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Godwin & Crowndale Estate / Arboricultural Survey and Impact Assessment / **Report for London Borough of**

Godwin & Crowndale Estate

Arboricultural Survey and Impact Assessment

Report for London Borough of Camden

Job Number	8102		
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Executive Summary

Arbeco was commissioned by the London Borough of Camden to undertake a ground level survey of trees that could be affected by and to produce an Arboricultural Impact Assessment for future works associated with the development of land at Godwin & Crowndale Estate. A qualitative assessment of each tree was carried out according to British Standard BS 5837:2012, Trees in Relation to Design, Demolition and Construction– Recommendations, focusing on arboricultural values (categories A1, B1, C1)[1] and landscape values (categories A2, B2, C3)[2].

The main findings of the survey are as follows:

- There were 39 individual trees in and adjacent to the proposed development site, each described in Appendix 1 of this report.
- Of the trees surveyed, a total of three individuals were attributed Category A status, 22 individuals were attributed Category B status, 13 individuals were attributed Category C status and one individual was attributed Category U status.
- A tree constraints check was carried out with the London Borough of Camden and it was confirmed that no trees located adjacent to or in the proposed development site were subject to Tree Preservation Order or Conservation Area restrictions.
- Root protection areas were calculated in accordance with BS 5837:2012 for each of the surveyed trees and ranged from 6.5m^2 to 587.9m^2 for T18 and T6 respectively.
- Of the trees surveyed, a total of four individuals will require removal to facilitate the proposed development.
- Of the trees to be removed, one individual was attributed Category A status, two individuals were attributed Category B status and one individual was attributed Category C status.
- Any work to trees should consider the potential presence of protected species, including breeding birds and roosting bats. Any relevant ecological reports pertaining to the site should be consulted prior to the commencement of works.

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1 Categorisation grading in accordance with BS 5837 2012. Trees suitable for retention: - Category A. Trees of high quality with an estimated remaining life expectancy of at least 40 years.
Category B. Trees of moderate quality with an estimated life expectancy of at least 20 years.
Category C. Trees of low quality with an estimated remaining life expectancy of at least 10 years or young trees with a stem diameter below 150mm.
Category U. Trees of very low quality normally with a life expectancy of less than 10 years or requiring immediate removal due to health and safety concerns.

2 British Standard BS 5837 2012 recommends that these categories may be further broken down into sub categories A1 A2 A3 pertaining to Arboricultural, Landscape or Cultural values respectively.

1 Introduction

BACKGROUND

1.1 Arbeco was commissioned on 19 February 2019 by the London Borough of Camden to carry out an arboricultural survey of trees at Godwin & Crowndale Estate and provide a report to inform future design proposals and tree protection. The survey is required to assess the condition of trees that could be affected by future development of the site and provide sufficient information for the development of site layouts and construction exclusion zones to enable the protection of existing trees.

SCOPE OF REPORT

1.2 This report has been produced in accordance with British Standard BS 5837:2012 Trees in Relation to Design, Demolition and Construction – Recommendations (hereafter referred to as BS 5837:2012). It provides information on the current condition of trees at the site, their suitability for retention, and the above and below ground constraints to development.

1.3 Any clear flaws or hazards have been identified in the Schedule of Trees provided in Appendix 1. Preliminary recommendations for the management of retained trees are provided, but a full hazard risk assessment comprising a more comprehensive analysis of tree condition and potential risk to target areas is beyond the scope of this report. Any recommendations relating to the management of potentially hazardous trees should be carried out as soon as possible[3].

SITE CONTEXT AND STATUS

1.4 The site is situated in the London Borough of Camden, 140m west of Goldington Crescent Gardens and 300m east of Mornington Crescent tube station. The site comprises the external areas of the Godwin & Crowndale Estate and measures 1.3ha in extent. The site's northern boundary is formed by Crowndale Road, with commercial

[3] All tree works should be undertaken by a suitably qualified Arboricultural Contractor. No arboricultural works to trees subject to planning constraints shall be carried out without the written consent of the relevant Local Planning Authority (LPA). Any proposed tree works should be undertaken in accordance with British Standard BS 3998:2010 Treework - Recommendations. Works to trees that are the subject of a Tree Preservation Order or within a Conservation Area which are deemed to be dangerous under Regulation 14 of the Town and Country Planning (England) (Regulations) 2012 may under certain circumstances be undertaken without needing to seek the prior written consent of the LPA.

buildings to the east, Charlton Street to the south and Oakley Square to the west. The Ordnance Survey National Grid reference for the centre of the site is TQ 29484 83419.

DESCRIPTION OF THE PROPOSALS

1.5 The proposals comprise the construction of a new residential housing block and the redesign of the existing garden areas with the addition of an outdoor play area and gym area.

2 Methodology

TREE SURVEY

2.1 The tree survey was conducted in accordance with BS 5837:2012 the results of which are presented in the Schedule of Trees (Appendix 1) and include a sequential numbering of each tree, species listed by common name; tree dimensions including overall height, canopy spreads measured against the cardinal compass points; crown height; age class; physiological condition; structural condition, life expectancy; root protection areas and preliminary management advice.

2.2 Each tree has been assigned a category grade in accordance with BS 5837:2012 categories A, B, C and U ranging from high to low quality. Definitions of tree quality are provided in Table 2 Appendix 1.

2.3 For the purposes of this report, arboricultural as well as landscape sub-categories have been used in the Schedule of Trees. BS 5837:2012 points out that each sub-category should be given equal weighting when grading trees against these criteria.

2.4 A tree constraints plan is presented in Appendix 2 showing the recommended root protection areas (RPA) for all surveyed trees and highlighting each grading category using the colour key system as described in BS 5837:2012.

2.5 The site was visited on 8 March 2019, weather conditions were dry and sunny. All trees likely to be affected by works inside the red line boundary of the site were visually assessed using the Visual Tree Assessment Method (VTA) (Mattheck and Beloer, 1994).

2.6 Stem diameters were measured using diameter tape. Canopy spreads were estimated by pacing and where possible, verified using a laser range finder. Height measurements were taken using a laser clinometer.

2.7 Formal assessments of topography, drainage, service conduits and soil conditions including specific laboratory investigations of soil properties (i.e. plasticity index, moisture content, suction pressure) were not undertaken and are beyond the scope of this report.

DESK STUDY

2.8 A tree constraints check was undertaken by contacting the Camden Council Tree Officer to search for Tree Preservation Order and Conservation Area restrictions to tree works in and adjacent to the site.

SUPPORTING DOCUMENTS

2.9 Drawing Reference: *J18464_01* (Spatial Dimensions, 2019) and *LUC-LD-SKE-190322A* (LUC, 2019) were provided for the purposes of compiling this report. They include the layout of existing site features and a footprint overlay of the proposed development.

