



## **Graven Hill, Bicester**

### **Barrus Development D1 & D4 - Tree Survey Report, Arboricultural Impact Assessment & Method Statement**

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### Quality Assurance – Approval Status

This document has been prepared and checked in accordance with Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS OHSAS 18001:2007)

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### Comments



## Disclaimer

This report has been prepared by Waterman Infrastructure & Environment Ltd, with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporation of our General Terms and Condition of Business and taking account of the resources devoted to us by agreement with the client.

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## 1. Introduction

- 1.1. This Tree Survey Report has been prepared by Waterman Infrastructure & Environment Ltd (Waterman) on behalf of E P Barrus Limited in support of the proposed redevelopment of the D1 and D4 sites within Land Transfer Area 2 (LTA2), sites D and E, MOD Graven Hill, Bicester (hereafter referred to as the 'Site').
- 1.2. A report entitled "Redevelopment of MOD Bicester, Graven Hill: Tree Survey, BIC/OPA/DOC/19, September 2011" prepared by Amec was submitted and approved in support of the Outline Planning Application for the wider redevelopment the Graven Hill site. That report detailed the results of a tree survey covering site D and MOD Bicester within the 'Preliminary Tree Constraints Survey and Report' by Amenity Tree Care Ltd dated 29<sup>th</sup> July 2010.
- 1.3. This Tree Survey Report has been completed to update the baseline tree survey data within and immediately adjacent to the Site and reflect the requirements of the 2012 revision of BS5837. This baseline data has been extracted from the Waterman Tree Survey Report undertaken for the wider Land Transfer Area 2 (LTA2) completed in January 2019. This Tree Survey Report sets out the findings of the survey of existing trees and tree groups on and immediately adjacent to the Site. The above and below ground constraints and opportunities posed by the canopy shape and rooting area of the surveyed trees are described, including the implications of any known planned construction works in the vicinity of these trees, and best practice for retention of trees in this context.

### Tree Survey Methodology

- 1.4. This Tree Survey Report is based upon existing topographical information relating to the Site provided by MK Surveys (project ref. 20338 revision 2 dated October 2015). This report has been prepared in accordance with the principles outlined within BS5837:2012 Trees in Relation to Design, Demolition and Construction – Recommendations<sup>1</sup> (BS5837) (see **Appendix A** extract).
- 1.5. Fieldwork was undertaken on 14-15 August, 5-7, 20-21 and 25-27 September and 2-3 October 2018 and included existing trees within the Site. Fieldwork comprised a non-intrusive, visual survey undertaken at ground level, during which dimensional data and observational information were collected. A Diameter at Breast Height (DBH) tape measure and Leica Disto™ laser distance meter were used in the collection of data presented in this report.
- 1.6. The following suffixes have been used:
  - 'T' suffix = individual trees;
  - 'G' suffix = groups, multiple trees, scrub or other arboreal features;
  - 'W' suffix = woodlands; and
  - 'H' suffix = hedgerows.

Where sufficiently consistent, these have been categorised and include information relating to species composition, age and condition ranges as appropriate. Within these features, principal trees have been identified, where appropriate.

### Height

<sup>1</sup> BS5837:2012 Trees in relation to design, demolition and construction – Recommendations, 2012, British Standards Institution.

- 1.7. Unless otherwise stated, tree heights are approximate and estimated in metres.

### Stem Diameter

- 1.8. The survey included collecting the following information on trees and woody vegetation with a stem diameter over 75mm.
- The stem diameter of single stemmed trees was measured at 1.5m above ground level and in millimetres.
  - The diameter measurement of multi-stemmed trees was taken as a combined measurement of all the major stems.
  - Where stems fork or swell, the measurement was taken at the narrowest point below the fork or swelling.
  - Where access to the trunk of a tree was not available, an estimation of the stem diameter was made and identified by ‘\*’ or ‘est’ on the accompanying schedule of existing trees presented in **Appendix B**.

### Crown Spread

- 1.9. Radial crown spread was measured in metres. These were recorded for each of the four cardinal points as access restrictions allow. Where direct access was not available, the spread was estimated and identified by ‘\*’ on the accompanying schedule of existing trees (**Appendix B**). The canopy shape for surveyed trees depicted on the accompanying **Drawing 1** is representative of the canopy spread as measured or estimated during fieldwork on the site.

### Height of Crown Clearance and Canopy

- 1.10. The height of crown clearance was measured as the height above ground in metres of the first significant branch and the direction of growth. The height of canopy was measured as the height above ground in metres of the main canopy.

### Age Class

- 1.11. The age of each tree is defined as follows:
- Young (Y): Within the first 1/4 of useful life expectancy;
  - Semi-mature (SM): Within the second 1/4 of useful life expectancy;
  - Early Mature (EM): Within the third 1/4 of useful life expectancy;
  - Mature (M): Within the fourth 1/4 of useful life expectancy;
  - Over Mature (OM): Exceeded normal useful life expectancy; and
  - Veteran (V): Significantly exceeded normal life expectancy and/or displays characteristics associated with a veteran tree<sup>2</sup>.

### Physiological and Structural Condition

- 1.12. The physiological and structural condition of each tree or tree group is summarised in this report, highlighting features relevant to the assessment process. This includes cultural conditions e.g.

