# Greengage

Tree Survey, Arboricultural Impact

Assessment and Arboricultural Method Statement





### QΑ

# Lincoln House - BS5837 Tree Survey, Arboricultural Impact Assessment and Arboricultural Method Statement

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### 1.0 EXECUTIVE SUMMARY

- 1.1 Greengage Environmental Ltd ('Greengage') was commissioned by Maizelands Limited & Arringford Limited to undertake an appraisal of trees at the Lincoln House site ("the Site"), in accordance with the BS5837:2012 Trees in relation to design, demolition and construction Recommendations.
- 1.2 A visit was made to the Site on the 15th November 2017. The crowns and stems were inspected from the ground using the 'Visual Tree Assessment' (VTA) method; no invasive techniques were used at this stage.
- 1.3 During the survey two individual offsite trees were recorded (adjacent to the site boundary), the details of which are given in the arboricultural data tables (Appendix 1.0).
- 1.4 The results of the survey, including the relevant BS5837 categorisation and calculated root protection areas (RPA's), are presented in the Tree Constraints Plan in Appendix 2.0.
- 1.5 An Arboricultural Impact Assessment (AIA) and Arboricultural Method Statement has subsequently been drawn up based on the identified constraints of the existing offsite trees on both the proposed development and its construction.



### 2.0 METHODOLOGY

### **Site Visit**

2.1 The survey was undertaken on 15<sup>th</sup> November 2017 during cold and cloudy conditions, with deciduous trees in mid-winter fall. A summary table of all the trees included in the Tree Schedule (detailing further information on each tree) is shown in Appendix 1.0.

### **Tree Categorisation**

- 2.2 Trees, tree groups and woodlands have been considered following evaluation into one of four categories (U, A, B, C) based on tree quality as outlined in British Standard 5837 (2012) which has been followed.
- 2.3 Categorisation of trees, following the British Standard, gives an indication as to the trees' importance in relation to the Site and the local landscape and also, the overall value and quality of the existing tree stock on Site. This allows for informed decisions to be made concerning which trees should be removed or retained, should development occur.
- 2.4 For a tree to qualify under any given category it should fall within the scope of that category's definition. In the categories A, B, C which collectively deal with trees that should be a material consideration in the development process, there are three subcategories which are intended to reflect arboricultural, landscape and cultural values respectively. Category U trees are those which would be lost in the short-term for reasons connected with their poor physiological or structural condition. They are, for this reason, not usually considered in the planning process.
- 2.5 In assigning trees to the A, B or C categories the presence of any serious disease or tree related hazards are taken into account. If the disease is considered fatal and / or irremediable, or likely to require sanitation for the protection of other trees it may be categorised as U, even if they are otherwise of considerable value.
- 2.6 **Category (A)** trees whose retention is most desirable and is of high quality and value. These trees are considered to be in such a condition as to be able to make a lasting contribution (a minimum of 40 years) and may comprise:
  - Trees which are particularly good examples of their species especially rare or unusual, or essential components of groups or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue);
  - Trees, groups or woodlands which provide a definite screening or softening effect
    to the locality in relation to views into or out of the Site, or those of particular
    visual importance (e.g. avenues or other arboricultural features assessed as
    groups); and