PERSONNEL

2.10 The tree survey was carried out by Alex Page Level 3 National Cert in Forestry and Arboriculture, an arboriculturalist with over 10 years' experience in the industry.

2.11 This report was written by Stefan Harrison BSc (Hons), TechArborA, an Assistant Arboricultural Consultant with over 3 years' experience writing arboricultural reports and conducting arboricultural surveys.

LIMITATIONS

2.12 Only preliminary recommendations for tree management are provided. A full hazard risk assessment comprising a more comprehensive analysis of the condition and potential risk to target areas is beyond the scope of this report.

2.13 The trees were inspected at ground level and no decay detection equipment was used. There is therefore a risk that any internal decay that may be present has gone undetected.

2.14 One of the trees surveyed T2, was situated in an area where access to the main stem was not possible. As such, assumptions have been made relating to dimensions of the main stem, and the overall condition is based upon the visible parts of the tree only.

2.15 Trees are living organisms and their health and condition change with time. Therefore, this assessment remains valid for 12 months from the date of inspection, or until a severe storm is experienced, after which time a new inspection is required. For the purpose of this report, a severe storm is defined as a period of violent weather, involving rain, hail, wind, snow, lightning or any combination of these, likely to cause damage to trees.

3 Results

TREE SURVEY

3.1 The results of the tree survey are provided in the Schedule of Trees in Appendix 1. A Tree Constraints Plan illustrating the BS 5837:2012 categories of each tree, their crown spread and RPA is presented in Appendix 2.

3.2 The survey recorded 39 individual trees which could potentially be affected by future development. These comprised: common ash *Fraxinus excelsior*, common hawthorn *Crataegus monogyna*, common lilac *Syringa vulgaris*, common walnut *Juglans regia*, common whitebeam S*orbus aria*, crab apple *Malus sylvestris*, crack willow *Salix fragilis*, false acacia *Robinia pseudoacacia*, Italian alder *Alnus cordata*, London plane *Platanus* x *acerifolia*, Norway maple *Acer platanoides*, silver birch *Betula pendula*, silver maple *Acer saccharinum*, small leaved lime *Tilia cordata*, sycamore *Acer pseudoplatanus* and wild cherry *Prunus avium*.

3.3 The numbers of each species are provided in Table 1 below.

Table 1: Species key and site frequency for trees potentially affected by development

Species	Frequency
Common ash	2
Common hawthorn	1
Common lilac	1
Common walnut	1
Common whitebeam	1
Crab apple	2
Crack willow	1
False acacia	1
Italian alder	3
London plane	10
Norway maple	1
Silver birch	4

Table 1: Species key and site frequency for trees potentially affected by development

Species	Frequency
Silver maple	3
Small leaved lime	1
Sycamore	5
Wild cherry	2

3.4 Physiological and structural condition[4] of the majority of surveyed trees was consistent with Category B status (22 individuals), with three individuals assigned Category A status, 13 individuals assigned Category C status and one individual assigned Category U status.

3.5 Of the trees surveyed, a total of 28 individuals were classified to be at a mature life stage[5], eight individuals were classified as early mature and three individuals were classified as semi mature. No trees were found to be in the young and over mature classifications.

3.6 A summary of the number of trees surveyed corresponding to BS 5837:2012 tree quality assessment definitions is provided below in Table 2 below.

Table 2: Grade Classifications

BS 5837:2012 Grades A to U	Trees attributed to each grade	Frequency
A	T1, T6, T25	3
B	T2, T4, T7, T13, T14, T15, T16, T17, T19, T20, T21, T23, T24, T26, T27, T28, T29, T30, T32, T34, T36, T39	22
C	T3, T5, T8, T9, T11, T12, T18, T22, T31, T33, T35, T37, T38	13

4 Physiological and structural condition are terms used to differentiate between a trees physiological condition i.e. annual growth, vigour, presence of disease etc. as opposed to structural condition relating to branch formation, mechanical strength and integrity.

5 Young. Establishing; usually with good vigour, but as of limited significance within the landscape.
Semi-Mature. Established; normally vigorous and increasing in height. Of increasing landscape significance.
Early Mature. Fully established trees around the middle half of their life span retaining good vigour. Not yet achieved full height and retaining apical dominance.
Mature. Fully established trees retaining moderate vigour. Apical dominance lost but crown still spreading.
Over Mature. Fully mature trees in the last quarter of their usual life expectancy; vigour declining.

Table 2: Grade Classifications

BS 5837:2012 Grades A to U	Trees attributed to each grade	Frequency
U	T10	1

3.7 All Category A and B trees, as described in Table 2, should be given priority consideration for retention in any future development, which should take full account of above and below ground constraints, as shown on the Tree Constraints Plan (Appendix 2).

3.8 A summary of the condition and value of the most noteworthy trees is provided below, based on information presented in Appendix 1.

- London plane T1, was situated on the southern boundary of the site, 106m south of the northern site boundary and 72m north-east of the south-west corner of the site. The tree was mature, was 20m in height, had a single stem with a stem diameter of 1000m and a maximum canopy radius extending 12m to the south. The tree's roots were lifting the curb stone of the pavement to the north. Despite this, the tree appeared to be in good structural and physiological condition, requiring no immediate remedial works. The tree was awarded Category A status due to the high amenity value associated with the tree's condition, size and prominent location.
- Silver birch T2, was situated 8m north of the southern site boundary, 107m south of the northern site boundary and 43m east of the western site boundary. The tree was semi mature, was 10m in height, had a single stem with a stem diameter of 300mm and a maximum canopy radius extending 6m to the north. Access to the base of the tree was restricted. Despite this, the visible parts of the tree appeared to be in fair structural condition and good physiological condition, requiring no immediate remedial works. The tree was awarded Category B status due to the considerable amenity value associated with the tree's condition and prominent location.
- London plane T6, was situated 7m north of the southern site boundary, 31m east of the western site boundary and 117m south of the northern site boundary. The tree was mature, was 22m in height, had a single stem with a stem diameter of 1140mm and a maximum canopy radius extending 14m to the north. The soil around the base of the tree was stripped back and the tree had prominent buttress roots. Despite this, the tree appeared to be in good structural and physiological

condition, requiring no immediate remedial works. The tree was awarded Category A status due to the high amenity value associated with the tree's condition, size and prominent location.