<sup>2</sup> <http://www.ancienttreeforum.co.uk/ancient-trees/what-are-ancient-veteran-trees/>

context and growing environment which may also be of relevance. Where further specialist inspection was deemed appropriate to ascertain the condition of the tree or other arboreal features, this is also highlighted within the report.

- 1.13. Unless otherwise stated, trees were found to be displaying 'normal' characteristics for their age, species and context.
- 1.14. The physiological condition for each tree is described as Good (G), Fair (F) or Poor (P) or may comprise a range where this relates to grouped features.
- 1.15. Where appropriate, notes on the structural integrity are provided on form, taper, forking habit, storm damage, decay, fungi, pests, etc.
- 1.16. No invasive investigations or climbing inspections were carried out to confirm visual or audible signs of defect or debility and no tissue or soil samples were taken for laboratory analysis.
- 1.17. Where identified, external signs of substantial defects or debility have been recorded.
- 1.18. Where access to a tree was restricted, this is qualified and, an estimation of physiological and structural condition has been made.

### **Estimated Remaining Contribution in Years**

- 1.19. The Estimated Remaining Contribution (ERC) for each tree is based on species, context and existing physiological and structural condition of the tree. The ERC may affect the management of the existing tree stock because the longer the tree is likely to live, the greater the contribution it will make and the greater the need for retention.

### **Category Grading**

- 1.20. Each individual tree was given a Category Grading in accordance with BS5837: 2012 to reflect the overall arboricultural value and retention category. Where sufficiently consistent, grouped features have also been graded. However, such grouped features may still contain trees of a range of potential Category Gradings.
- 1.21. The Category Gradings are defined according to the following criteria, and are further divided into sub-categories based on arboriculture, landscape and/or historic value, as defined within BS5837:2012 (**Appendix A**):
  - **Category Grading A:** Trees of high quality and value, (with a suggested remaining life expectancy exceeding 40 years);
  - **Category Grading B:** Trees of moderate quality and value, (with a suggested remaining life expectancy of at least 20 years);
  - **Category Grading C:** Trees of low quality and value, (with a suggested remaining life expectancy exceeding 10 years or young/immature trees which may have the potential to attract a higher Grade as they mature); and
  - **Category Grading U:** Trees which are in such a condition that they are unsuitable for retention in the context of the current land use for longer than 10 years.
- 1.22. Trees that are dead in-situ have been recorded within **Appendix B** but have not been assigned a Category Grading in order to delineate them from Category U trees which are still living, but unsuitable for retention for longer than 10 years. Such trees have been drawn using a separate colour within the attached drawings.

## Preliminary Management Recommendations

- 1.23. Any recommendations made for management of the existing tree stock, (for example, tree surgery) are not a 'specification' for tree work. These recommendations are instead intended as a **preliminary guide** to inform future management of tree stock in the current context which should be formalised as a separate management plan.
- 1.24. It should be noted that recommendations for the removal of dead or 'U' Category trees within **Appendix B** are made purely from an arboricultural perspective. The habitat value of such trees must be considered before removal is decided these trees may support legally protected or notable species (such as, but not limited to, bats and nesting birds). Similarly, references to habitat value within **Appendix B** should be taken as comparative observations compared with a baseline situation with no tree present. Please refer to separate Ecological report from Ecology Solutions, dated October 2018 for further details on protected species and habitat value provided by trees within the Site.
- 1.25. Proposed tree surgery or inspection works should be undertaken by a qualified arboricultural contractor, such as those listed in the Arboricultural Association's Approved Contractors Directory (Ref. [www.trees.org.uk](http://www.trees.org.uk)). Any work undertaken by the contractor should be in accordance with best practice, such as the European Tree Pruning Guide<sup>3</sup>, or required by BS3998: 2010 Tree Work - Recommendations<sup>4</sup>.

## Limitations

- 1.26. All trees were visually inspected from ground level with no climbing, boring or sampling undertaken. All measurements are metric and where qualified, approximate. The comments made were based on the conditions observable factors present at the time of inspection, including weather, seasonality and access.
- 1.27. This report is intended to assist with the planning and management of construction, refurbishment and/or demolition operations under current best practice.
- 1.28. This Tree Survey Report does not constitute a tree risk assessment or tree condition survey. This report is not intended to confirm the safety, (or otherwise) of surveyed trees or tree groups. References to defects or potential safety issues are not exhaustive intended as a guide only to inform the provision of further resources / more detailed investigations.
- 1.29. The impact of Ash Dieback Disease (*Hymenoscyphus fraxineus*) to mature Ash (*Fraxinus excelsior*) trees is currently unknown. As such, accuracy cannot be placed on the estimated remaining contribution (in years) for Ash trees within **Appendix B**.
- 1.30. The person(s) responsible for the management of the trees surveyed within this report are recommended to commission a separate tree condition survey by a suitably qualified and experienced person in order to manage the Health and Safety aspects of trees under their control and discharge their reasonable Duty of Care under the 'Duty of Care' owed under the Occupiers' Liability Act 1984<sup>5</sup>.

