

Hertfordshire Constabulary Headquarters Redevelopment

Arboricultural Impact Assessment Report

Hertfordshire Constabulary

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Quality information

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1. Introduction

1.1 Background

AECOM has been instructed by Hertfordshire Constabulary (the Client) to undertake an Arboricultural Impact Assessment to BS5837:2012 Trees in relation to design, demolition and construction – Recommendations (BS5837); to include trees with the potential to be affected by development works within or immediately adjacent to the Hertfordshire Constabulary Headquarters (hereafter referred to as 'the Site' and 'Proposed Development') in support of a planning application.

This report identifies the likely direct and indirect impacts of the Proposed Development along with suitable mitigation measures, as appropriate. The Tree Protection Plan (included within Appendix F) identifies trees to be removed and how retained trees are to be successfully protected.

1.2 Trees and the Planning Process

The National Planning Policy Framework (NPPF) seeks to ensure that new development is sustainable and underlines the importance of Green Infrastructure, of which trees form an integral part. This encompasses a recognition of the importance of trees in relation to the management of air, soil and water quality along with other associated ecosystem services and climate change adaptation. The NPPF also seeks to achieve the protection and enhancement of landscapes and a net gain in biodiversity. Finally, it specifically identifies veteran and ancient trees and woodland as a highly valuable and irreplaceable habitat.

Local Planning Authorities (LPA) in the UK have a statutory duty to consider both the protection and planting of trees when considering planning applications. The potential impact of development on all trees (including those not protected by a Tree Preservation Order or other statutory designation) is therefore a material consideration.

'BS5837:2012 Trees in relation to design demolition and construction – Recommendations (BS5837)' provides a framework which sets out how trees should be considered in this context and also explicitly applies to development where planning consent is not required.

BS5837 recommends that a tree survey is undertaken to identify the quality and benefits of trees and the spatial constraints associated with them. This is then used to produce a Tree Constraints Plan showing the above and below ground constraints associated with trees. This drawing is used to inform the design process and to allow the retention of good quality trees where appropriate.

An Arboricultural Impact Assessment is then developed to identify the likely direct and indirect impacts of the Proposed Development, and a Tree Protection Plan is prepared to identify trees to be removed or retained and to illustrate how retained trees are to be protected. An Arboricultural Method Statement is often required as a condition of planning consent to detail how sensitive operations are to be achieved in proximity to retained trees. These elements are the minimum normally required for a planning application and are intended to ensure both a sustainable and harmonious relationship between trees and new development.

1.2.1 Local Policy Context

The Site is located within Welwyn Hatfield Borough Council planning authority. The Welwyn Hatfield District Plan¹ adopted in 2005, includes the following live policies relating to trees:

1.2.1.1 Policy R17 - Trees, Woodland and Hedgerows

The Council will seek the protection and retention of existing trees, hedgerows and woodland by the use of planning conditions, section 106 agreements, hedgerow retention notices and tree preservation orders where applicable. New development will be required to incorporate wherever appropriate new planting with locally native species and should be in accordance with Policy D8 Landscaping.

1.2.1.2 Policy D8: Landscaping

All development, other than changes of use of buildings, should include landscaping as an integral part of the overall design. This should reflect the strong tradition of urban landscape design in the district.

¹ <https://www.welhat.gov.uk/media/869/District-Plan-District-wide-Policies/pdf/WrittenStatement2DWP.pdf?m=633925147440000000>

Landscaping schemes will require the use of materials which respect the character of the area, the planting of trees, hedgerows and shrubs and details of future maintenance. The retention and enhancement of existing key landscape features such as trees and shrubs, ponds and watercourses will be expected where feasible; where this is not possible, replacement planting should be carried out.

The design of landscaped areas should be such that maintenance is straightforward. On larger schemes, certain landscaped areas will be required to be designed in a manner capable of adoption.

Tree Preservation Orders or planning conditions may be used to ensure continued future protection of particular trees, groups of trees or woodlands.

The New Welwyn Hatfield Council Local Plan² which is intended to cover the period 2013-2032 has yet to be approved by the Secretary of State but contains the following policy relating to trees:

1.2.1.3 Policy SADM 16 - Ecology and Landscape

i. Proposals will be expected to maintain, protect and wherever possible enhance biodiversity, the structure and function of ecological networks and the ecological status of water bodies.

ii. Proposals that would result in loss of or harm to:

a. International sites, Sites of Special Scientific Interest, National Nature Reserves, Local Nature Reserves or other statutorily protect features or species, will be refused unless:

the mitigation hierarchy has been followed, to firstly avoid, reduce and remediate direct and indirect adverse impacts before considering compensation; and imperative reasons of overriding public interest can be demonstrated.

b. Ancient Woodland, veteran trees, chalk river habitats or habitats or species of national principal importance, will be refused unless:

the mitigation hierarchy has been followed, to firstly avoid, reduce and remediate direct and indirect adverse impacts before considering compensation; and the need for, and benefits of, the development significantly outweigh the loss or harm.

c. Local Wildlife Sites, other habitats, species and ecological assets of local importance, including ecological networks, woodland, orchards, protected trees and hedgerows and allotments, will be refused unless:

the mitigation hierarchy has been fully implemented to avoid, reduce and remediate and compensate direct and indirect adverse impacts; and the need for, and benefits of, the development outweigh the loss or harm.

iii. Where compensation is required to make development acceptable within ii) above, necessary financial and/or other provision will be required to deliver and maintain ecological and biodiversity objectives over appropriate time scales.

Although yet to be approved the above policy is likely to be taken into consideration when determining a future planning application.

1.3 Methodology

The tree survey has been based on the topographical survey plan provided (ref: 07908P/1 by CSL Surveys).

Where individual trees or groups have not been recorded on the topographical survey plan these have been plotted indicatively with reference to GPS positions, site features and publicly available aerial photography. Their positions must be considered indicative only and the relative distances of features must be measured out on Site.

The survey was otherwise conducted in accordance with the requirements of BS5837:2012 Trees in relation to design, demolition and construction – Recommendations (BS5837).

The initial fieldwork was undertaken on 21st and 22nd September 2020, during which dimensional data and observational information were collected. A diameter tape measure was used to measure stem diameters where feasible.

² https://www.welhat.gov.uk/media/14557/Draft-Local-Plan-Submission-Document-August-2016/pdf/Draft_Local_Plan_Submission_Document_August_2016_opt.pdf?m=636866922998770000

The fieldwork informing this report has comprised a preliminary, non-intrusive, visual survey undertaken from ground level with the specific intention of evaluating the quality and benefits of trees on Site.

Where further inspection is deemed appropriate to ascertain the condition of the tree or other arboreal features, this has been identified within the preliminary management recommendations. Average dimensions or dimensional ranges have occasionally been used, where appropriate, to best describe features.

The Root Protection Area (RPA) is the notional extent of what is considered the key rooting area for tree health and function. This is generally depicted as a circle but can be amended to a polygon with an equivalent area in accordance with Section 4.6.2 of BS5837 where the RPA is likely to have developed asymmetrically. The RPA of all surveyed trees is depicted as a circle and no RPAs have been amended.

A Tree Constraints Plan showing the position of trees and the spatial constraints associated with them is included as Appendix A of this report, which corresponds with the Tree Survey Schedule presented in Appendix B.

The tree categorisation process recommended by BS5837:2012 is summarised in the table below and corresponds with the tree canopy outline shown on the Tree Constraints Plan (Appendix A) and the information in the Tree Survey Schedule (Appendix B).