- Sycamore T7, was situated 7m east of the western site boundary, 15m north of the site southern site boundary and 100m south of the north-west corner of the site. The tree was mature, was 16.5m in height, had a single stem with a diameter of 635mm and a maximum canopy radius extending 8m to the east and west. The tree appeared to be in fair structural and physiological condition, requiring no immediate remedial works. The tree was attributed Category B status due to the considerable amenity value associated with the tree's condition and prominent location.
- Crab apple T14, was situated on the northern boundary of the site, 54m north-east of the north-western corner of the site and 103m north of the southern boundary of the site. The tree was mature, was 8m in height, had a single stem with a stem diameter of 400mm and a maximum canopy radius extending 6m to the north and the east. The tree appeared to be in good structural and physiological condition, requiring no immediate remedial works. The tree was attributed Category B status due to the considerable amenity value associated with the tree's condition and prominent location.
- London plane T25, was situated 29m north of the southern site boundary, 65m east of the western site boundary and 70m south of the northern site boundary. The tree was mature, was 22m in height, had a single stem with a diameter of 840mm and a maximum canopy radius extending 8m to the south. The tree's canopy had been historically reduced and there was a minor occluded cavity 2m from ground level on the south-west side of the tree's stem. However, the tree appeared overall to be in good structural and physiological condition, requiring no immediate remedial works. The tree was attributed Category A status due to the high amenity value associated with the tree's condition, size and prominent location.
- London plane T30, was situated 33m south-east of the north-western corner of the site, 22m west of the eastern site boundary and 89m north of the southern site boundary. The tree was mature, was 20.5m in height, had a single stem with a diameter of 720mm and a maximum canopy radius extending 13m to the east. The tree had a moderate lean to the south-east and a significant large cavity on the northern side of the stem. Notwithstanding this, the tree appeared to be in fair structural condition and good physiological condition. The tree was attributed

Category B status due to the considerable amenity value associated with the tree's condition and prominent location.

- London plane T32, was situated 55m south-east of the north-western corner of the site and 26m south of T30. The tree was mature, was 19.5m in height, had a single stem with a diameter of 630mm and a maximum canopy radius extending 12m to the east and west. The tree had been historically reduced and had a surface root on the southern side of the base, extending 2.5m. The tree appeared to be in good structural and physiological condition, requiring no immediate remedial works. The tree was attributed Category B status due to the considerable amenity value associated with the tree's condition and prominent location.
- Common ash T34, was situated 27m south of the northern site boundary and 28m west of the eastern site boundary. The tree was mature, was 22m in height, had a single stem with a diameter of 560mm and a maximum canopy radius extending 10m to the east. The tree had a minor lean to the east and had an occluded wound on the western side of its stem, 1m above ground level. The tree appeared to be in fair structural and physiological condition, requiring no immediate remedial works. The tree was attributed Category B status due to the considerable amenity value associated with the tree's condition and prominent location.

DESK STUDY

3.9 It was confirmed that no trees situated in or adjacent to the site were subject to Tree Preservation Order or Conservation Area restrictions.

3.10 Based on Drawing Reference: *LUC-LD-SKE-190322A* (LUC, 2019) received from the client on the 26 March 2019, the impact of the proposal on the existing trees has been assessed and all trees that will potentially be affected by the development are listed below in Table 3. Tree numbers in the table correspond to the Schedule of Trees in Appendix 1 and Tree Constraints Plan described in Appendix 2.

Table 3: Summary of trees possibly affected by the development

Impact	Reason	BS Cat A	BS Cat B	BS Cat C
Trees to be removed	Located within development footprint	T25	T26, T27	T22
Trees which could sustain damage to RPA	Installation of hardstanding	T1	T21, T23, T28, T30, T32	T31
	Installation of foundations	T1	T21	-
	Soil compaction through construction traffic access	T1	T21, T23, T28, T30, T32	T31
Trees which could sustain damage to stem or canopy	Impact by construction traffic	T1	T20, T21, T23, T28, T30, T32	T31
Trees to be pruned	Access facilitation	T1	T20, T21, T23, T30, T32	T31
	Canopy within building line.	T1	T21, T23	-

Tree removal and pruning

3.11 Based on the design proposal, a total of four individuals will require removal to facilitate development works.

3.12 Of the trees to be removed, one individual was attributed Category A status, two individuals were attributed Category B status and one individual was attributed Category C status.

3.13 The proposed building line will encroach into the northern canopy extents of T1, the south-western canopy extents of T21 and the southern canopy extents of T23. All three trees will require minor pruning of lateral branches in order to facilitate construction.

3.14 Trees T1, T20, T21, T23, T30, T31 and T32 will require the crown lifting of their canopies to facilitate construction traffic access.

3.15 Specific pruning details are provided in Section 4 of this report.

Trees which could potentially sustain damage to stem, canopy or RPA.

3.16 Development proposals have the potential to indirectly impact the stem, canopy or RPAs of eight trees scheduled for retention, as displayed in Table 3. In order to ensure that these features are successfully retained during the proposed works, recommendations for tree protection have been provided in Section 4 of this report.

3.17 Tree T1 is situated directly adjacent to the southern site boundary and the south west corner of the proposed building. There is the potential for the tree to sustain damage to its stem and canopy from impact by construction traffic. There is also the potential for soil compaction from construction traffic access within the tree's RPA.

3.18 Tree T20 is situated adjacent to the eastern end of the proposed building and there is the potential for the tree to sustain damage to its stem and canopy from impact by construction traffic.

3.19 Tree T21 is situated directly adjacent to the north-east corner of the proposed building. There is the potential for the tree to sustain damage to its stem and canopy from impact by construction traffic. There is also the potential for soil compaction from construction traffic access within the tree's RPA.

3.20 Tree T23 is situated directly adjacent to the northern end of the proposed building. There is the potential for the tree to sustain damage to its stem and canopy from impact by construction traffic. There is also the potential for soil compaction from construction traffic access within the tree's RPA.

3.21 Tree T28 is situated on the eastern side of the site of the proposed play area and outdoor gym. There is the potential for the tree to sustain damage to its stem and canopy from

impact by construction traffic. There is also the potential for soil compaction from construction traffic access within the tree's RPA.

3.22 Trees T30, T31 and T32 are situated on the western side of the site of the proposed play area and outdoor gym. There is the potential for the trees to sustain damage to their stems and canopies from impact by construction traffic. There is also the potential for soil compaction from construction traffic access within the trees' RPAs.

Incursions into RPA of trees effected by the development proposal.

3.23 The proposed development will encroach into the RPAs of seven trees to be retained, as displayed in Table 4 below.

Table 4: Proposed incursions in RPAs of trees to be retained.

Tree ID	Activity	Total RPA (m^2)	Area of incursion (m^2)	Area of Incursion (%)
T1	Hardstanding	452.4	26.9	5.9
T1	Foundation	452.4	8.5	1.9
T21	Hardstanding	68.8	9.9	14.4
T21	Foundation	68.8	1.6	2.3
T23	Hardstanding	221.7	40.4	18.2
T23	Foundation	221.7	6.5	2.9
T28	Hardstanding	254.5	80.0	31.4
T30	Hardstanding	234.5	0.9	0.4
T31	Hardstanding	141.9	7.4	5.2
T32	Hardstanding	179.6	39.3	21.9

3.24 The incursion by the foundations of the proposed residential block inside the RPA of T1 was calculated to be 1.9% of the total RPA. The incursion by the proposed hardstanding inside the RPA of T1 was calculated to be 5.9% of the total RPA, this added to the incursion of the foundations equals a total incursion of 7.8% of the total RPA. This RPA incursion is unlikely to impact the health of the tree and as such, specialist root protection measures for the RPA of T1 will not be required.