<sup>3</sup> European Tree Pruning Guide, 2001, Arboricultural Association

<sup>4</sup> BS3998:2010 'Treework - Recommendations', 2010, BSI

<sup>5</sup> Occupiers' Liability Acts 1957 and 1984. HMSO

### Un-assessable Risks

- 1.31. Owing to the changing nature of trees as living, dynamic features and other site circumstances, this report and any recommendations made remain valid for a period of 18 months from first issue.
- 1.32. Unless otherwise stated, trees should be re-inspected regularly to satisfy the 'Duty of Care' owed under the Occupiers' Liability Act 1984<sup>6</sup>, or directly proceeding heavy storms (i.e. force 6-7 and above on the Beaufort scale). It is recommended that advice from an ecologist is sought prior to carrying out any works to trees, in order to ensure these are carried out in accordance with, (in particular) the protection afforded to wild birds and bats under The Wildlife and Countryside Act<sup>7</sup> and The Conservation of Habitats and Species Regulations<sup>8</sup>.

### Root Protection Area

- 1.33. The Root Protection Area (RPA) defines the approximate underground area occupied by the tree roots based on a calculation relating to the girth of the tree, point above ground at which the trunk begins to branch out and the number of stems. BS5837 outlines the calculation of RPA as follows:

$$RPA(m^2) = \left( \frac{\text{stem diameter (mm) @ 1.5 m} \times 12}{1\ 000} \right)^2 \times \pi \quad (3.142)$$

- 1.34. Trees with more than one stem below 1.5m above ground level are given an aggregate stem diameter using either of the following two calculations as outlined in BS5837. This diameter is then used in the above calculation to estimate RPA:

- a) For trees with two to five stems:

$$\sqrt{(\text{stem diameter } 1)^2 + (\text{stem diameter } 2)^2 \dots + (\text{stem diameter } 5)^2}$$

- b) For trees with more than five stems:

$$\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$$

- 1.35. The RPA of existing tree stock is an important material consideration when considering site constraints and planning development activities.
- 1.36. Construction activities, materials storage or changes in level should generally be avoided within the RPA of a tree to be retained. This is because these operations have the potential to damage or kill the tree, the safe retention of which may be a condition of planning permission. This is significant when considering construction in proximity to off-site / third party land. Special construction techniques, i.e. no-dig construction / permeable surfacing may be considered for light loadings, e.g. pedestrian footpaths etc., within the RPA.
- 1.37. The RPA often varies in size to the physical area occupied by the canopy spread (due to particular tree species or management practices to artificially alter the canopy size). This is of particular importance when integrating new development in proximity of existing trees. Similarly, the canopy

<sup>6</sup> Occupiers' Liability Acts 1957 and 1984. HMSO

<sup>7</sup> The Wildlife and Countryside Act 1981 (as amended), OPSI

<sup>8</sup> The Conservation of Habitats and Species Regulations 2017, OPSI

heights (as identified in the schedule of existing trees in **Appendix B**) should be considered as the usable space below a low branching tree will be severely restricted without specific arboricultural works to raise the canopy (which may not always be appropriate).

- 1.38. It should also be noted that BS5837 states that although RPAs should be plotted as a circle centred on the base of the stem, pre-existing site conditions or other factors may indicate that rooting has occurred asymmetrically, and so RPAs may instead be represented as a polygon of equivalent area.

## 2. Fieldwork Observations

- 2.1. A total of 47No. individual trees, tree groups and woodland groups were recorded on or adjacent to the Site as shown on Tree Survey **Drawings 1 to 3 (ref. 15089-WIE-ZZ-XX-DR-SU-77001 to 77003)**.
- 2.2. The Site comprises an agricultural landscape with later 20<sup>th</sup> century development associated with the current MOD occupation and use of the Site (**Photographs 1 and 2**). The majority of existing trees, tree groups and woodlands are reflective of this phase of development.



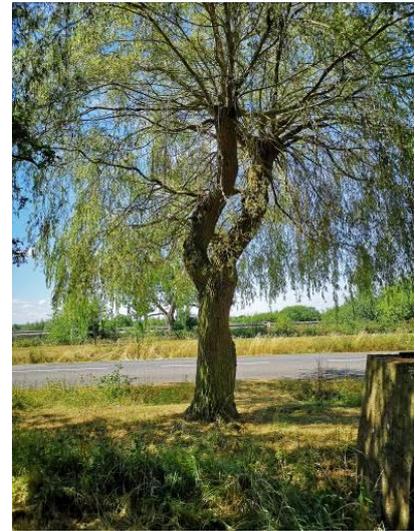
**Photograph 1:** The Site (looking south)

**Photograph 2:** Adjacent woodland

- 2.3. The majority of trees within the Site appear to be associated with the MOD occupation of the Site and are mostly semi-mature to early mature age. This includes woodland plantation groups and avenues of trees associated with roads and boundaries. This has been further supplemented by natural regeneration within lesser used and/or recently unused areas and adjacent to the internal railway tracks within the Site.
- 2.4. A large proportion of the trees recorded within the Site are native to the UK (although not necessarily indigenous to this location). Notable exceptions included the Red Horse Chestnut (*Aesculus x carnea*) avenue along Anniversary Avenue to the north of the Site. This tree species is progressively succumbing to Bleeding Canker of Horse Chestnut (BCHC) (*Pseudomonas syringae* pv *aesculi*) (**Photograph 3**) which has caused the decline and ultimate death of many trees. Several of such failed trees have been removed which has resulted in a locally gappy avenue. Distinctive Weeping Willow (*Salix x sepulcralis* 'Chrysocoma') was frequently recorded as individuals within areas of mown grass. Many trees had lost limbs and contained variable states decay, which is not uncommon for this fast-growing species (**Photograph 4**).