Table 1: BS5837:2012 Tree Categorisation process

Category	Definition
A	High quality, minimum of 40+ years remaining contribution
B	Moderate quality, minimum of 20+ years remaining contribution
C	Low quality, minimum of 10+ years remaining contribution
U	Unsuitable for retention, <10 years remaining contribution
1	Arboricultural value
2	Landscape value
3	Conservation or cultural value

2. General Arboricultural Principles

2.1 General Principles

Trees are dynamic living organisms which provide essential benefits to society and the wider environment. Any Proposed Development with the potential to impact on trees must take into consideration the value of trees on Site; the impact of any proposed activity along with any potential future conflicts on the Site. Suitable measures to safeguard retained trees or mitigate the loss of trees (to be removed) will need to be fully considered and may be subject to a condition of planning consent.

Tree branches and roots frequently grow across site boundaries and off-site trees can pose a significant constraint and should be carefully considered when assessing the developable space.

2.2 Below Ground Constraints

Below ground tree roots and the soil environment in which they grow need to be protected if the tree is to be retained. Trees grow in association with fungi and other soil organisms which are of key importance to tree health. Roots are essential for anchorage, the uptake of water and nutrients, and the storage of energy (carbohydrates) for the future growth and function of the tree.

Roots can be damaged by physical severance or wounding (e.g. following excavation of the soil) which can lead to the development of decay and a decline in vitality and/or instability. Raising the soil level can bury tree roots at a depth where suitable conditions for growth are less available. Toxic materials discharged into the soil (such as cement-based aggregates, fuel and chemicals) can lead to root death and dysfunction. Soils can be compacted to levels inhospitable to tree growth with even a single pass of machinery, regular pedestrian traffic or the storage of plant and materials. Relieving compaction can be problematic and may require costly remedial works. Changes in drainage/water levels can also have significant long-term impacts for tree health.

The effects of these incursions may take many years to manifest, with a resulting decline in amenity value and potentially the death or failure of the tree. It should be noted that older trees are particularly sensitive to damage and changes in conditions.

The Root Protection Area (RPA) is a notional area considered to be the minimum zone that must be protected to avoid any adverse impacts on retained trees. This area is deemed to be particularly important for tree stability, growth, function and health. However, roots may extend far greater distances, with the distribution of the root system relating directly to the availability of suitable conditions for growth (namely oxygen, water and nutrients). It is generally accepted that tree roots are predominantly located in the upper 1000mm of soil; however, roots may develop at deeper levels where conditions allow.

RPAs are calculated as per BS5837: 2012 Annex C, D and Section 4.6 in the BS 5837 2012 Document.

The RPA of the existing tree stock is an important material consideration when considering site constraints and planning development activities. The RPA of significant trees on Site is shown on the Tree Constraints Plan (Appendix A).

The default position must be that all development, including any associated services will occur outside the RPAs of retained trees. Where this is unavoidable, it may be appropriate to use special measures to install structures, services or surfacing within RPAs which allow the protection of roots and soil structure which are essential for tree growth and keep any incursion to a minimum.

Further steps to improve or increase the useable rooting area available to the tree may also be required.

2.3 Soils

On shrinkable clay soil, tree growth can lead to the differential movement of structures as moisture is removed from the soil during the growing season. Soils must be carefully assessed, and any foundations must be installed following the recommendations of National House Building Council (NHBC) Standards Chapter 4.2: *Building Near Trees (2020)* to avoid potential future damage. Where trees which predate existing structures are to be removed, this can result in heave as the soils are re-wet.

The advice of a suitably qualified engineer must be obtained to inform any potential issue of heave. Specific advice in relation to this issue is beyond the scope of this report.

2.4 Above Ground Constraints

Tree stems and branches can restrict available space on a site. Damage or wounding (including excessive pruning) can significantly reduce the amenity contribution of the tree and may lead to the development of dysfunction and decay, with significant long-term implications for tree health. The future impact of existing trees should be carefully considered, including individual species characteristics (such as potential future size, fruit fall, shade etc.) and how the tree will interact with any proposed development and future land use. Annual tree growth can lead to direct damage if stems/branches (or roots) come into physical contact with structures and this must also be taken into consideration.

2.5 Trees and Risk in the Context of Development

Tree owners/managers have a legal duty to prevent foreseeable harm. It is generally accepted that this duty can be fulfilled by undertaking proactive inspections of significant trees to identify obvious defects and by taking appropriate remedial action or gaining further advice as appropriate.

Further guidance is available from the National Tree Safety Group³.

The tree survey carried out as the basis of this report is primarily for planning purposes, focusing on the quality and benefits of the trees and is not specifically designed to assess the safety of trees on Site. However, when obvious issues have been identified recommendations have been included in the Tree Survey Schedule.

The Construction (Design and Management) Regulations (2015) states that developers and contractors have responsibilities for health and safety as a result of their actions. Should trees be left in an unstable or hazardous condition the Health and Safety Executive (HSE) could seek to prosecute those responsible along with the potential for further Civil claims for damages.

2.6 Trees and Wildlife

Full consideration must be given to the presence of species protected under the Wildlife and Countryside Act (1981 - as amended), the Countryside Rights of Way Act (2000) and the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations (2019), in particular the presence of bats and nesting birds. It is recommended that wherever possible, significant tree/hedge works take place outside of the typical bird nesting season of March to September. The advice of a suitably qualified Ecologist is recommended in relation to any potential impacts on protected species.

2.7 Tree Works

Any tree surgery recommendations contained within this report are to be undertaken in accordance with BS3998: 2010 Tree work – Recommendations (BS3998) by suitably qualified and insured contractors. Significant pruning works are best undertaken when trees are dormant or outside periods of high functional activity to reduce the overall impact on energy available to the tree for growth and processes. In general, the optimum period for works is between November to February and July to August (subject to the presence of protected species) when the tree is less active and better placed to respond to wounding and a reduction in leaf area.

³ National Tree Safety Group (NTSG),2011. Common sense risk management of trees. Forestry Commission.

3. Field Work Observations

3.1 The Site

The Site boundary is shown on the Tree Constraints Plan included within Appendix A (ref: ACM-606003290-TCP) of this report.

The Site is the Hertfordshire Constabulary Headquarters located on Stanborough Road south of Welwyn Garden City. The Site is an operational police headquarters and includes several buildings, areas of car parking, hardstanding and open green space.

Stanborough Road forms the Site's north western boundary; the north eastern boundary abuts the Gosling Sports Park; the south eastern boundary is formed by a railway line; and the south western boundary abuts Stanborough Park.

3.2 The Trees

The survey identified 85 individual trees, 37 tree groups and 5 hedgerows within and bordering the Site.

Of the 85 individual trees recorded, nine individual trees were considered of high quality (Category A), 32 individual trees were of moderate quality (Category B) and 34 were of low quality (Category C). Of the 37 groups recorded 13 were of moderate quality and 20 were of low quality. All five hedgerows were considered of low quality.

A total of ten individual trees and four groups were considered unsuitable for retention (Category U) due to significant defects and a safe life expectancy of less than ten years. The majority of these Category U trees were young to semi mature planted specimens within the Site, which due to poor planting and a lack of aftercare had either failed to establish or were unlikely to develop into suitable mature specimens.

There is a good range of species on the Site, including: English oak (*Quercus robur*), wild cherry (*Prunus avium*), ash (*Fraxinus excelsior*), Norway maple (*Acer platanoides*), silver birch (*Betula pendula*), sycamore (*Acer pseudoplatanus*), rowan (*Sorbus aucuparia*), hybrid black poplar (*Populus x canadensis*), lime (*Tilia sp.*), Lawson cypress (*Chamaecyparis lawsoniana*), hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*) and elder (*Sambucus nigra*).

Tree cover on the Site varied in age from young to mature. Mature tree cover within the verge between the Site and Stanborough Road likely pre-dates the Hertfordshire Constabulary Headquarters. Tree cover within the Site was generally of younger proportions, having likely been planted as the Hertfordshire Constabulary Headquarters was developed and added to.

Only two mature English oak within the Site (T93 and T105) are likely to predate the Hertfordshire Constabulary Headquarters. T93 situated within a planting pit, likely constructed around this tree and T105 situated within an unsurfaced car park in the east of the Site.