3.25 The incursion by the foundations of the proposed residential block inside the RPA of T21 was calculated to be 2.3% of the total RPA. The incursion by the proposed hardstanding inside the RPA of T21 was calculated to be 14.4% of the total RPA, this added to the incursion of the foundations means a total incursion of 16.7% of the total RPA. This RPA incursion is likely to impact the health of the tree and as such, specialist root protection measures for the RPA of T21 will be required.

3.26 The incursion by the proposed hardstanding inside the RPA of T23 was calculated to be 18.2% of the total RPA. The incursion by the foundations of the proposed residential block inside the RPA of T1 was calculated to be 2.9% of the total RPA, this added to the incursion of the hardstanding equals a total incursion of 21.1% of the total RPA. This RPA incursion is likely to impact the health of the tree and as such specialist root protection measures for the RPA of T23 will be required.

3.27 The incursion by the proposed hardstanding inside the RPA of T28 was calculated to be 31.4% of the total RPA. This RPA incursion is likely to impact the health of the tree and as such, the RPA of T28 will require specialist root protection measures.

3.28 The incursions by the proposed hardstanding into the RPAs of T30 and T31 were calculated to be 0.4% and 5.2% of the total RPAs respectively. These RPA incursions are unlikely to impact the health of the trees and as such, the RPAs of the trees will not require specialist root protection measures.

3.29 The incursion by the proposed hardstanding inside the RPA of T32 was calculated to be 21.9% of the total RPA. This RPA incursion is likely to impact the health of the tree and as such, the RPA of T32 will require specialist root protection measures.

Impact on visual amenity and local character

3.30 Tree T25 was attributed Category A status. Without appropriate mitigation, as recommended in section 4 of this report, its removal would represent a significant impact on local visual amenity.

3.31 Trees T26 and T27 were both attributed Category B status. Without appropriate mitigation, as recommended in section 4 of this report, their removal would represent a considerable impact on local visual amenity.

3.32 While tree T22 was attributed Category C status and therefore considered to be of low visual amenity value, it is understood that the proposed landscaping scheme will address the minor loss to visual amenity as a result of its removal.

4 Recommendations

TREE WORKS

4.1 The following tree pruning, and removal operations should be undertaken prior to the commencement of demolition works in order to facilitate access for development.

- Trees T22, T25, T26 and T27 should be removed.
- T1 should have its canopy raised to a height of 6m and have the lateral branches in its northern canopy quadrant reduced by 3m.
- T38 should have the lateral branches in its southern canopy quadrant shortened in length by 1m.
- T45 should have the lateral branches in its northern canopy quadrant shortened in length by 1m.

4.2 Although not specifically required for the purposes of evaluating design proposals and layouts, preliminary recommendations for tree management are provided below. These recommendations should be undertaken independently of recommendations for demolition and construction works, in order to ensure the ongoing safety of students and staff utilising the site.

- Further evaluation and a full hazard risk assessment of trees T11, T16, T17, T19, T26, T27, T28, T30 and T33 should be undertaken, to establish the extent of decay, weakness or defects present, if it is progressive and whether immediate intervention such as canopy reduction or removal are necessary.
- T5 should have its canopy reduced by 1m on all side to reduce the stress on the stem.
- T10 should be removed to prevent further damage to the retaining wall.
- T31 should have its two leading branches removed and have its cable brace replaced by a dynamic cable bracing system (cobra or equivalent). The installation of the system should be assessed and undertaken by a trained and competent arboricultural contractor.
- T36 should have the deadwood in its canopy removed due to health and safety concerns.

4.3 All tree works should give due consideration to the potential presence of protected species, including breeding birds and roosting bats. Any relevant ecological reports pertaining to the site should be consulted prior to the commencement of works.

4.4 Arisings from tree works (e.g. wood piles and standing dead trunks) can provide valuable habitats for wildlife. As such, consideration should be given to their retention on site in areas unlikely to cause issues to public health and safety.

4.5 All tree pruning should be carefully planned and undertaken in accordance with *BS 3998: 2010 Recommendation for Tree Works*.

4.6 Any recommendations highlighting the management of potentially hazardous trees should be reviewed as soon as is practically possible[3].

MITIGATION

4.7 It is recommended that a scheme of soft landscaping is submitted, including tree planting details which address the potential loss of visual public amenity, where tree removal is unavoidable. The tree selection should be appropriate to the site and chosen from a species palette in accordance with local tree planting policies and in accordance with any recommendations provided in the PEA and any subsequent ecology reports.

4.8 The design of any new planting and landscaping proposals should be based upon a soil analysis which considers PH values and any nutrient deficiencies or imbalances

4.9 The planting detail should be considered and planned at an early stage of the design process and feed into the wider landscape design proposal. Ideally, species selected should be native and/or of proven ecological value.

4.10 Often the need for future remedial pruning or tree removal can be avoided through careful species selection and planning during the design of the mitigation planting scheme.

4.11 The positioning of mitigation planting in relation to new or existing buildings should take full account of the final canopy height and spread of all trees included in the planting scheme. Buildings should ideally be located a sufficient distance from the predicted canopy line and RPA to avoid future pressure to undertake remedial pruning or tree removal.

ISSUES FOR THE ARBORICULTURAL METHOD STATEMENT

4.12 The incursions by the proposed new hardstanding into the RPAs of trees T21, T23, T28 and T32 have the potential to significantly impact the structural or physiological condition of the trees. As such, the construction of new surfaces inside the RPAs of these trees should comprise a build-up of a porous, load bearing cellular confinement system (Cellweb or equivalent). It is recommended that the system is constructed to an engineered specification and is included as part of an Arboricultural Method Statement drafted by a qualified Arboricultural Consultant.

4.13 In order to minimise disturbance in the RPAs of retained trees, excavation into the soil or soil regrading should not be a requirement of finalised construction layouts, existing levels should remain intact and should be protected from overloading to prevent soil compaction.

4.14 Protective fencing should be installed in accordance with figure 2 of BS 5837:2012 to enable the safe retention of trees to be retained. The positioning of tree protection and the establishment of construction exclusion zones (CEZ) should initially be based upon the root protection areas as described in Appendix 1 and should be in place prior to the commencement of works.

4.15 All works should be undertaken from outside the RPA wherever possible. Where working in an RPA is unavoidable, ground protective measures fully compliant with section 6.2 of BS 5837: 2012 and agreed by the consulting arboriculturalist should be used.