**Photograph 3:** Trees killed by Bleeding Canker of Horse Chestnut pathogen



**Photograph 4:** Typical Weeping Willow

- 2.5. Woodland plantation stands adjacent to the Site comprised mostly even aged Scots Pine (*Pinus sylvestris*) or a mix of fast-growing deciduous species. Several of these stands are over-stood and would benefit from thinning out to allow space for the development of fewer, but superior specimens. Some natural regeneration was noted within the within the understorey areas of both evergreen and deciduous plantation stands.
- 2.6. Several pest and pathogen species were recorded on Site. Symptoms consistent with Dutch Elm Disease (*Ophiostoma novo-ulmi*), spread by the Elm Bark Beetle (*Scolytus spp.*) are present within Elm (*Ulmus*) areas of natural regeneration and some hedgerows. Symptoms of bleeding Canker of Horse Chestnut were frequently recorded within Red Horse Chestnut trees, as noted above (**Photograph 3**). Chalara Dieback of Ash (*Hymenoscyphus fraxineus*) (also known as Ash Dieback Disease, ADD) has been recorded within the region and is progressively spreading through the UK. Some visible dieback of Ash (*Fraxinus excelsior*) foliage was recorded during the fieldwork (**Photograph 5 & 6**), however, this did not appear to be accompanied by the stem lesions that are characteristic symptoms of Chalara Dieback of Ash<sup>9</sup>. This disease is expected to impact the Ash trees within and immediately adjacent to the Site in the short to medium term with younger and weaker trees typically more susceptible.

<sup>9</sup> <https://www.forestry.gov.uk/ashdieback#Symptoms>



**Photograph 5:** Possible Dieback of Ash    **Photograph 6:** Possible Dieback of Ash

- 2.7. The overall amenity value of the tree stock is currently reduced by the secure nature of the Site, with MOD staff largely being the only receptors (although this may change as the Site is developed). Unfortunately, many of the prominent avenues of roadside trees have declined (and continue to decline) due to disease. The quality of other trees and tree groups has also been impacted in the absence of timely or sensitive management. However, the collective value of trees and tree groups is undoubtedly positive in both amenity and environmental terms. The semi-mature and early-mature ages of many trees inherently offer good long-term life expectancies in this context. Development of the Site offers opportunities to improve the quality of the existing tree stock and reinforce green infrastructure corridors through informed active management.

### 3. Arboricultural Impact Assessment

#### Development Proposals

3.1. The Development Proposals for the Site are illustrated on **Drawing 4 Site Plan as Proposed (ref. 5005462-RDG-XX-ST-PL-B-0116)** and include the re-use of the two existing buildings and adaptation of the existing external spaces/access routes. The Development Proposals include the following elements;

- New sections of vehicular highway, hardstanding, car park areas and kerb-lines;
- New boundary fencing and gated access points;
- New underground services;
- Infill of sections of existing railway line;
- New gravel path links; and
- New single storey 20x40 warehouse.

#### Trees to be Removed

3.2. The removal of some existing trees and partial removal of some tree groups will be required to allow the construction and operation of the proposed Development. Existing trees to be removed are illustrated on **Drawings 5 to 7 Tree Protection & Removal, Waterman Drawing 15089-WIE-ZZ-XX-DR-SU-77101 to 77103**.

3.3. 11No existing trees and 3No. tree groups and woodlands (in part) will be removed. This is either due to the proximity of built elements of the proposed Development and likely operational requirements or due to the declining health/condition of the trees and the removal is proposed to allow safe operation of the Site in this context.

#### Proposed New Tree Planting

3.4. The proposed Development includes the retention of several areas of open space which could accommodate new tree planting as part of the proposed Development. New tree planting provide mitigation for existing trees removed as part of the proposed Development.

3.5. It is recommended species choice is informed by those found to be thriving within the local area and likely to be suitable to the ground conditions and climate on site. The further diversification of species mix and age across the Site will enhance general environmental resilience to climate change and tree pests and diseases. A varied age range will also be of assistance in longer term management.

#### Trees to be Retained

3.6. 28No. Existing trees and 3No. tree groups and 2No. woodlands (either complete or in part) are to be retained and are summarised in **Table 1** and shown on **Drawings 5 to 7**.

Table 1: Category Grading of Existing Trees to be Retained

Category	Quantity	Description
A	0	-
B	7	W307 (In part), W316 (In part), T328, T338, T340, T435 & T436

Category	Quantity	Description
C	26	T268, T270, T271, T272, G273, T319, T320, T321, T322, T325, T326, T327, T331, T332, T333, T334, T335, T339, G341, T344, G345 (In part), T352, T353, T354, T357 & T437.
U	0	-

- 3.7. Tree groups W307, W316 and G345 will be partially impacted by the proposed Development with localised tree removal and/or pruning required to facilitate construction operations and/or access.