- Trees or groups or woodlands of significant conservation, historical, commemorative or other value (e.g. Veteran or wood-pasture trees).
- 2.7 **Category (B)** are trees whose retention is considered desirable and are of moderate quality and value. These trees are considered to be in such a condition as to make a significant contribution (a minimum of 20 years) and may comprise:
  - Trees that might be included in the high category but because of their numbers or slightly impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage), are downgraded in favour of the best individuals;
  - Trees present in numbers such that they form distinct landscape features and attract a higher collective rating than they would as individuals. Individually these trees are not essential components of formal or semi-formal arboricultural features, or trees situated mainly internally to the Site and have little visual impact beyond the Site; and
  - Trees with clearly identifiable conservation or other cultural benefits.
- 2.8 **Category (C)** are trees that could be retained and are considered to be of low quality and value. These trees are in an adequate condition to remain until new planting could be established (a minimum of ten years) or are young trees with a stem diameter below 150mm and may comprise:
  - Trees not qualifying 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 screening benefit; and
  - Trees with very limited conservation or other cultural benefits.
- 2.9 **Category (U)** trees for removal are those trees in such a condition that any existing value would be lost within 10 years and which should in the current context be removed for reasons of sound arboricultural management. Trees within this category are:
  - 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 category U trees;
  - Trees that are dead or are showing signs of significant, immediate or irreversible overall decline; and
  - Trees infected with pathogens of significance to the health and or/safety of other trees nearby trees or very low-quality trees suppressing adjacent trees of better quality.
- 2.10 Species have been recorded by common name and recorded as such in the Arboricultural Data Tables in Appendix 1.0. Height has been estimated in metres and stem diameters have been measured at 1.5 metres above ground level and recorded in millimetres.



Crown spreads have been measured in half metres and taken to the point of greatest spread unless the crown has presented a pronounced asymmetrical form and therefore measurements have been taken for the four cardinal points. The measurements have always been considered in the following sequence, North, East, South, and West, and therefore appear as such within the Arboricultural Data Tables.

- 2.11 In the assessment, particular consideration has been given to the following when deciding the most appropriate British Standard Category and Sub-Category allocation:
  - a. the health, vigour and condition of each tree;
  - b. the presence of any structural defects in each tree and its life expectancy;
  - c. the size and form of each tree and its suitability within the context of the proposed scheme; and
  - d. the location of each tree relative to existing site features, e.g. its value as a screen or as a skyline feature.

### **Age Class & Condition**

- 2.12 Age class is assessed according to the age class categories referred to in BS 5837.
  - Y: Young trees up to five years of age;
  - **SM:** Semi-mature trees less than 1/3 life expectancy;
  - **EM:** Early mature trees 1/3 2/3 life expectancy;
  - M: Mature trees over 2/3 life expectancy;
  - OM: Over mature declining or moribund trees of low vigour; and
  - **V:** Veteran characteristics have been noted where a tree exhibits certain distinctive features of veteran trees.
- 2.13 The overall condition of the tree, or group of trees, has been referred to as one of the following. A more detailed description of condition has been noted in the Arboricultural Data Tables and discussed in the Arboricultural Impact Assessment Report.
  - Good: A sound tree, trees, needing little, if any, attention;
  - **Fair:** A tree, trees, with minor but rectifiable defects or in the early stages of stress, from which it may recover;
  - **Poor:** A tree, trees, with major structural and physiological defects or stressed such that it would be expensive and inappropriate to retain; and
  - **Dead:** A tree, trees, no longer alive. However, this could also apply to those trees that are dying and will be unlikely to recover, or are / have become dangerous.
- 2.14 Major defects or diseases and relevant observations have also been recorded under Structural Condition. The assessment for structural condition has included inspection of the following defects:



- The presence of fungal fruiting bodies around the base of the tree or on the stem, as they could possibly indicate the presence of possible internal decay;
- Soil cracks and any heaving of the soil around the base indicating possible root plate movement;
- Any abrupt bends in branches and limbs resulting from past pruning, as it may be an indication of internal weakness and decay;
- Tight or weak 'V' shaped unions and co-dominant stems;
- Hazard beam formations and other such biomechanical related defects (as described by Claus Mattheck, Body Language of Trees HMSO Research for Amenity Trees No. 4 1994);
- Cavities as a result of limb losses or previous pruning;
- Broken branches;
- Storm damage;
- Canker formations;
- Loose bark;
- Damage to roots;
- Basal, stem or branch / limb cavities;
- Crown die-back;
- Abnormal foliage size and colour;
- Any changes to the timing of normal leaf flush and leaf fall patterns; and
- Other pathological diseases affecting any part of the tree.
- 2.15 Major defects or diseases and relevant observations have also been recorded. Dead wood has been defined as the following:
  - Twigs and small branch material up to 5cm in diameter;
  - Minor dead wood 5cm to 10cm in diameter; and
  - Major dead wood 10cm in diameter and above.
- 2.16 The survey was completed from ground level only, aerial inspection of trees was not undertaken. Investigations as to the internal condition of a tree have not been undertaken. Further investigations of this type can be made and have been recommended where it has been considered necessary, within the report although these investigations are beyond the scope of this report.
- 2.17 Evaluation of the trees' condition given within this assessment applies to the date of survey and cannot be assumed to remain unchanged. It may be necessary to review these within 12 months, in accordance with sound arboricultural practice.