Despite the significant building works carried out within the rooting areas of both T93 and T105, both trees were in good physiological condition and recorded as high quality (Category A). T105 did however display some defects. These include having recently lost a limb at 4m to the north, resulting in a tear wound on its main stem and a possible structural defect within its stem which will require further investigation and possible future management. This has been detailed further below in the Tree Works section of this report.

Tree cover within the verge between the Site and Stanborough Road was generally of mature proportions, with several large mature English oak and ash being recorded. This tree cover is highly likely to predate the Hertfordshire Constabulary Headquarters and were considered of either high or moderate quality for their arboricultural and landscape value.

Tree cover within the Site was generally of lower quality (Category B or Category C) with several trees displaying defects and poor physiological condition. This was largely as a result of poor planting and a lack of aftercare.

Several young trees had not been protected following planting and had been damaged by rabbits. While others had been planted with little consideration for their rooting environment, such as G57, a row of lime which had been planted directly into pavements. This had resulted in die back of tree crowns with leaf necrosis and small diameter dead branches being noted.

Site photography can be found at Appendix D located to the rear of this report.

3.3 Statutory and Non-Statutory Designations

AECOM checked the Welwyn Hatfield Borough Council website⁴ on 16th September 2021 and there were no Tree Preservation Order (TPO) designations identified which could affect trees within or immediately adjacent to the Site.

The Welwyn Garden City Conservation Area (reference WGC1), abuts the Site's northern boundary and as such all trees with a stem diameter greater than 75mm (measured at a height of 1.5m) within this area are subject to statutory protection, equivalent to that of a TPO.

A small section of G8 is situated within this Conservation Area but prior to any tree works within the northern section of the verge between the Site and Stanborough Road, the extent of this Conservation Area must be verified with Welwyn Hatfield Borough Council.

A felling licence may be required by the Forestry Commission to fell more than 5m³ in any calendar quarter (subject to relevant exceptions including trees in gardens, designated public open spaces or churchyards).

Full planning consent is an exemption from the need to give notice of the intention to undertake works within a Conservation Area and the need to apply for a Felling Licence with the Forestry Commission (to fell more than 5m³ per calendar quarter).

The Hedgerow Regulations (1997) protect agricultural or countryside hedgerows which meet the requirements of an 'important hedgerow'. These include a minimum length of 20m (or meets another hedge at each end) and a minimum age of at least 30 years. A wide range of other ecological and archaeological/heritage features can constitute an important hedgerow and further advice from a qualified ecologist is recommended in advance of any planned works which could impact established hedgerows on or bordering agricultural or countryside land.

Prior to the removal or destruction of a protected hedgerow an application must be made to the Local Planning Authority. Full planning consent is however an exemption to this requirement.

Following a review of Magic Map⁵ the Site does not include any identified SSSI's or Ancient Woodland designations. A Biodiversity Action Plan (BAP) Priority Habitat of Deciduous Woodland was identified to the north of the Site, this includes individual trees T20 and T21 along with a section of group G8. This is a non-statutory designation which has potential to be a material consideration in the planning process.

A review of the Woodland Trusts Ancient Tree Inventory⁶ identified no recorded ancient, veteran or notable trees within or immediately adjacent to the Site and no trees were documented as veteran during the walk over survey.

3.4 Tree Works

As part of the survey, preliminary management recommendations were identified in the context of the current land use. Preliminary management works were identified where trees present a clear and obvious risk or where further assessment is required.

Of the 85 individual trees recorded, only 14 were identified as requiring preliminary management work, these are detailed in the Tree Survey Schedule included as Appendix B.

T105 a mature English oak situated centrally within an unsurfaced car park in the east of the Site had recently lost a branch (circa 300mm diameter) at 3m on the northern aspect. It was evident from a ground level assessment that this branch was hollowing, with an open cavity at its base, which is highly likely to have contributed to its failure.

A further large diameter (circa 600mm diameter) branch which develops at 4m on the western aspect and extends 10m towards a parking area, similarly, had a branch socket cavity at its base as well as a bulge within the main stem beneath this branch. An initial visual assessment identified this branch as being susceptible to failure.

⁴ <https://gis.welhat.gov.uk/CommunityMaps/>

⁵ <https://magic.defra.gov.uk/MagicMap.aspx>

⁶ <https://ati.woodlandtrust.org.uk/tree-search/>

Bulging within a stem can be a tree response to provide additional support to a limb and not considered a structural weakness, however it can also be a sign of decay where the residual wall of the stem has protruded due to a pocket of decay within the stem behind.⁷

Prior to specifying any management recommendations, it will firstly be necessary to determine the cause of the stem bulge and if any decay is present within the stem. This could be achieved by carrying out an assessment of the branch socket cavity with an endoscope and probe to determine if the hollowing extends into the stem or up the branch. Should this assessment not be conclusive a further assessment using either a resistograph or sonic tomograph should be undertaken to determine if there is a pocket of decay within the stem.

The results of this assessment should determine the future management recommendations and the extent of any pruning work or additional structural support that may be required in order to safely retain this high-quality tree.

The additional 13 trees where preliminary management recommendations have been provided, should have these recommended works actioned within the recommended timescales. This includes the removal of dead branches from above public footpaths, the removal of dead or dying trees from within the Site, the removal of ivy to allow for a visual assessment of stems and the identification of a fungal pathogen where the bracket present at the time of the survey was too degraded to identify.

⁷ The Body Language of Trees C. Mattheck

4. The Proposed Development

The Proposed Development is detailed on the Proposed Site Landscaping Plan included as Appendix E (ref: HCHQ-VGA-XX-XX-DR-AR-00122) and includes the redevelopment of the Hertfordshire Constabulary's Stanborough Headquarters site comprising of the demolition of multiple life-expired buildings and the construction of a new Headquarters with associated car parking and landscaping.

The client's requirements for the new HQ Building are summarised as follows: design an overall building of 9,000msq gross internal floor area and office accommodation for 623 operational staff. As well as office space, the building will accommodate a new restaurant with dining facilities, conference space and communal space for community and partnership engagement. The Decant Building will provide 3,300msq gross internal floor area, office accommodation for 300 operational staff. The Decant Building will provide space for occupational health, gymnasium and fitness facilities, locker space and two floors of office accommodation. Both buildings are seeking to respond to new Policing working methods, providing agile working spaces, addressing staff wellbeing, smarter working considerations and provide designs that are responsive to individual, environmental and comfort controls. The design of the HQ Building will have to accommodate considered spaces that carefully bring together the public, Police and community partnership groups in a safe environment that satisfies the secure-by-design team. The building will require communal spaces, meet- and greet areas, exhibition spaces, conference facilities and restaurant areas to accommodate these activities

In addition to the HQ and Decant buildings, there were several ancillary buildings that have been identified to support the primary development. The brief included the requirement for a new Estates and Facilities (E&F) building to accommodate security/post building. This E&F requirement will need to be located away from the main buildings, so deliveries could be scanned and security checked prior to accessing the secure site. The security/post building was the result of detailed discussions with the Counter Terrorism team. The objective was to keep potential suspect packages away from the main buildings and avoid the need for mass evacuation. In the short term, the security/post building will be used as temporary reception accommodation whilst the demolition and construction programmes are implemented.

The relocation of the dog kennels and dog handler's welfare facilities was also identified as part of these redevelopment proposals. The Police were keen to move the dog kennels and ancillary buildings away from their current central site location closer to the dog training areas on the eastern side of the site and away from primary Police activity.

During the construction programme, there will be a need over a two-to-three-year period to provide catering and canteen facilities for the operational Police staff. Ultimately, this facility will be provided in the new HQ building, therefore will need to be by temporary accommodation. Modular canteen and kitchen facilities were identified as an appropriate short-term solution.