References

British Standard Institute (BSI) (2012). *BS 5837:2012 Trees in Relation to Design Demolition and Construction-Recommendations*. BSI, London.

British Standard Institute (BSI) (2010). *BS 3998:2010 Recommendation for Tree Works*. BSI, London.

British Standard Institute (BSI) (2014). *BS 8545:2014 Trees: from nursery to independence in the landscape – Recommendations*. BSI, London.

Department for Communities and Local Government (2014). *Planning Practice Guidance on Tree Preservation Orders and trees in conservation areas.*

Lonsdale, D. (1999). *Research for Amenity Trees No.7: Principles of Tree Hazard Assessment and Management*. HMSO

LUC (2019). *LUC-LD-SKE-190322A*

Mattheck and Beloer (1994). HMSO London. Research for Amenity Trees No 4; *The Body Language of Trees.*

Spatial Dimensions (2019). *J18464_01*

Town and Country Planning Act 1990 (as amended).

Town and Country Planning (Tree Preservation) (England) Regulations 2012.

Appendix 1: Schedule of Trees

Table 1: Schedule of Trees and Tree Quality Assessment*

* See Table 3 for key to terms
** See Table 2 for definitions of categories

No	Species	Ht.	S	St. 1.5 m	Canopy Spread				Cr. Cl	Ls	SC	PC	Comments /Observation	Preliminary Management Advice	LE	Cat **	RPAm ^{2}	RPA *r*
					N	S	E	W										
T1	London plane	20	1	1000	10	12	10	9	3.5	M	Good	Good	Landmark tree, retention very desirable, root lifting curb stone to north.	No immediate remedial works.	40+	A1	452.4	12.0
T2	Silver birch	10	1	300	6	3	5	3	2	SM	Fair	Good	Access to base restricted in private amenity space.	No immediate remedial works.	10-20	B1	40.7	3.6
T3	Silver birch	10	1	230	4	2	4	5	4	EM	Fair	Fair	Suppressed by neighbours	No immediate remedial works.	10-20	C1	23.9	2.8
T4	Silver birch	13	1	300	5	8	8	4	3	EM	Fair	Good	Inclusion at first fork.	No immediate remedial works.	10-20	B1	40.7	3.6
T5	Common hawthorn	7.5	1	450	4	4	5	5	4	M	Poor	Good	Cavity at 1m on south side to north side.	Reduce canopy by 1m.	0-10	C1	91.6	5.4
T6	London plane	22	1	1140	14	9	7	7	3	M	Good	Good	Soil stripped around tree, prominent buttress, damage to nearby retaining walls.	No immediate remedial works.	40+	A2	587.9	13.7
T7	Sycamore	16.5	1	635	7	5	8	8	5	M	Fair	Fair	Codominant stem at 2m union good, located in fenced planting bed.	No immediate remedial works.	20-40	B1	182.4	7.6
T8	Sycamore	16.5	2	530; 530	4	5	8	8	5	M	Fair	Fair	Heavily topped.	No immediate remedial works.	10-20	C1	254.2	9.0
T9	Sycamore	16	1	500	7	0	8	8	5	M	Fair	Fair	Codominant at 2m inclusion on second fork, heavily topped.	No immediate remedial works.	10-20	C1	113.1	6.0

Table 1: Schedule of Trees and Tree Quality Assessment*

* See Table 3 for key to terms
** See Table 2 for definitions of categories

No	Species	Ht.	S	St. 1.5 m	Canopy Spread				Cr. Cl	Ls	SC	PC	Comments /Observation	Preliminary Management Advice	LE	Cat **	RPAm ^{2}	RPA *r*
					N	S	E	W										
T10	Sycamore	11.5	1	450	6	6	5	7	4	M	Good	Good	Tree roots compromising retaining wall, potential risk of failure into intersection.	Remove.	10-20	U	91.6	5.4
T11	Crab apple	5	1	300	3	3	3	3	2	M	Poor	Fair	Cavity at 1m close to retaining wall.	Hazard Risk Assessment.	0-10	C1	40.7	3.6
T12	Wild cherry	4.5	1	210	3	2	0	3	2	EM	Poor	Good	Signs of canker at first fork.	No immediate remedial works.	0-10	C1	20.0	2.5
T13	Wild cherry	6	1	370	5	3	3	4	3	M	Good	Good	-	No immediate remedial works.	20-40	B1	61.9	4.4
T14	Crab apple	8	1	400	6	5	6	5	3	M	Good	Good	-	No immediate remedial works.	10-20	B1	72.4	4.8
T15	Silver maple	18	1	570	9	7	10	3	1	M	Fair	Fair	Growing in tarmac some old root damage on north side.	No immediate remedial works.	10-20	B1	147.0	6.8
T16	Silver maple	16	1	540	1	5	9	2	6	M	Poor	Good	Growing in tarmac lifting root damage moulded over edge, cavity at 1m on north side significant.	Hazard Risk Assessment.	10-20	B1	131.9	6.5
T17	London plane	20	1	720	5	11	10	11	3	M	Poor	Good	Significant cavity at 2m on west side examine, large surface root to east lifting parking spaces.	Hazard Risk Assessment/ Decay Detection.	10-20	B2	234.5	8.6

Table 1: Schedule of Trees and Tree Quality Assessment*

* See Table 3 for key to terms
** See Table 2 for definitions of categories

No	Species	Ht.	S	St. 1.5 m	Canopy Spread				Cr. Cl	Ls	SC	PC	Comments /Observation	Preliminary Management Advice	LE	Cat **	RPAm ^{2}	RPA *r*
					N	S	E	W										
T18	Common Lilac	3	2	85; 85	1.5	1.5	1.5	1.5	1	M	Poor	Poor	-	No immediate remedial works.	0-10	C2	6.5	1.4
T19	Silver maple	17.5	1	750	5	8	4	7	5	M	Poor	Good	Significant cavity at 1m west side examine, in planting bed historic canopy reduction, lifting hardstanding and first fork cup shaped union with cavity below.	Hazard Risk Assessment/ Decay Detection.	10-20	B2	254.5	9.0
T20	Italian alder	12	1	395	5	6	5	4	3.5	EM	Fair	Good	Lean to south.	No immediate remedial works.	20-40	B1	70.6	4.7
T21	Italian alder	12.5	1	390	5	5	5	5	3.5	EM	Good	Good	-	No immediate remedial works.	20-40	B1	68.8	4.7
T22	Common ash	15	1	320	6	8	6	0	4.5	M	Fair	Fair	Minor deadwood in canopy stubs from previous reduction.	No immediate remedial works.	10-20	C1	46.3	3.8
T23	London plane	19	1	700	4	9	6	6	3.5	M	Good	Good	Historically reduced, minor lean to south, codominant canopy.	No immediate remedial works.	40+	B1	221.7	8.4
T24	Silver birch	16	1	240	4	4	4	4	3.5	EM	Good	Good	-	No immediate remedial works.	20-40	B2	26.1	2.9
T25	London plane	22	1	840	7	8	5	7	6	M	Good	Good	Minor occluded cavity on southwest 2m, historically reduced.	No immediate remedial works.	40+	A2	319.2	10.1
T26	Italian alder	21	1	450	5	8	9	3	2	M	Good	Good	Lean to south over school play area.	Hazard Risk Assessment.	20-40	B1	91.6	5.4