2.18 The position of the trees recorded in the Tree Schedule has been shown on the Tree Constraints Plan, in Appendix 2.0. The positions of the trees are based on a topographical survey supplied by the client for the purpose of plotting trees and from estimations during the Site visit.

### **Root Protection Areas**

- 2.19 The Root Protection Areas (RPA) for individual and groups of trees are indicated on the Tree Constraints Plan in Appendix 2.0. The Root Protection Areas are formulated as described below.
- 2.20 Below ground constraints to future development is represented by the area surrounding the tree that contains sufficient rooting volume to ensure survival of the tree. This area requires protection in order for the tree to be incorporated into any future scheme, without adverse harm to the tree or structural integrity of buildings. This is referred to as the RPA and is shown as a circle of a given radius.
- 2.21 The RPA circle may be modified in shape to maintain a similar total area depending on the presence of surrounding obstacles that are likely to have impeded root growth in a given direction. Details of these RPA modifications are given in the Tree Constraints Plan in Appendix 2.0.
- 2.22 Where groups of trees have been assessed, the RPA has been shown based on the maximum sized tree in any one group and so would automatically exceed the RPA's required for many of the individual specimens within the group. A RPA is equivalent to a circle with a radius 12x the stem diameter for single stem trees and 10x the basal diameter for trees with more than one stem arising less than 1.5 meters above ground level.



### 3.0 BACKGROUND

### **Site Description**

- 3.1 The Site covers an area of approximately 0.12 hectares (ha) and is centred on National Grid Reference TQ309815 and OS Co-ordinates 530906, 181574.
- 3.2 The Site is an eight-storey mixed use building (plus basement and ground) providing a total floor area of 5,660sqm GEA. Office accommodation is located at the upper floors and there are two shop-type units at ground floor, currently occupied by a bank and a café.
- 3.3 The Site was originally constructed in the early 1955-56 and has been subject to various adaptions and extensions since its original construction. It now takes on a 'T' shape form sitting on a broadly rectangular site on the south side of High Holborn, with the building presenting a full width frontage to the street. The upper floors step in at various levels on the different elevations reflecting its incremental extension over time.
- The Site is bounded by High Holborn to the north, Northumberland House (303-306 High Holborn) an 9 storey office building to the east, and 294-295 High Holborn to the west
   which is currently a vacant site, with no buildings or structures, awaiting redevelopment.
- 3.5 The private gardens of Lincoln's Inn are located immediately to the south of the Site and Lincoln's Inn Fields, to the south-west of the Site, which is included at Grade II on the Register of Historic Parks and Gardens of Special Historic Interest. A number of the buildings around Lincoln's Inn and Lincoln's Inn Fields are listed, including the Stone Buildings (Grade I) which face onto the gardens of Lincoln's Inn.

### **The Proposals**

3.6 The Proposed Development is the Refurbishment, remodelling and extensions at rear, flank and roof level to provide 2,193sqm (GIA) additional floorspace and rooftop plant. Also, the change of use of ground floor Use Classes from A1, A2 and B1a uses to provide 2 x A1 units (204sqm GIA) and remainder in B1a Use. Finally, the associated external alterations to the elevations and provision of appropriate cycle parking, waste/recycling storage, additional services and associated ancillary works.



### 4.0 RESULTS

- 4.1 Two trees adjacent to the proposed development area were identified within the tree survey that have the potential to be affected by the proposed development of the site. Full details are provided in the appended Tree Schedule (Appendix 1.0), together with their respective BS category ratings.
- 4.2 Both are London Plane trees and are located to the south of the Lincoln House perimeter.