### Protection of Existing Trees to be Retained

- 3.8. Where existing trees are retained in proximity to construction operations, tree protection will be required to mitigate for potential above and below ground impacts and ensure these trees are retained successfully. Tree protection fencing is illustrated on **Drawings 5 to 7**. The factors which most commonly result in below ground damage affecting oxygen diffusion and availability of water (and which therefore must be avoided) include:
- Compaction of the ground;
  - Any change in soil levels (even if temporary), including ground excavation and soil stripping;
  - Covering the root zone with impervious surfaces;
  - A rise in the water table level or ground saturation; and
  - Damage by the direct toxicity of some materials (e.g. petrol, oil and lime in cement can kill underlying roots).
- 3.9. Tree protection should generally accord with the recommendations contained within BS5837:2012. Ideally the area occupied by the canopy spread or RPA, (whichever is the greater) should be secured as a **Construction Exclusion Zone (CEZ)** where no unauthorised access or demolition operations (including Site compounds/facilities/storage of materials) are permitted, in order to protect the ground from compaction or excavation and canopies from physical damage. The majority of existing trees and tree groups to be retained, will be protected by **CEZs**.
- 3.10. The **CEZ** will be secured by means of temporary protective fencing with weatherproof signage as per the examples provided within **Appendices C and D** with weatherproof signage as per the example provided within **Appendices E**.
- 3.11. Where essential construction works are required in the area inside the canopy spread and/or RPA of retained trees, this will become a **Construction Working Area (CWA)** for the purposes of tree protection. This is pertinent to trees T339 and T340 and group G341.
- 3.12. Most tree roots can be expected to be found within the upper soil horizons (usually the top 600mm of field soil) and soft landscape operations within the **CWA** should have regard to the potential presence and protection of tree roots within this location. This will be achieved through ground protection to prevent compaction and the use of minimally intrusive cultivation techniques/hand tools when completing planting/seeding operations.
- 3.13. The location/extent of individual **CWAs** relating to trees T339, T340 and G341 has been provisionally identified on **Drawings 5 to 7**. The **CWAs** should be clearly identified and marked on Site prior to the commencement of any demolition operations.
- 3.14. In addition to the principles outlined within BS5837:2012, it is therefore recommended that the works within the **CWAs** are planned and developed using the following **AMS**:

- Select site access routes for demolition plant that can safely access and move around the Site given the physical constraints imposed by the height of the existing retained tree canopies;
  - For construction purposes, systems for the control and suppression of dust, hydrocarbons, cementitious and other phytotoxic elements should be employed to prevent damage to the adjacent trees;
  - Do not store materials or demolition plant within the canopy spread or RPA of trees to be retained;
  - In order to minimise damage to shallow tree roots, it is recommended the depth of any excavation work within the **CWA** is minimised to reduce the potential to expose and/or damage shallow tree roots;
  - The temporary retention of existing hard surfaced areas within the **CWA** should be considered where these areas maybe subject to regular pedestrian or vehicular over-run. The retention of such surfaces may, (subject to proposed loadings) prevent additional compaction of the underlying soils and rootzone;
  - Where any existing surface within the **CWA** is removed, removal should be carefully undertaken using hand-held equipment wherever possible. Following removal, these areas should be protected from excessive compaction from people/plant. This should include the use of temporary ground protection and selection of light, tracked plant over heavier, wheeled alternatives;
  - Where new underground services cannot be routed outside the **CWA**, excavation for these should be undertaken by hand or air-spade to prevent damage to retained tree roots;
  - Where tree roots are encountered during essential ground intrusive works, roots exceeding 25mm diameter should remain undamaged, intact and protected by damp hessian/straw to prevent desiccation prior to backfilling with arisings from the original excavation; and
  - Where tree roots below 25mm diameter are encountered, and cannot be retained, these can be cut with a single, sharp saw cut to minimise the cut area and potential for infection. Any torn/damaged roots should similarly be cut back to sound wood with a clean cut.
- 3.15. Should any tree surgery be proposed to retained trees to facilitate construction access, this would be undertaken by an Arboricultural Association Approved Contractor with works compliant with BS3998:2010 and BS5837:2012. Trees to be felled or vegetation to be removed should be clearly marked prior to the commencement of any demolition operations. Tree work should be timed to avoid the bird nesting season and other potential ecological constraints (e.g. bats), subject to consultation with an ecologist. If required, tree surgery work on trees with deadwood, cavities, split/lifted bark and dense ivy should be carried out under an Ecological Watching Brief. Care should be taken not to damage any surrounding vegetation to be retained.