Table 1: Schedule of Trees and Tree Quality Assessment*

* See Table 3 for key to terms
** See Table 2 for definitions of categories

No	Species	Ht.	S	St. 1.5 m	Canopy Spread				Cr. Cl	Ls	SC	PC	Comments /Observation	Preliminary Management Advice	LE	Cat **	RPAm ^{2}	RPA *r*
					N	S	E	W										
T27	False acacia	16	1	370	5	5	4	5	3.5	M	Fair	Fair	Fault at 2.5m above ground, on south side.	Hazard Risk Assessment.	20-40	B1	61.9	4.4
T28	London plane	20.5	1	750	8	7	7	4	7	M	Fair	Good	Occluded cavity on western side of stem at 1m, trifurcated at 2.5m with bark inclusion, historically reduced.	Hazard Risk Assessment.	20-40	B2	254.5	9.0
T29	London plane	9.5	1	170	3	3	3	3	3	SM	Good	Good	-	No immediate remedial works.	40+	B1	13.1	2.0
T30	London plane	20.5	1	720	5	10	13	5	4	M	Fair	Good	Large significant cavity on north side, moderate lean to south-east.	Hazard Risk Assessment.	40+	B1	234.5	8.6
T31	London plane	17.5	1	560	5	5	7	4	4	M	Poor	Good	Due to poor cable bracing management, main leaders now ringbarking,	Re assess/adjust cable bracing.	10-20	C1	141.9	6.7
T32	London plane	19.5	1	630	8	10	12	12	3	M	Good	Good	Historically reduced, surface root to south extending 2.5m.	No immediate remedial works.	40+	B1	179.6	7.6
T33	Small leaved lime	14	1	510	4	6	4	6	5	M	Fair	Good	Previously reduced, cavity at 1m east side and minor root damage on north, central stem in upper canopy in decline.	Hazard Risk Assessment.	10-20	C1	117.7	6.1
T34	Common ash	22	1	560	6	8	10	4	4.5	M	Fair	Fair	Lean to east, occluded wound to west at 1m.	No immediate remedial works.	20-40	B2	141.9	6.7

Table 1: Schedule of Trees and Tree Quality Assessment*

* See Table 3 for key to terms
** See Table 2 for definitions of categories

No	Species	Ht.	S	St. 1.5 m	Canopy Spread				Cr. Cl	Ls	SC	PC	Comments /Observation	Preliminary Management Advice	LE	Cat **	RPAm ^{2}	RPA *r*
					N	S	E	W										
T35	Common whitebeam	9	1	250	5	3	3	5	2	EM	Fair	Good	Severe lean to west.	No immediate remedial works.	10-20	C1	28.3	3.0
T36	Norway maple	12	1	400	6	5	5	5	3.5	M	Good	Good	Moderate retained deadwood in canopy.	Remove deadwood.	40+	B1	72.4	4.8
T37	Common walnut	10	1	260	4	4	4	4	2	EM	Fair	Good	Grown into fence and lifting paving.	No immediate remedial works.	10-20	C2	30.6	3.1
T38	Crack willow	4.5	2	110; 110	1	1	2	2	2	SM	Poor	Fair	Located in planting bed.	No immediate remedial works.	0-10	C1	10.9	1.9
T39	Sycamore	20	1	600	7	7	7	7	4	M	Fair	Fair	Extensive surface roots to south, historically reduced.	No immediate remedial works.	20-40	B2	162.9	7.2

Table 2: BS: 5837 2012 Tree Quality Assessment Definitions

TREES FOR REMOVAL		
Category & Definition	**Criteria**	**Identification on Plan**
Category U Those in such a condition that they cannot realistically be retained as a living tree in the context of the current land use for longer than 10 years.	• Trees that have a serious, irremediable structural defect such that their early loss is expected due to collapse, including those that will become unviable after removal of other U category trees (i.e. Where for whatever reason the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant immediate or irreversible overall decline. • Trees infected with pathogens of significance to the health and or safety of other trees nearby by or very low quality trees suppressing adjacent trees of better quality.	RED