To facilitate this large construction programme phased over a four/five year period, access for construction vehicles needs to be isolated from the operational Police activity. Following discussions with the Gosling Sports Centre, which is immediately north of the Stanborough site, the Police have negotiated a potential access route for construction vehicles. This proposed access route would leave the highway at the northern roundabout at the top of Stanborough Road and access the Gosling Sports Centre site prior to the internal roundabout, the road would branch off on to an established parking area and head south towards the Police site. The proposed route would follow an existing unmade track adjacent to and around the existing driving range prior to entering the Police site on the northern boundary. The existing track would be re-enforced to take heavy contractor vehicles throughout the construction programme. If deemed appropriate at the end of the building programme the self-draining haul road may be left in-situ for use by the Gosling Sports Centre to access sports fields beyond.

5. Arboricultural Impact Assessment

5.1 Purpose

This impact assessment sets out the likely principal direct and indirect impacts of the Proposed Development on the trees on or immediately adjacent to the Site and suitable mitigation measures to allow for the successful retention of significant trees or to compensate for trees to be removed, where appropriate.

A brief summary of trees to be removed, tree works and incursions related to the Proposed Development are detailed within the table below.

Table 2: Summary of Removals, Incursions and Pruning to Facilitate the Proposed Development

Impact	Category A	Category B	Category C	Category U
Trees to be removed to facilitate the Proposed Development	0	T40, G41 (part), G45, T68, T72, T73, T78, T89, T97	H14, H42 (part), T53, T54, T58, T60, T61, T62, T64, T67, T71, T74, T75, G83, T87, G88 (part), G90, G92 (part), T95, T114, T117, T118	T56, G65, T66
Total	0	7 individual trees, 1 group and part of 1 group	16 individual trees, 2 groups, part of 2 group, 1 hedge and part of 1 hedge	2 individual trees and 1 tree group
Trees which may require some incursion into their construction exclusion zone to allow the Proposed Development.	T34, T39, T47, T93, T105	T32, T49, G41, G57, G86, T111	H42, G96	0
Total	5 individual trees	3 individual trees and 3 tree groups	1 hedge, 1 group	0
Trees to be pruned to facilitate the Proposed Development	T47	T49	0	0
Total	1 individual tree	1 Individual tree	0	0

5.2 Trees to be Removed

23 individual trees, three groups, part of three groups, one hedge and part of one hedge are to be removed to facilitate the Proposed Development; this includes seven individual trees, one group and part of one group classed as moderate quality (Category B) and the remaining 16 individual trees, two groups, part of two groups, one hedge and part of one hedge classified as low quality (Category C).

In addition, two individual trees and one tree group of very low quality (Category U) are also recommended for removal. These trees are arguably not suitable for long term retention and their removal is justified regardless of the Proposed Development. These trees are positioned within the red line application boundary.

The loss of these trees is necessary to achieve the construction and landscaping proposals for the Site.

Tree removals will be mitigated with a high-quality scheme of new tree planting and associated landscaping works as detailed in the Site Landscaping Plan (Ref: HCHQ-VGA-XX-XX-DR-AR-00122 rev P01) which will represent an opportunity to enhance the quality, benefits and resilience of trees on Site.

All of the remaining recorded trees can be retained and protected.

5.3 Tree Works

Tree removals and tree pruning works to facilitate the Proposed Development are detailed in the Tree Survey Schedule included as Appendix B. Trees T47 and T49 are to be pruned to provide a 2m clearance of the adjacent proposed single storey structure. This will impact on the outer edge of the canopy only and will not result in a significant negative impact on the health or amenity value of either of these trees.

No additional works to retained trees are likely to be required. All tree work is to follow the principles of *BS3998: 2010 Treework – Recommendations* and must be carried out by suitably qualified and insured contractors. The Arboricultural Association provides a list of contractors who meet these requirements which can be found at www.trees.org.uk.

Should the requirement for additional tree works be identified, this will be discussed with an arboriculturist and no works will be undertaken without the consent of the Local Planning Authority (LPA).

5.4 Incursions within the RPA or Canopy Spread

Existing hard surfacing will be resurfaced within the RPA of trees T32, T34, T39, H42, G57 and G86. The removal of the existing wearing course must be achieved using an excavator with an untoothed bucket, working backwards away from retained trees. All plant must be positioned on existing, intact, hard surfacing at all times. This work will be carried out under arboricultural supervision and works will revert to the use of hand tools only where roots are anticipated or encountered within or immediately below the wearing course. The existing sub-base will be retained intact, will be ameliorated as required and used as the basis for the new surface.

Trees T105 and T111 are currently surrounded by gravel used for vehicular access. New hard surfacing is proposed within the outer RPA of both trees. This will be achieved by carefully excavating the footprint of the new hard surface and assessing the significance of any roots encountered. At this distance from the tree stem, roots are highly likely to be low in diameter and significance and will be able to be carefully pruned back to the edge of the hard surface footprint using clean secateurs to enable standard sub-base construction. The existing use of this area for vehicular access further reduces the likelihood that significant roots will be present.

A new hard surfaced footway is proposed within a currently unsurfaced area within the RPA of G41. This will be achieved using a proprietary raft or tile system installed using no dig techniques (e.g. Cellweb, ArborRaft or equivalent).

New structures are proposed within the RPA of T47 and T49. This will only impact a very small percentage of the overall RPA of these trees and are limited to the outer RPA only. The footings for the structure will be dug by hand and any roots encountered will be assessed by an arboriculturist before being carefully pruned back to the edge of the footprint of the structure. Any concrete used for foundations will be fully contained using a robust impermeable membrane to prevent any leaching of uncured concrete into the root zone of the adjacent trees.

As demonstrated by photograph two in Appendix C of this report, T93 is set at a lower level than the surrounding ground with a raised hard surface bridging the unsurfaced ground around the tree to the north with a lintel and a stepped area of hard landscaping to the south, east and west. It is not possible to fully determine the depth or distribution of the tree's root system in this setting which will depend, at least in part, on the design and past implementation of the engineered landscape around the tree. The proposed design seeks to establish a new ground level equivalent to the level of the base of the tree. However, there is sufficient flexibility to amend the design and proposed levels where necessary to accommodate tree roots at the depth that they are encountered.

The existing hard landscaped area around the tree will be carefully broken out using hand tools. It will be acceptable to utilise mechanical excavators and breakers positioned outside the RPA and reaching inwards where initial trial hole investigations can demonstrate that no roots are present in the immediate area for demolition. The removal of existing structures and material must be supervised by an arboriculturist. Any plant must operate under the supervision of a banksman when working within 5m of any part of the tree. Following the removal of existing structures and surfacing, and confirmation of the rooting distribution and depth of the tree, the design will be reviewed as necessary to ensure a suitable final layout that will not have a significant negative impact on the tree. The removal of large areas of hard surfacing and structures is likely to constitute an improvement in the growing conditions for this tree. New hard surfacing will be installed using a proprietary raft or tile system using no dig techniques where an existing subbase cannot be reutilised for resurfacing.

5.5 The Future Impact of Retained Trees

The retained trees are located well clear of all structures and will not have a significant future impact on the future use of the Site in terms of future growth, shading, leaf or fruit fall. In car parking areas there is no significant change in land use from the existing situation.

The Site contains a significant population of large trees in varying condition. Trees within the Site will require ongoing maintenance and assessment by a competent person to ensure that any risks from tree failure are managed in accordance with best practice. T105 in particular has been highlighted during the tree survey for

further assessment due to the recent failure of a large branch and the current and proposed regular use of the area surrounding the tree for car parking.

All tree works recommended as a result of the preliminary tree survey of the Site, which considered trees in the context of the current use of the Site should be actioned within the recommended timescales. These works are included as preliminary management recommendations in the Tree Schedule in Appendix B of this report.

