trees may be required to ascertain whether protected species (e.g. bats, badgers and invertebrates etc.) may be affected