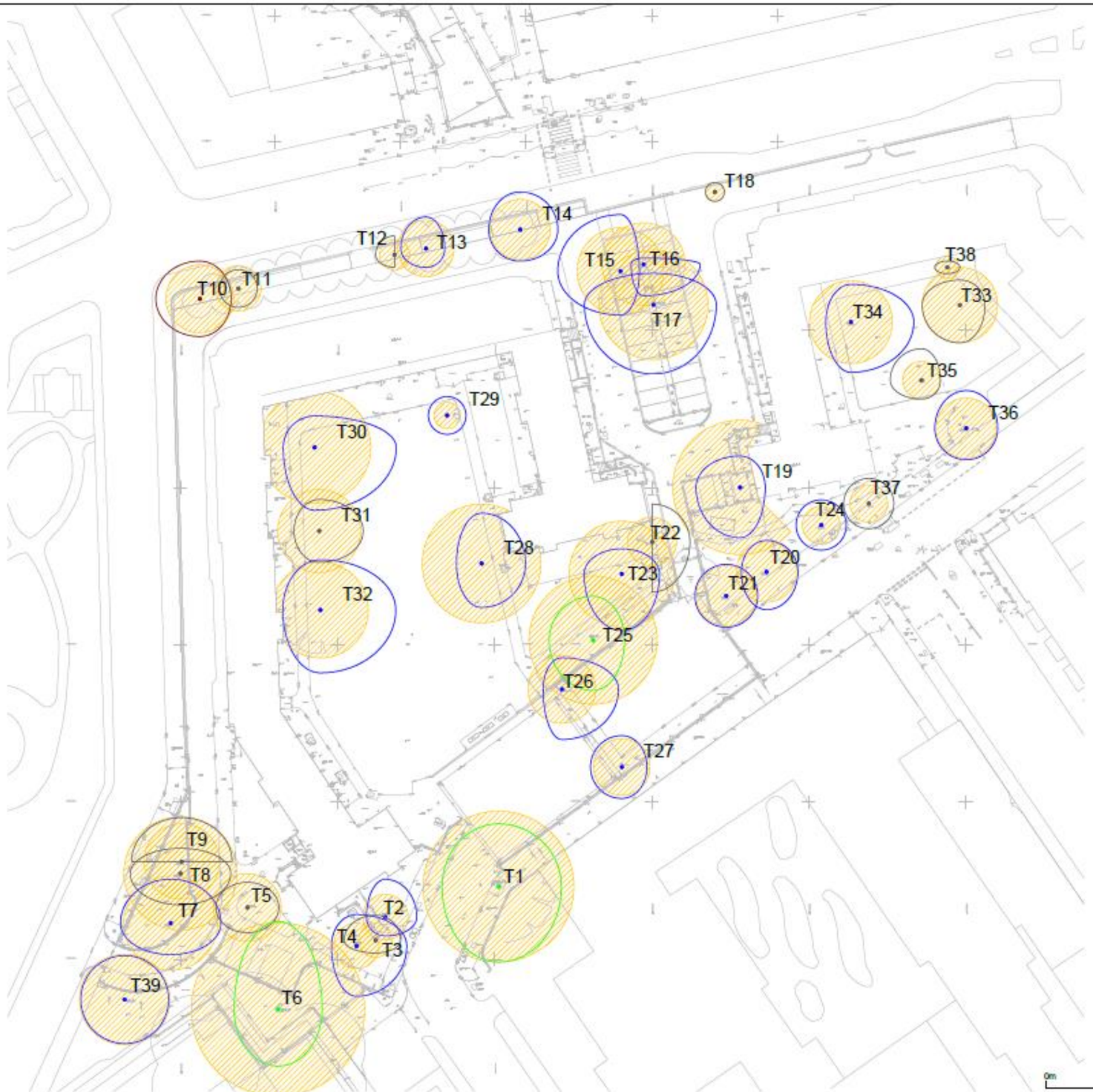
TREES TO BE CONSIDERED FOR RETENTION				
Category & Identification	**1 Mainly arboricultural values**	**2 Mainly landscape values**	**3 Mainly cultural values including conservation**	**Identification on plan**
Category A Trees of High Quality with an estimated remaining life expectancy of at least 40 years	Trees that are a particularly good example of their species, especially if rare or unusual, or essential components of groups or of formal or semi-formal arboricultural features e.g. the dominant and/or principal trees in an avenue)	Tree groups or woodlands of particular visual importance as arboricultural and/or landscape features.	Tree groups or woodlands of significant conservation historical, commemorative or other value (e.g. veteran trees or wood pasture)	GREEN
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.	Trees that might be included in the high category but are downgraded because of impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage).	Trees present in numbers, usually as groups or woodlands such that they attract a higher collective rating than they might as individuals: or trees occurring as collectives but situated so as to make little visual contribution to the wider locality.	Trees with material conservation or other cultural benefits.	BLUE

TREES TO BE CONSIDERED FOR RETENTION				
Category & Identification	**1 Mainly arboricultural values**	**2 Mainly landscape values**	**3 Mainly cultural values including conservation**	**Identification on plan**
Category C Trees of a low quality with an estimated remaining life expectancy of at least 10 years or young trees with a stem diameter below 150mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.	Trees present in groups or woodlands but without this conferring on them significantly greater landscape value and/or trees offering low or only temporary/transient landscape benefits.	Trees with no material conservation or other cultural benefits.	GREY

Table 3: Key Schedule of Trees

Column Heading	Explanation
Tree No	Sequential number corresponding to number on plan.
Species	English names.
Ht.	Height in metres.
S	Number of main stems.
St. 1.5 (Stem Diameter)	Stem diameter when measured in accordance with Annex C of BS 5837:2012.
NSEW	Crown radius in metres to cardinal points of the compass.
Cr. Cl. (Crown Clearance)	Height in metres between the ground and underside of canopy.
Ls.	Life stage definitions. Y= Young. SM = Semi-mature. EM = Early mature. M = Mature. OM = Over mature.
SC	Brief description of structural condition.
PC	Brief description of physiological condition.
Preliminary Advice	Preliminary tree works advice and recommendations.
LE	Estimated remaining useful life contribution in years. <10, 10+, 20+ and 40+ yr.
Cat. (Category)	Categorisation grading in accordance with BS 5837 2012. Trees suitable for retention: - Category A trees of high quality and amenity value. Category B trees of moderate quality and amenity value. Category C trees of low quality or amenity value. British Standards BS 5837:2012 recommends that these categories may be further broken down into sub-categories A1 A2 A3 pertaining to Arboricultural, Landscape or Cultural values respectively.
RPA m^2	Root Protection Area (RPA). Indicative area around a tree measured in m^2 and calculated in accordance with Annex C of BS 5837:2012 deemed to contain sufficient rooting volume to maintain the viability of a tree and where the protection of roots and soil structure is treated as a priority.
RPA *r*	Root Protection Area (RPA) radius calculation centred on the base of the tree and calculated in accordance with Annex C of BS 5837:2012

Appendix 2: Tree Constraints Plan



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Ecology, Tree & Habitat Services

Job title	Godwin & Crowndale Estate
Job no.	ET8102
Client	London Borough of Camden
Map title	Tree Constraints Plan
Section:	N/A
Scale (at A3)	1:650
Date of survey	08/03/2019
Surveyor	Alex Page