  They lay just beyond the existing boundary wall, forming part of a larger tree group within the park area to the east of Lincoln's Inn field.
- 4.3 Growing approximately 5m south of the southern perimeter wall, T1 shows an asymmetrical crown shape with heavy suppression from T2 to the west, developing into a free growing area to the east. This suppression has also resulted in the main stem and crown structure showing sweeping phototrophic growth to the east, although this is not considered to detract significantly from its generally fair structural health.
- 4.4 The stem and crown structure of T2 is developing in a very similar way to T1 with an eastern lean, resulting from phototrophic development away from the adjacent western tree (not included within the survey) and has an asymmetrical crown. The crown in this case showing significant suppression on both sites.
- 4.5 Both trees are growing within the park area to the east of Lincoln's Inn Fields, just south of the garden maintenance sheds; an area usage likely to have resulted in soil compaction to the northern RPA sections of both trees. It was also noted that the buttresses of both trees are starting to grow into and over the brickwork path running parallel with the garden maintenance sheds. This this does not present any structural concerns at this time. Furthermore, given London Plane trees are well adapted to successfully grow in such urban conditions, any negative impacts are likely to remain minimal as the tree grows.
- 4.6 Both trees have been historically pruned back to the site premier wall line to eliminate what would have presented previous conflict between the developing tree crowns and the existing Lincoln House southern building facade. This has resulted in there being minimal overhang of the site boundary (approximately 1-2 m).
- 4.7 From inspecting both sides of the southern perimeter site wall of Lincoln House, it is clear that the onsite basement floor level is lower than that at the base of the two trees, which will most likely have impeded root spread onto the site. This aspect with respect to the Proposed Development is detailed further in Section 6.0.
- 4.8 Other than as set out above (and some minor historic pruning wounds), the trees discussed show no significant visual defects. This includes the upper crown, which was inspected from the 6<sup>th</sup> floor of Lincoln House.



### **Tree Legal Protection**

- 4.9 Through discussion with Nick Bell (LB Camden Tree Officer) on 29<sup>th</sup> November 2017, it was confirmed that neither T1 or T2 are currently designated under Tree Preservation Orders. Both the development area and the grounds of Lincolns Inn to the south (containing the trees under assessment) do though fall within the boundary of the Bloomsbury Conservation Area.
- 4.10 This Conservation Area designation means any required tree work would need consent from London Borough of Camden, unless undertaken in accordance with detailed planning permission. It should be noted though that both trees are off site with only minor crown overhang and possible root development within the Lincoln House development boundary.



### 5.0 ARBORICULTURAL IMPACT ASSESSMENT

### Introduction

- 5.1 The purpose of this Arboricultural Impact Assessment (AIA) is to assess the potential impacts to existing trees from the proposed development, and to highlight the need for the retention or removal of specific trees during construction.
- 5.2 Works associated with development of this type can damage trees, threatening the survival of those that are to be retained. The following actions can have negative impacts upon tree health:
  - Soil compaction;
  - Root damage (e.g. severance);
  - Soil coverage with impermeable material;
  - Alterations in ground level;
  - · Leaks and spillages from stored materials; and
  - Vehicle and heavy plant collision.
- As such, where possible, the RPAs and canopies that are defined in Appendix 2 should be protected and considered throughout works to prevent risks to the health of the trees.

### **Direct Tree Loss**

5.4 As there are no trees onsite and only two off site trees that minimally impact the site; no tree removals are proposed as part of the Lincoln House Development Proposals.

### **Development Facilitation Pruning**

- As described in para 5.6, previous limb reduction pruning has been undertaken on both trees (T1 and T2) to remove significant overhang conflicting with the Lincoln House site. Given the location for both the development site and the trees, falls within the Bloomsbury Conservation Area (designated under the Planning (Listed buildings and Conservation Areas) Act 1990), any future works (post the planning application) of this nature, may require an application to be made to LB Camden.
- 5.6 For the purpose of identifying tree constraints, only the basement level is shown in the Tree Constraints Plan (Appendix 2.0). It is though noted that all proposed upper floor southern facades are set back 5.5m from the existing retaining wall at the closest point to the crown of T1 London Plane. This then demonstrates there to be no current or future conflict between the Proposed Development and the tree crowns of T1 and T2 London Planes, provided the current management of these trees continues.