5.6 Tree Protection

Retained trees are vulnerable to damage from construction activities which can include physical damage to stems and branches following impacts with plant, root severance following trenching, root death or dysfunction following damage to soil structure (caused by the movement of people or machinery on unsurfaced ground) or via the spillage of materials toxic to tree health. The default position is that the RPA and canopy spread of trees to be retained will form an effective Construction Exclusion Zone, secured with robust fencing where no access will be permitted. Where access is necessary within this area special measures such as the use of ground protection and arboricultural supervision are generally required.

Outline tree protection measures are considered in Appendix F of this report. An Arboricultural Method Statement is often required as a condition of planning consent to set out the phasing of site operations, the finalised tree protection measures for the site and to provide detail on how sensitive elements of work are to be achieved in proximity to retained trees. Issues to be addressed by the Method Statement are listed in the Conclusion section of this report.

5.7 Site Organisation, Storage and Use of Materials, Plant and Machinery.

All construction site facilities including site huts, staff and contractor parking and areas for storage will be located outside of the RPA or crown spread of retained trees, including those not specifically covered in this report. Space is likely to be constrained on Site and will need to be carefully considered. The Construction Exclusion Zones identified on the Tree Protection Plan must be fully respected and their location and significance is to be highlighted to all site staff and contractors during the formal site briefing.

The use, mixing and washing of materials can lead to run off or inadvertent spillage into tree root zones. Many substances often used on construction sites can be toxic to tree roots (such as concrete, fuels, salts, builders sand and herbicides) and can result in the death of tree roots and beneficial soil organisms and can have a significant impact on the future health and appearance of the tree.

The storage of materials and arising's can result in an effective raised soil level. This buries tree roots at depths where air and water are less available and can lead to the decline or death of the tree.

For these reasons the storage of materials and any washing, mixing or refuelling will take place in agreed allocated areas at least 5m from the edge of the RPA of retained trees.

Any slope effect must be taken into account and where there is a potential for run off, heavy duty polythene sheeting and sandbags must be in place as bunding to prevent toxic materials reaching RPAs.

Particular care is required where high sided vehicles, long reach machinery and plant with jibs, booms and counterweights are to operate with in proximity to retained trees. A banksman will be used where the movement of plant or long reach machinery occurs within 5m of any part of a retained tree to ensure no damage is sustained.

5.8 Tree Planting

Existing areas of unsurfaced ground must be protected during the demolition and construction phases if they are to be re-used for new plantings. Protection can be achieved using fit for purpose ground protection measures as set out in BS5837:2012 Section 6.2.3 or by creating a fenced exclusion zone. Where protection is not feasible, soil amelioration or replacement works will be required to ensure suitable growing conditions for new trees to fully establish.

Where new trees are to be planted, the minimum planting distances detailed in Annexe A, Table A.1 of BS5837:2012 must be adhered to, to prevent direct damage to services and structures from future tree growth.

New tree planting should be implemented in accordance with the guidance set out in BS8545: 2014 Trees: from nursery to establishment in the landscape – Recommendations.

5.9 Services

No information in relation to services has been made available at this stage.

Where existing services become redundant within the RPA of a retained tree, the default position must be that they be decommissioned and left in situ. Where this is not feasible the following principles are to be observed.

Existing services are to be removed by winching out from an access/inspection chamber located outside of an RPA. It may be acceptable to fill redundant pipe work with an inert material or undertake pipe bursting where necessary within the RPA of retained trees.

Excavation to install services has the potential to result in unacceptable root severance which could result in instability, dysfunction or the death of trees. Repeated incursions are particularly damaging and must be avoided by bundling services wherever possible.

The default position will therefore be that all services be routed outside of the RPA of retained trees. The following general principles will apply and where services must be routed within the RPA of a retained tree this process will be subject to a detailed method statement with approval from the Planning Authority. The principles of the National Joint Utilities Group (NJUG) Volume 4 guidance must be adhered to.

All services must be bundled as far as possible and installed within RPAs using hand/compressed air excavation (e.g. for shallow service runs) or trenchless techniques such as impact moling (thrust boring) with all access pits and inspection chambers being located outside of the RPA. The route must run as far from the main stem of a retained tree as possible and must be at a minimum depth so that the upper 1.5m of the soil profile is undisturbed. The depth of the run may need to be adjusted to account for soil type and species variation and this must be determined subject to the advice of an arboriculturist.

This operation must take place as specified in a Method Statement. Any water pipes must be constructed so as to be resistant to ingress by tree roots (both existing trees, and newly planted trees) which could include the use of root barriers where appropriate.

6. Conclusions

23 individual trees, three groups, part of three groups, one hedge and part of one hedge are to be removed to facilitate the Proposed Development; this includes seven individual trees, one group and part of one group classed as moderate quality (Category B) and the remaining 16 individual trees, two groups, part of two groups, one hedge and part of one hedge classified as low quality (Category C).

In addition, three trees of very low quality (Category U) are also recommended for removal. These trees are arguably not suitable for long term retention and their removal is justified regardless of the Proposed Development. These trees are positioned within the red line application boundary.

Tree loss will be mitigated with a robust and high-quality scheme of new tree planting as detailed in the SiteLandscaping Plan (ref: HCHQ-VGA-XX-XX-DR-AR-00122 rev P01) which represents an opportunity to increase the quality, impact, diversity and resilience of the local tree stock.

Soil structure for areas of new tree planting where the ground is currently unsurfaced will either be protected using ground protection or fenced exclusion zones; or the soil structure will be ameliorated or replaced following the completion of construction works on Site.

6.1 Issues to be addressed by an Arboricultural Method Statement:

- Conditions of planning consent
- Pre commencement meeting and site briefing
- Order and phasing of operations
- Tree works
- Tree protection fencing
- Ground protection
- Site storage and facilities
- Movement of people, plant and materials
- Demolition
- Enabling works
- Installation of new surfacing
- Installation of new structures
- Installation of new services and/or diversion of existing services
- Hard landscaping
- Soft Landscaping
- Removal of tree protection measures

7. References

British Standards Institution (BSI), BS5837:2012. Trees in relation to design, demolition and construction – Recommendations. BSI

British Standards Institution (BSI), BS3998:2010. Tree work – Recommendations. BSI

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Mattheck, C. 2015. The Body Language of Trees, Encyclopaedia of Visual Tree Assessment,

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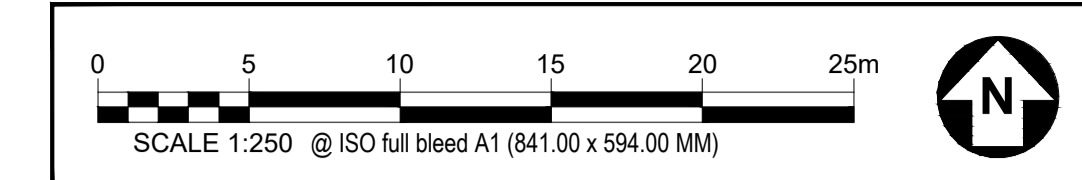
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National Tree Safety Group (NTSG), 2011. Common sense risk management of trees. Forestry Commission.