## 4. Summary

- 4.1. A total of 47No. individual trees, tree groups and woodland groups were recorded on or adjacent to the Site as shown on Tree Survey **Drawing 1, 2 and 3**. The Site comprises an agricultural landscape with later 20<sup>th</sup> century development associated with the current MOD occupation and use of the Site.
- 4.2. Trees within the Site appear to be associated with the MOD occupation of the Site and are of semi-mature to early mature age. This includes woodland plantation groups and avenues of trees associated with roads and boundaries. A large proportion of the trees recorded within the Site are native to the UK (although not necessarily indigenous to the region).
- 4.3. The overall amenity value of the tree stock is currently reduced by the secure nature of the Site. However, the collective value of trees and tree groups is undoubtedly positive in both amenity and environmental terms.
- 4.4. The Development Proposals for the Site are illustrated on **Drawing 4** and include the re-use of the two existing buildings and adaption of the existing external spaces/access routes.
- 4.5. The removal of some existing trees and partial removal of some tree groups will be required to allow the construction and operation of the proposed Development. Existing trees to be removed are illustrated on **Drawings 5 to 7**. The Site could accommodate new tree planting as part of the proposed Development. New tree planting provide mitigation for existing trees removed as part of the proposed Development.
- 4.6. 36No. Existing trees and tree groups are to be retained and are shown on **Drawings 5 to 7**. Tree groups W307, W316 and G345 will be partially impacted by the proposed Development with localised tree removal and/or pruning required to facilitate construction operations and/or access.
- 4.7. Where existing trees are retained in proximity to construction operations, tree protection will be required to mitigate for potential above and below ground impacts and ensure these trees are retained successfully. Tree protection fencing is illustrated on **Drawings 5 to 7**.
- 4.8. Tree protection should generally accord with the recommendations contained within BS5837:2012. Ideally the area occupied by the canopy spread or RPA, (whichever is the greater) should be secured as a **CEZ**. The majority of existing trees and tree groups to be retained, will be protected by **CEZs**.
- 4.9. The **CEZ** will be secured by means of temporary protective fencing as per the examples provided within **Appendices C and D** with weatherproof signage as per the example provided within **Appendices E**.
- 4.10. Where essential construction works are required in the area inside the canopy spread and/or RPA of retained trees not protected by a **CEZ**, these areas will become a **CWA**. All construction works affecting the **CWA** will be carefully planned and executed via a Site specific **AMS** to eliminate or reduce residual impacts to the retained trees. Construction work in proximity to retained trees T339, T340 and G341 will be subject to a **CWA** and **AMS**.
- 4.11. Should any tree surgery be proposed to retained trees, this would be undertaken by an Arboricultural Association Approved Contractor with works compliant with BS3998:2010 and BS5837:2012. Tree work should be timed to avoid the bird nesting season and other potential ecological constraints (e.g. bats), subject to consultation with an ecologist.



## **Drawings**

Drawings 1 to 3: Tree Survey, Waterman Drawing 15089-WIE-ZZ-XX-DR-SU-77001 to 77003

### **Drawings**

Graven Hill, Bicester

WIE15089-100

WIE15089-100-R-1-2-3-TSR&AIA&MS



Note: Base Plan information has been changed.

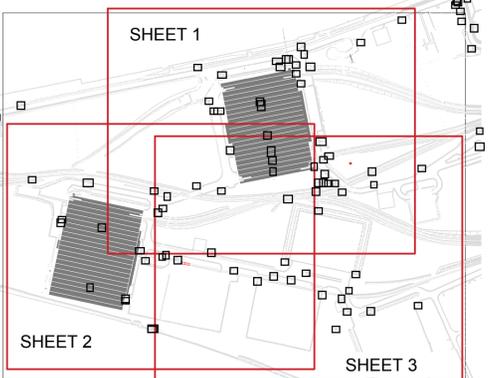
- LEGEND**
-  CATEGORY GRADE A  
Trees of high quality
  -  CATEGORY GRADE B  
Trees of moderate quality
  -  CATEGORY GRADE C  
Trees of low quality
  -  CATEGORY GRADE U  
Trees unsuitable for retention
  -  DEAD TREES
  -  ROOT PROTECTION AREAS (RPA)
  -  INDICATIVE EXTENT OF GROUPED FEATURE
  -  LAND TRANSFER AREA 2 - SITE BOUNDARY
  -  PROPOSED BARRUS SITE BOUNDARY (WATERMAN)

**NOTES:**

**ROOT PROTECTION AREA**  
Root Protection Areas are calculated in accordance with BS5837: 2012. The precise morphology and disposition of roots may not be fully reflected by these areas, particularly where there are hard standings, however they provide a good indication of potential root constraint.

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH WATERMAN TREE SURVEY REPORT

LOCATION PLAN: NOT TO SCALE



Rev	Date	Description	By
P02	21.01.19	PLANNING	BM
P01	11.01.19	PRELIMINARY	BM

Project  
**MOD, Graven Hill Bicester**

Title  
**Site D1 & D4, Barrus Development  
Baseline Tree Survey  
Sheet 1 of 3**

Client  
**EP BARRUS Ltd**

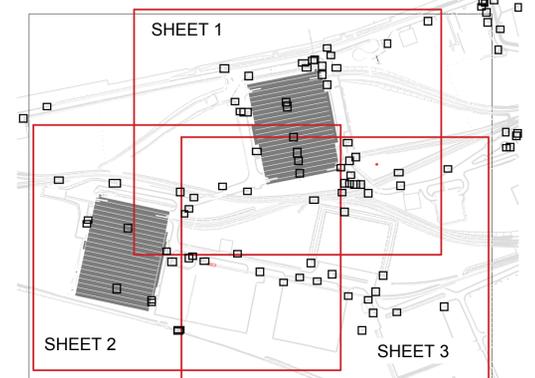


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1 0117 937 8200  
mail@watermangroup.com www.watermangroup.com