### **Development Within Root Protection Areas**

- 5.7 The proposed extension for the development is to construct further south of the existing building line to a distance of 500/800 mm from the southern retaining wall. Given the existing site levels, the proposed basement level will be at the existing site level therefore avoiding the need for general excavation across the site. The only requirement to dig below the existing level is for the construction of the pile pad foundations, to a depth of 1100 mm.
- 5.8 Site assessments have shown the average level change between the development site and the base of the trees (beyond the existing retaining wall) to be 700 mm. Furthermore, with the retaining wall running to a foundation depth of 900 mm, a total root barrier depth of 1600 mm exists before tree roots could potentially penetrate the site boundary.
- 5.9 Generally, in a free growing environment, the main rooting depth for trees is around 1-1.5 m below ground level, it is therefore assumed that significant roots from the two surveyed trees are unlikely to have penetrated the site boundary in a way that would constrain the required pile pad excavation space.
- 5.10 With consideration to the detailed existing and proposed construction levels, only the pile pad foundations are shown to run below the existing retaining wall foundation depth; by 200 mm. However, as root penetration below the retaining wall and on to the site is considered unlikely, these pad foundations are not anticipated to be conflicted by significant tree roots.
- 5.11 These detailed assumptions are presented within the Tree Constraints Plan (Appendix 2.0) by way of showing a restricted root spread scenario, as calculated by the BS5837 method.
- 5.12 It should be noted that the Tree Constraints Plan with the Proposed Development basement level, shows the new build line to be directly adjacent to the existing southern retaining wall. This is because the plans include the required space for drainage design in this location. The proposed pile pad excavation distance (from the retaining wall) will be starting at 500 mm/800 mm.



### 6.0 ARBORICULTURAL METHOD STATEMENT

- 6.1 The Arboricultural Method Statement (AMS) and Tree Protection Plan normally sets out how site works should be carried out near trees to avoid accidental damage. In doing so the statement details all recommendations for pre-development tree works, including facilitation pruning and ground works, as well as the location of tree protective fencing.
- 6.2 As described in Section 6, with no on-site trees, only two off site trees potentially need protection throughout the duration of the construction process.
- 6.3 Appendix 2.0, shows the Tree Constraints Plan for both the existing and proposed basement floor plans. As T1 and T2 are outside the existing and proposed boundary of the building line, the only concern in terms of formulating a suitable method statement, are the protection of any overhanging crown sections (1-2m back, at a height of approximately 9 m) and any roots considered to be encroaching over the southern site boundary.

### **Works in Root Protection Areas**

6.4 Section 6 (para. 6.6) discusses the existing and proposed site levels with respect to construction, and in doing so concludes that significant root conflicts within the proposed foundation design are unlikely. However, it is good practice in such cases to employ an Arboricultural Clerk of Works to oversee all foundation excavation in such areas.

### **Arboricultural Clerk of Works**

6.5 A suitably qualified arboriculturist should be appointed to act as an Arboricultural Clerk of Works (ACoW). The ACoW will be engaged to monitor and oversee the implementation of the works required in this method statement. The role of the ACoW is a formal one with on-site presence and site visits to allow decisions to be taken quickly.

### **Works near Tree Crowns**

During the survey minor crown sections of T1 and T2 (to a lesser extent), were shown to be overhanging the southern site boundary. Normally any such areas would require tree protection fencing to avoid damage to the crown from construction activities in the area. However, as these crown areas have been previously reduced to clear any conflict with the existing site, it is suggested that any perceived conflict from regrowth at these points, is again trimmed back to the site boundary.