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Appendix A Tree Constraints Plan

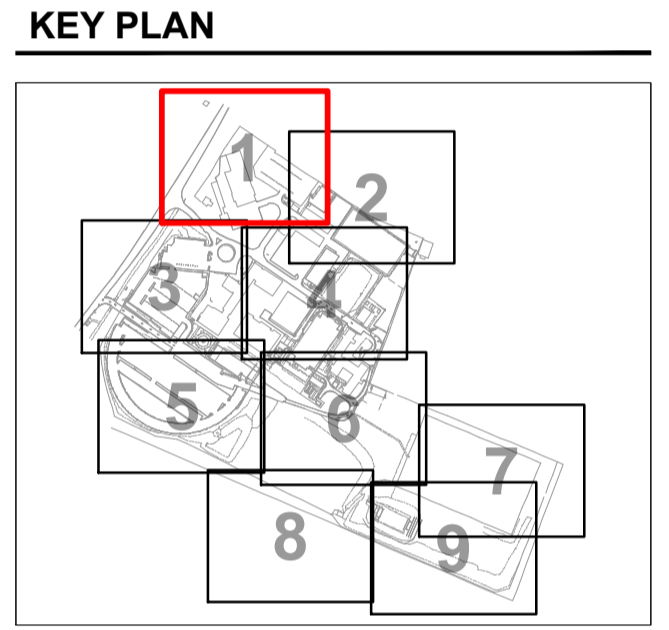


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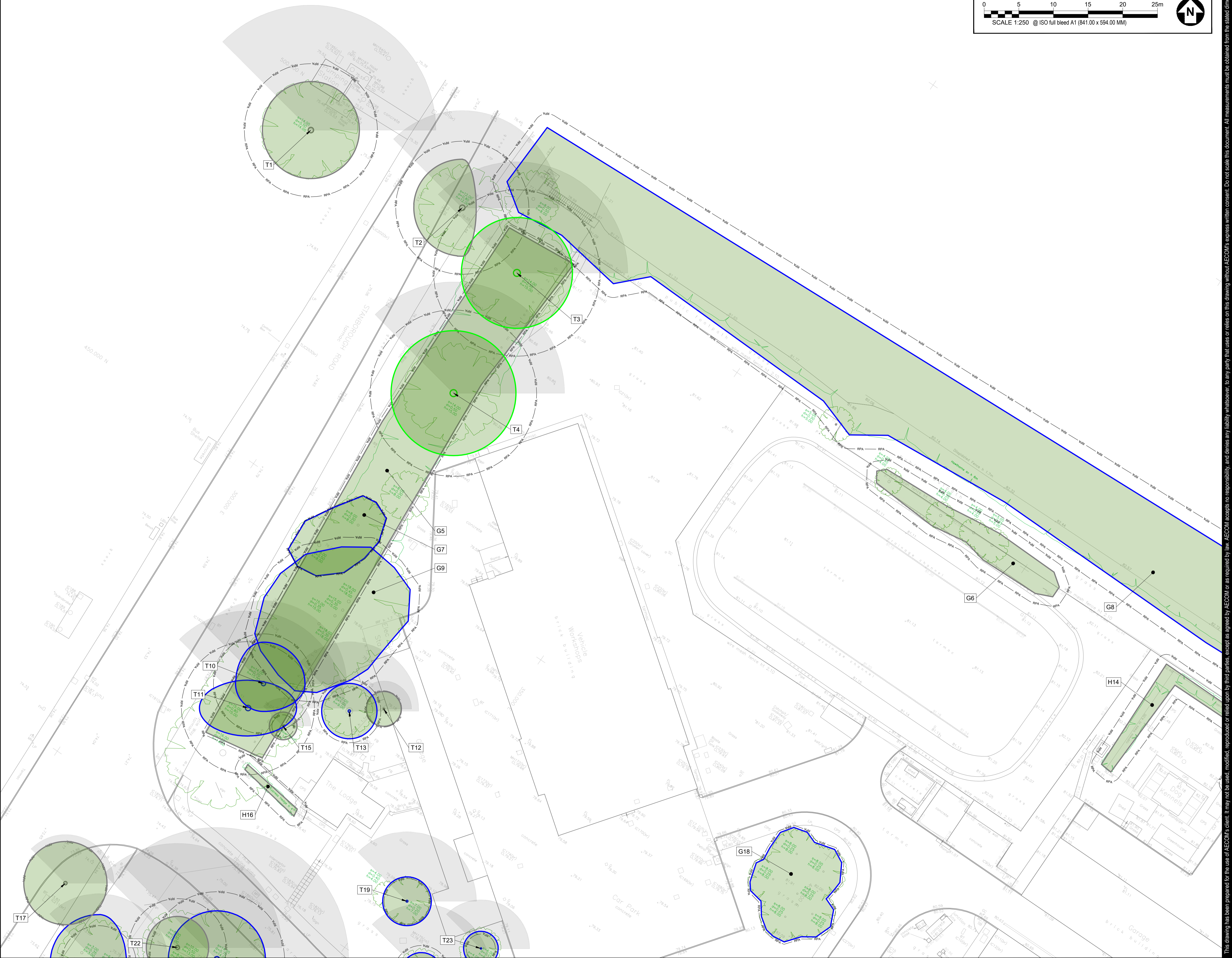
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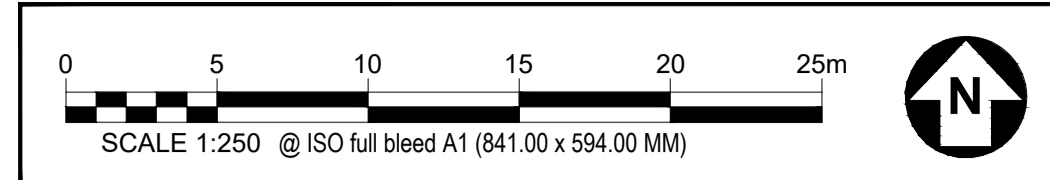
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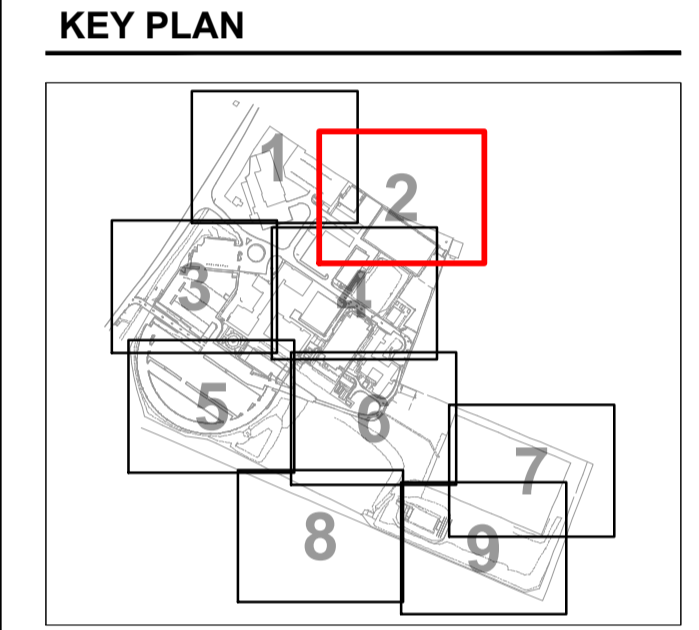
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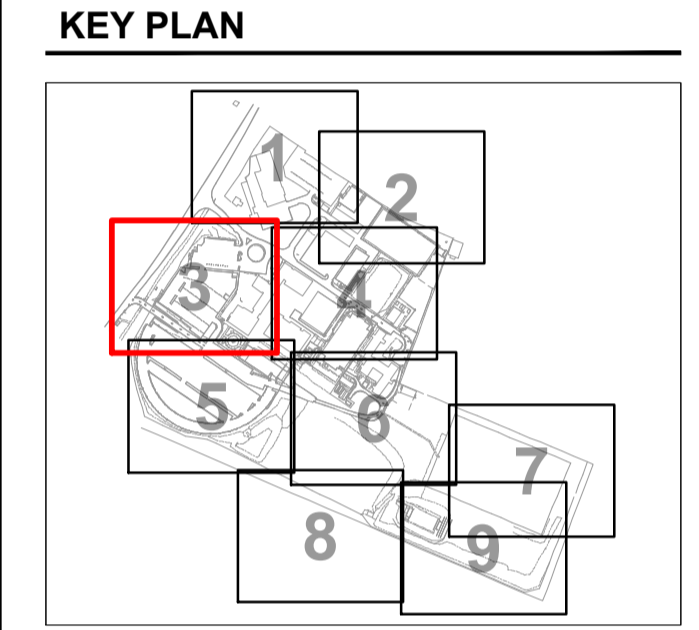
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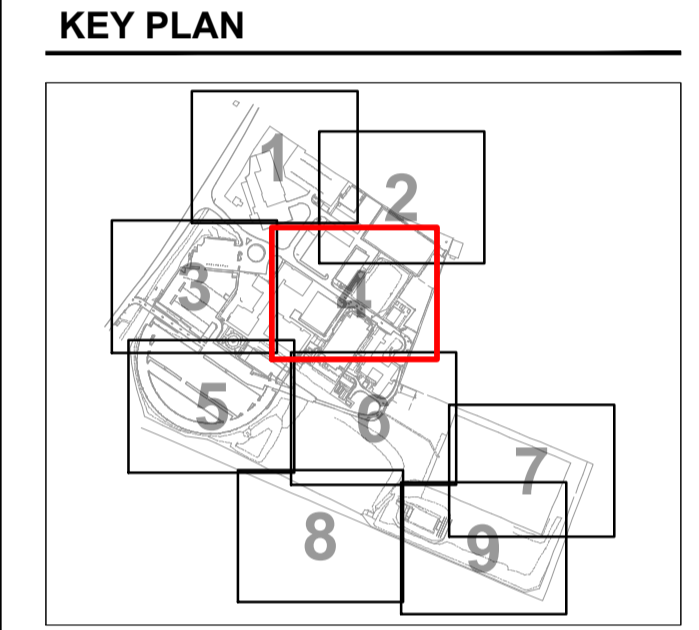