Status  
**PLANNING**

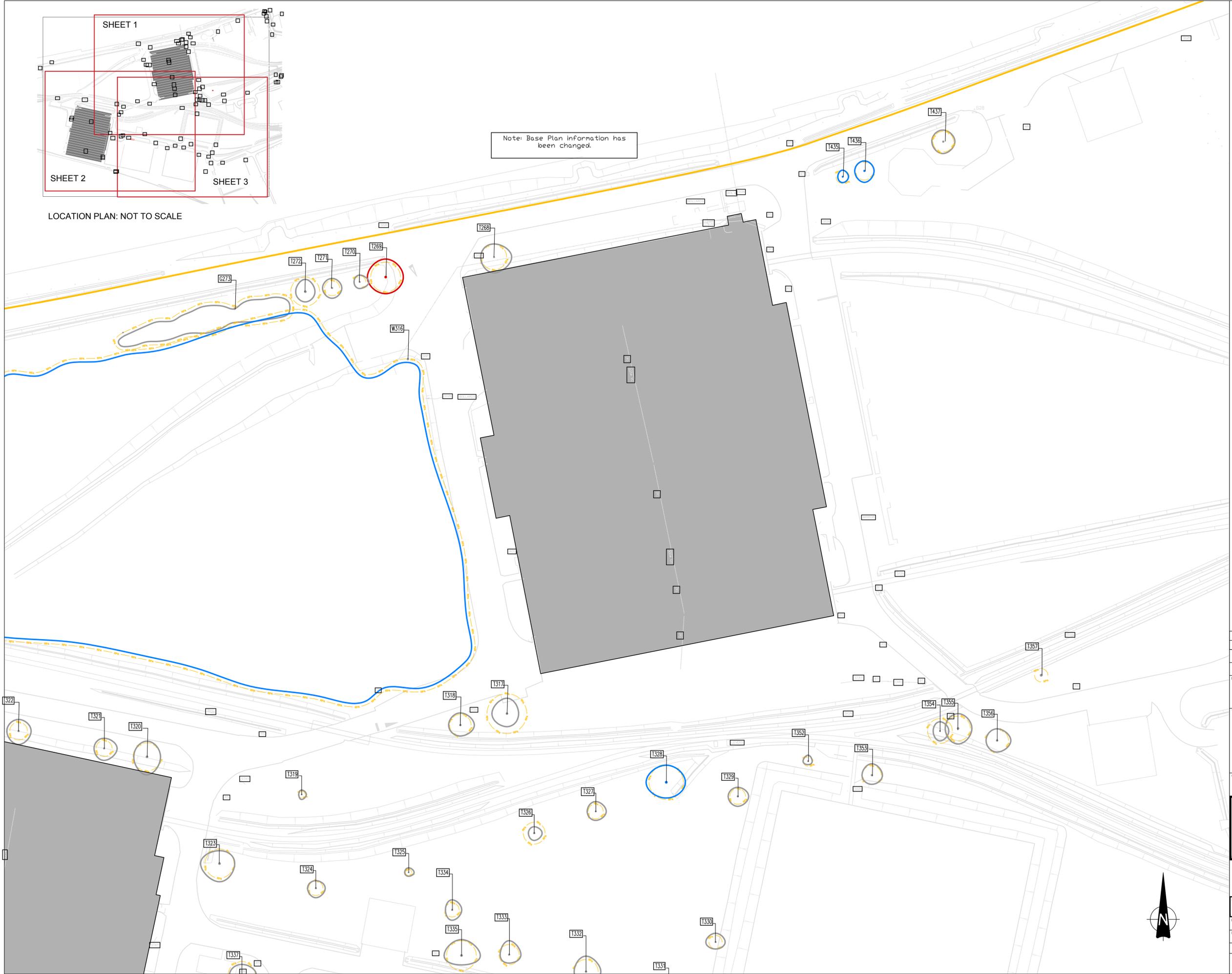
Designed By	TA	Checked By	TA	Waterman Ref	WIE15089
Drawn By	BM	Date	JANUARY 2019	Scales @ A1	1:1000 @ A1

Project	Originator	Volume	Level	Type	Role	Number	Revision
15089-WIE-ZZ-XX-DR-SU-77001							P02



LOCATION PLAN: NOT TO SCALE

Note: Base Plan information has been changed.



**LEGEND**

- CATEGORY GRADE A  
Trees of high quality
- CATEGORY GRADE B  
Trees of moderate quality
- CATEGORY GRADE C  
Trees of low quality
- CATEGORY GRADE U  
Trees unsuitable for retention
- DEAD TREES
- ROOT PROTECTION AREAS (RPA)
- INDICATIVE EXTENT OF GROUPED FEATURE
- LAND TRANSFER AREA 2 - SITE BOUNDARY
- PROPOSED BARRUS SITE BOUNDARY (WATERMAN)

**NOTES:**

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THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH WATERMAN TREE SURVEY REPORT