### 7.0 CONCLUSIONS

- 7.1 Two trees were identified within the scope of the survey that could potentially be impacted by the proposed redevelopment of Lincoln House. Both of which will be retained.
- 7.2 In line with the proposed southern façade extension of Lincoln House, facilitation pruning of both T1 and T2 is proposed as part of the planning application.
- 7.3 Whilst on site assessments have shown that conflict between tree roots from T1 and T2 and the proposed construction are unlikely, the need for an Arboricultural Clerk of Works to oversee the foundation excavation phase is set out.
- 7.4 Assuming the advice and methods set out in this report are followed, T1 and T2 London Planes will not be negatively impacted by the development and can be retained within the scheme.

### Limitations

- 7.5 This report includes information on only the trees that were inspected and the condition they were observed in at the time of survey. The condition of trees can change, and as such any findings from this report should be held valid to inform for purposes of development for no longer than 12 months from the survey date.
- 7.6 No guarantee can be given for the structural integrity of any trees on the Site as a full hazard assessment has not been made. Inaccessible trees will have best estimates made about location, physical dimensions and characteristics.



- END -



## **APPENDIX 1.0: TREE SCHEDULE**

Tree	Species	Height (m)	Stem Diameter	Cr	own	Spre	ad	1 <sup>st</sup> Signi Branch	ficant	Crown Clea	Age Class	Condition		Condition		Age Class		Age Condition		Condition		General Notes	Estimated y remaining	Grade Category
No	Species		eter (mm)	N	E	S	w	Height (m)	Direction	ass Clearance (m)		P	S	General Notes	years	jory								
Т1	London Plane	28	1110	7	10	9	3	7 (on site)	N	10 (on site)	М	G	F	Asymmetrical crown shape with heavy suppression from T2 to the west. Main stem and crown structure showing sweeping phototrophic growth to the east. Some evidence of historic pollarding and pruning wounds throughout. Growing within the Lincoln Inn Park garden area above the maintenance sheds; an area of possible soil compaction. Buttress areas starting to grow into and over brickwork path running parallel with the site perimeter wall.	>20	В								
T2	London Plane	30	1030	5	7	8	6	8	N&S	No site over hang	М	G	F	Asymmetrical crown shape with suppression from adjacent trees. Showing an eastern lean, resulting from phototrophic development away from the adjacent western tree. Growing within the Lincoln Inn Park garden area above the maintenance sheds; an area of possible soil compaction. Buttress areas starting to grow into and over brickwork path running parallel with the site perimeter wall.	>20	В								