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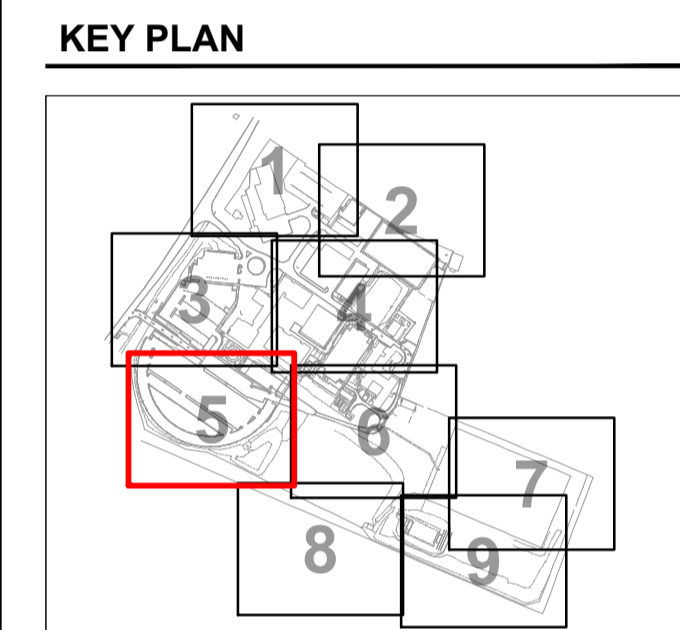
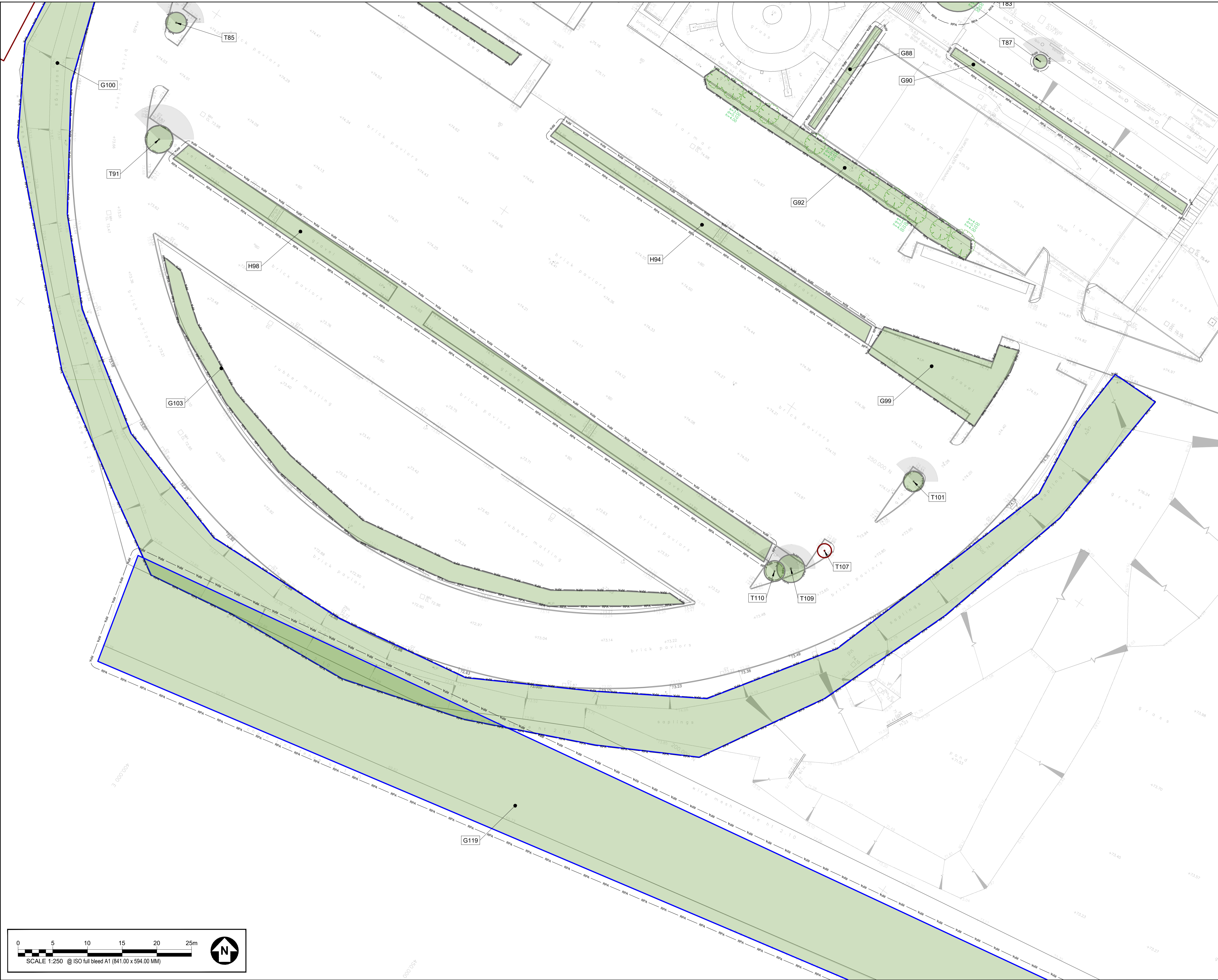
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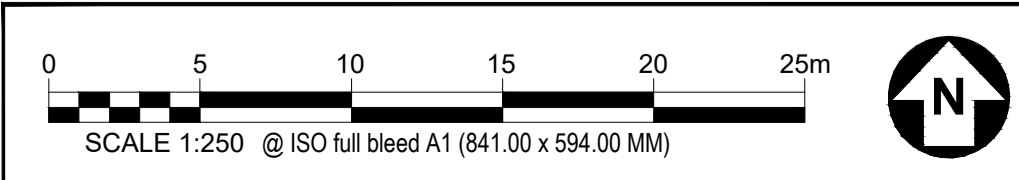
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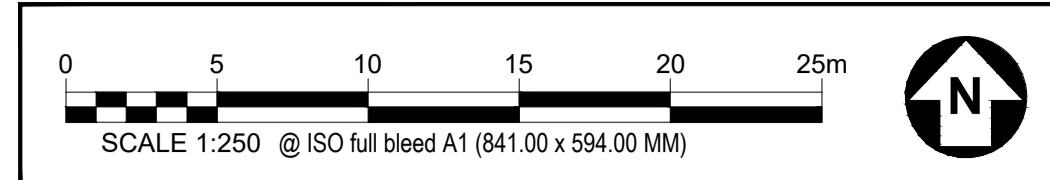
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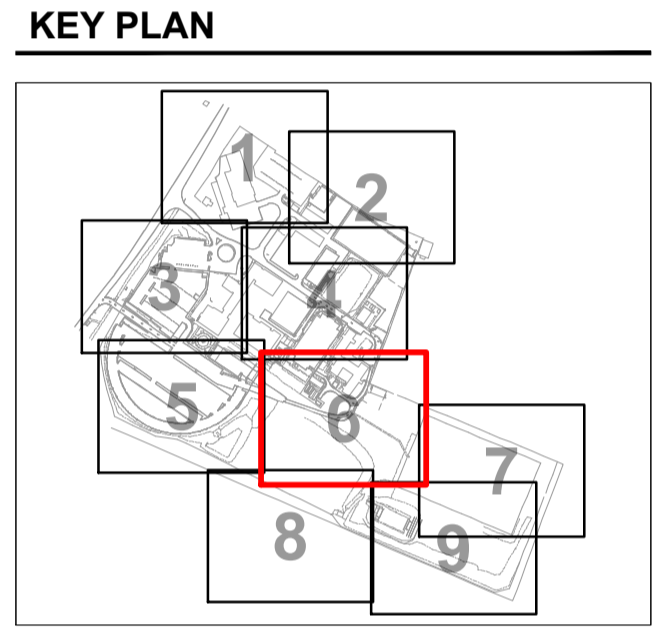