Rev	Date	Description	By
P02	21.01.19	PLANNING	BM
P01	11.01.19	PRELIMINARY	BM

Project: MOD, Graven Hill Bicester

Title: Site D1 & D4, Barrus Development Baseline Tree Survey Sheet 2 of 3

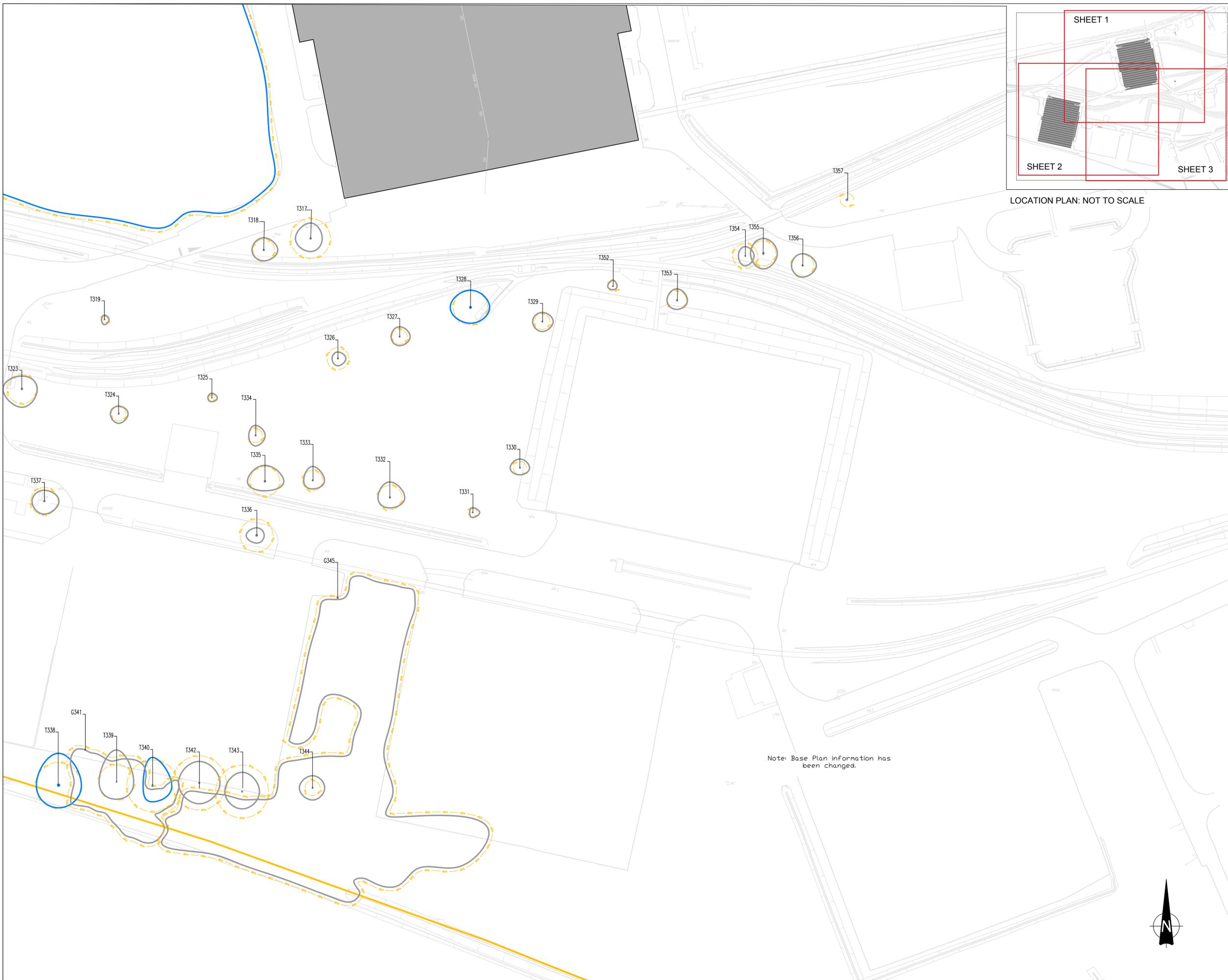
Client: EP BARRUS Ltd

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Status: **PLANNING**

Designed By	TA	Checked By	TA	Waterman Ref	WIE15089
Drawn By	BM	Date	JANUARY 2019	Scales @ A1	1:500 @ A1

Project	Originator	Volume	Level	Type	Role	Number	Revision
15089-WIE-ZZ-XX-DR-SU-77001							P02



LOCATION PLAN: NOT TO SCALE

Note: Base Plan information has been changed.

- LEGEND**
-  CATEGORY GRADE A  
Trees of high quality
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THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH WATERMAN TREE SURVEY REPORT

Rev	Date	Description	By
P02	21.01.19	PLANNING	BM
P01	11.01.19	PRELIMINARY	BM

Project  
**MOD, Graven Hill Bicester**

Title  
**Site D1 & D4, Barrus Development  
Baseline Tree Survey  
Sheet 3 of 3**

Client  
**EP BARRUS Ltd**



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Status  
**PLANNING**

Designed By	TA	Checked By	TA	Waterman Ref	WIE15089
Drawn By	BM	Date	JANUARY 2019	Scales @ A1	1:500 @ A1

Project - Originator - Volume - Level - Type - Role - Number	Revision
15089-WIE-ZZ-XX-DR-SU-77001	P02





Drawing 4: Site Plan As Proposed, Ridge Property & Construction Drawing 5005462-RDG-XX-ST-PL-B-0116

**Drawings**

Graven Hill, Bicester  
WIE15089-100

WIE15089-100-R-1-2-3-TSR&AIA&MS