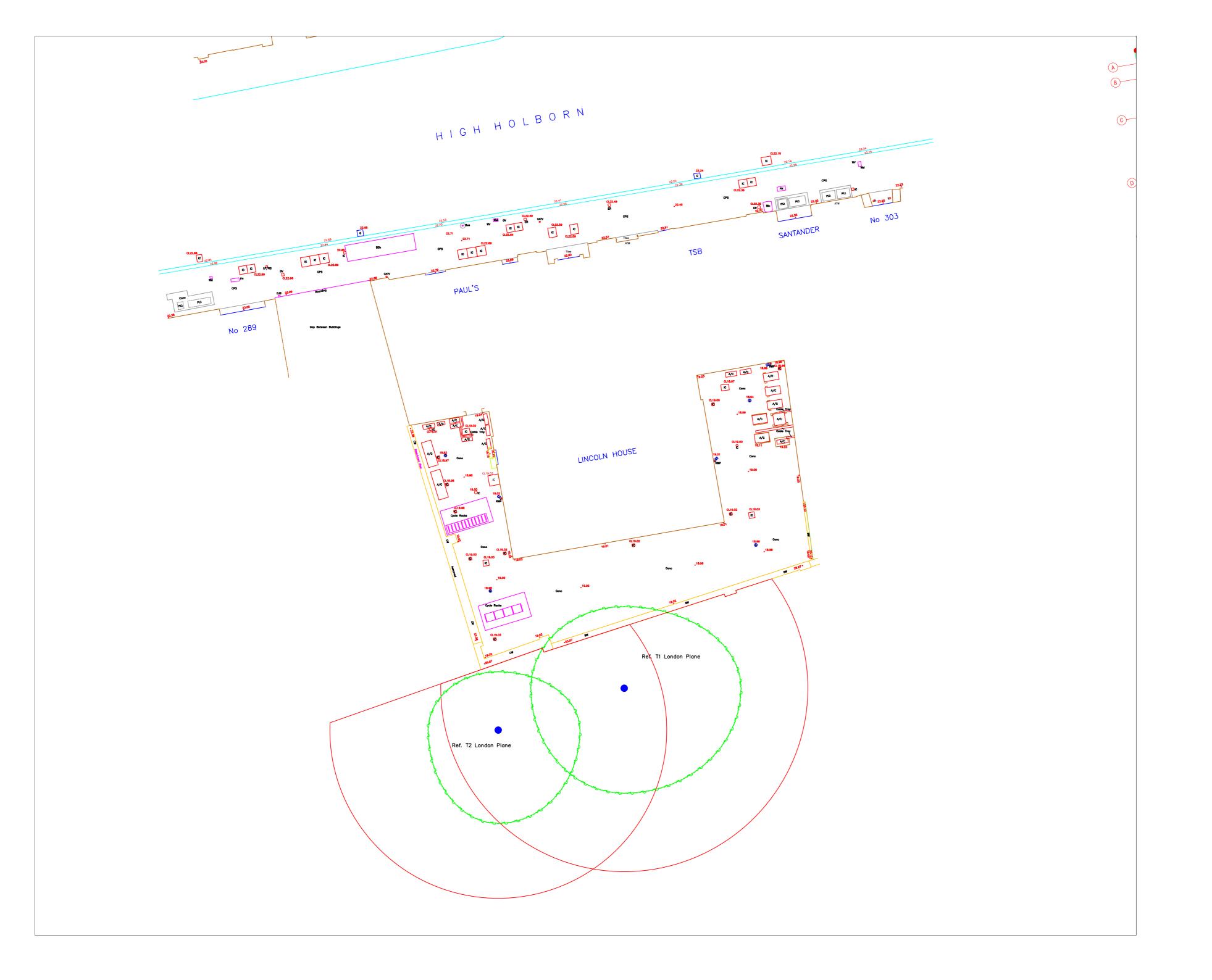
Project: Lincoln House Client: Maizelands Limited & Arringford Limited Project Number: 551001 Greengage Environmental

**G:** Good **F:** Fair **P:** Poor

**SM**: Semi mature **EM**: Early mature



### **APPENDIX 2.0: TREE CONSTRAINTS PLANS**



Tree Constraints Plan showing existing layout against BS5837:2012 tree categories & Root Protection Areas (partial BS5837 RPA)



Trees of high quality with an estimated remaining life expectancy of at least 40





Trees of moderate quality with an estimated remaining expectancy of at least 20 years.



Trees of low quality with an estimated remaining life expectancy of at least 10 years, or a stem diameter below 150mm.



### RPA Incursion



BS5837:2012 calculated root protection area with line showing root incursion



No. Revision/Issue		Date
1	551001_exTCP_jrMar18_FV01.dwg	21/03/18



64 Great Suffolk Street SE1 0BL Tel: 0203 544 4000

### Project Name and Address

Lincoln House 296-302 High Holborn WC1V 7JH

Project Lincoln House	Sheet 1 of 1
Date 21/03/2018	
Scale	
1 to 200 at A2	

# HIGH HOLBORN No 303 SANTANDER No 289 LINCOLN HOUSE (Basement Level) Ref. T1 London Plane Ref. T2 London Plane

Tree Constraints Plan showing proposed layout against BS5837:2012 tree categories & Root Protection Areas (partial BS5837 RPA)



Trees of high quality with an estimated remaining life expectancy of at least 40 years.





Trees of moderate quality with an estimated remaining expectancy of at least 20 years.



Trees of low quality with an estimated remaining life expectancy of at least 10 years, or a stem diameter below 150mm.



### RPA Incursion



BS5837:2012 calculated root protection area with line showing root incursion



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1	551001_prTCP_jrMar18_FV01.dwg	21/03/18



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