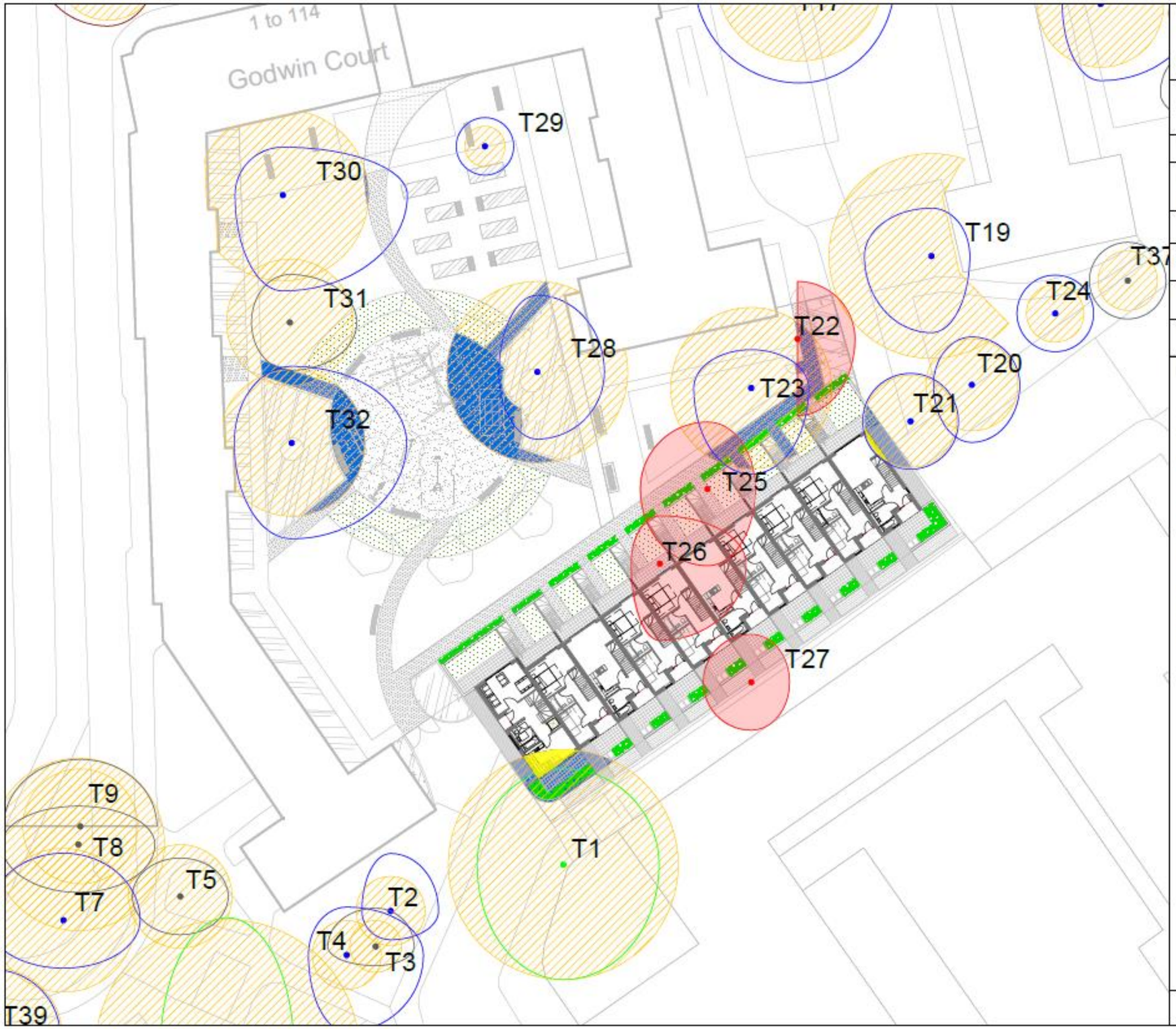
Drawn	Approved	Date
SH	JP	28/03/2019

Legend

- Crown spread of category C - Trees with lowality and value
- Crown spread of category B - Trees with moderate quality and value
- Crown spread of category A - Trees with high quality and value
- Crown spread of category U - Trees of poor quality
- Root Protection Area (RPA)

This plan is provided solely for the purpose of supporting the description of the arboricultural features of the site as contained in the accompanying report

Appendix 3: Tree Retention and Removal Plan



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Ecology, Tree & Habitat Services

Job title: Godwin & Crowndale Estate
Job no. ET8102

Client: London Borough of Camden

Map title: Tree Retention and Removal Plan

Section: N/A
Scale (at A3): 1:400

Date of survey: 08/03/2019

Surveyor: Alex Page

Drawn	Approved	Date
SH	JP	28/03/2019

Legend

- Crown spread of category C - Trees with lowality and value
- Crown spread of category B - Trees with moderate quality and value
- Crown spread of category A - Trees with high quality and value
- Crown spread of category U - Trees of poor quality
- Root Protection Area (RPA)
- Trees to be removed
- RPA Incursion (Building Foundation)
- RPA Incursion (Hardstanding)

This plan is provided solely for the purpose of supporting the description of the arboricultural features of the site as contained in the accompanying report

Appendix 4: Glossary of Terms

Glossary of Terms

Term	Explanation
Arboricultural Impact Assessment (AIA)	Evaluation of direct and indirect effects of a proposed design and/or construction.
Arboricultural Method Statement (AMS)	Methodology for the implementation of any aspect of development that is in the root protection area or has the potential to result in the loss of or damage to a tree to be retained.
Branch structure	Qualitative description of formation of main framework of limbs and branches.
Canopy face	Orientation of canopy relative to cardinal points of the compass
Canopy radius	A measurement taken from the centre of a tree to the furthest radial extension of tree canopy relative to the cardinal points of the compass.
Competent Person	Person who has training and experience relevant to the matter being addressed and an understanding of the requirements of the particular task being approached.
Conservation Area	Local Planning Authority special designation generally prohibiting tree works without 6 weeks prior written notification.
Construction Exclusion Zone (CEZ)	Area based upon the calculated root protection area prohibiting access.
Cavity	Open and exposed aperture where wood tissue has internally degraded.
Constraints check	Formal search of local authority records to determine legal and statutory constraints on tree works.
Crown lifting	Removal of lower branches to achieve a stated vertical clearance above ground level or another surface.
Crown reduction	Pruning of a trees canopy in both height and width.
Decay	Deterioration and breakdown of tree wood fibres resulting in structural and/or physiological dysfunction of a tree.
Dieback	Continual decline and death of wood tissue including twigs and branches.
Failure	Description of structural failure or wood fibres including fracture of branches, limbs and main stems.
Fork	Area or point of union between one or more limbs or branches.
Hazard Risk Assessment	Qualitative and quantitative appraisal of the potential for tree failure and the possible risk of harm or damage to persons or property.
Local Planning Authority	Body responsible for the administration of Statutory duties relating to Development Management.
Multi-stem	A single tree formed from 2 or more codominant main stems
Occlusion	Wood development enclosing an extant wound or pruning cut.
Pruning	The targeted removal of branches or limbs using saws or other tools.

Glossary of Terms

Term	Explanation
Physiological Condition	Observation relating to a trees physiology for example vigour, leaf area, growth rate, the presence of pests or disease.
Root Protection Area	Root Protection Area (RPA). Indicative area around a tree deemed to contain sufficient rooting volume to maintain the viability of a tree.
Shelter belt	A wind break normally made up of one or more trees planted in such a way to provide cover from the wind.
Structural Condition	Observation relating to a trees structural integrity and the presence of any physical defects.
Suppressed	Where a trees development has been influenced or effected by the presence of competing vegetation.
Tree Constraints Plan	A scaled plan indicating above and below ground constraints relating to the protection of trees
Tree Preservation Order	A legal order made by the local planning authority protecting specific trees in the interests of amenity.
Visual Tree Assessment (VTA)	A method of assessment based upon the research developed to recognise dynamic responses of a tree to its surroundings.
'V' Shaped Branch Union	The union point between two branches that have grown at a tight angle, forming the 'V' shape. This structure is inherently weaker than the 'U' shaped union.
'U' Shaped Branch Union	The union point between two branches that have grown at a wider angle, forming the 'U' shape. This structure is considered to be the strongest and most optimised shape that a union can form.

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