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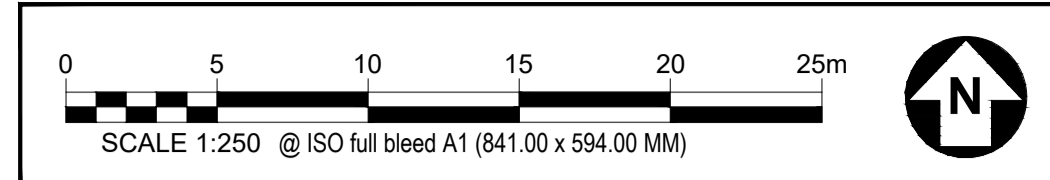
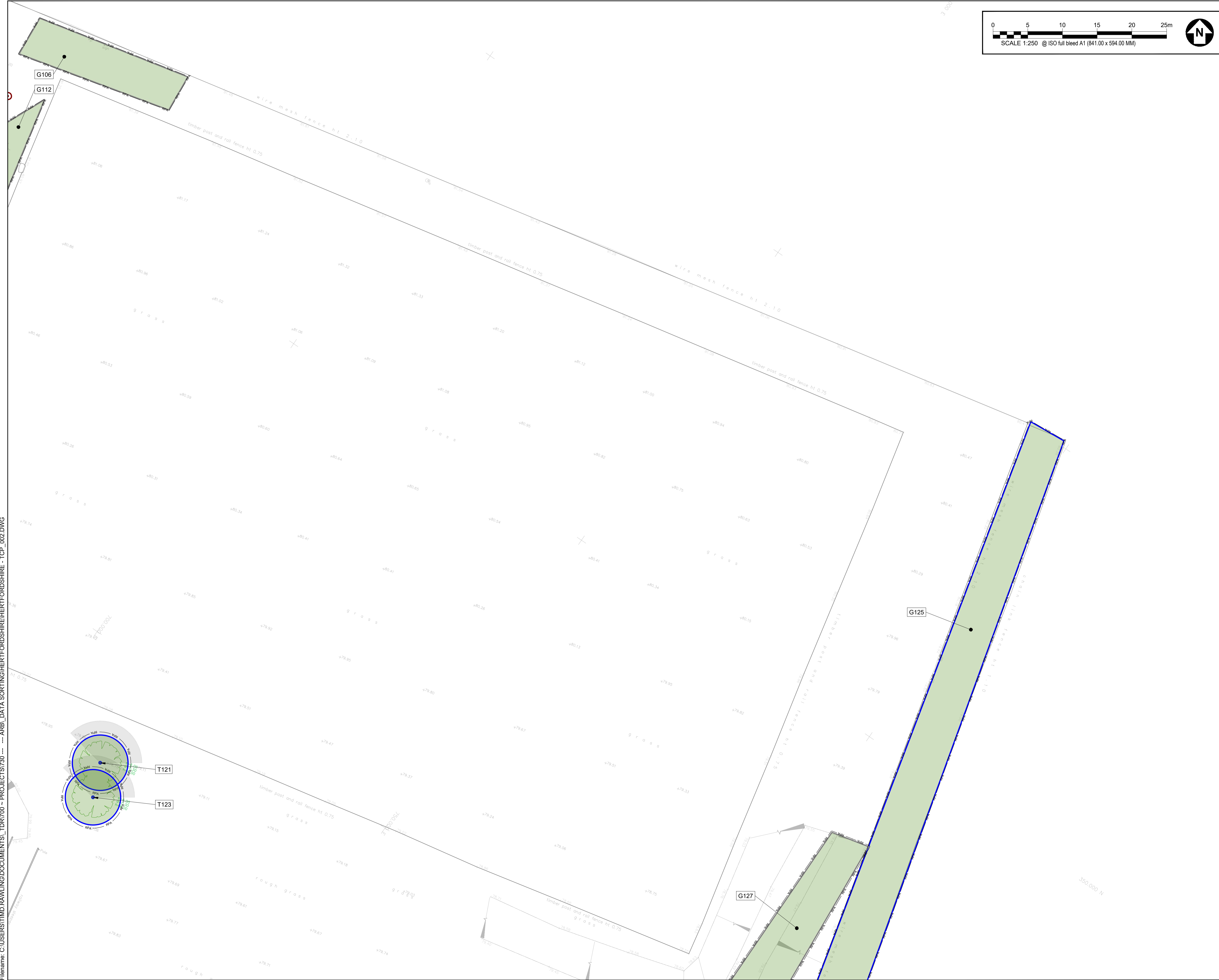
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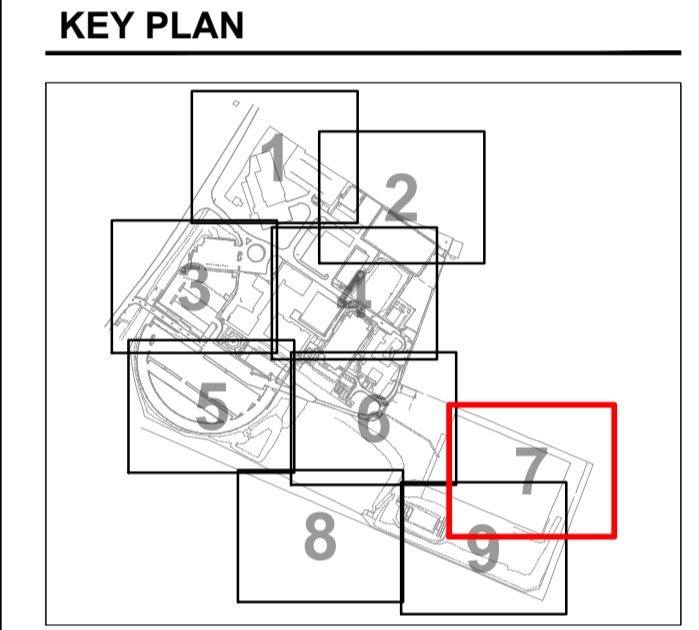
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- GENERAL NOTES**
1. TREE CATEGORIES AS DEFINED BY BS 5837:2012
 2. TREE LOCATIONS ARE BASED ON THE TOPOGRAPHICAL SURVEY AND GPS CO-ORDINATES FROM ON SITE WALKOVER
 3. * INDICATES A TREE / GROUP WHOSE POSITION IS APPROXIMATE AS BASED UPON AERIAL PHOTOGRAPHY AND ON SITE OBSERVATIONS.
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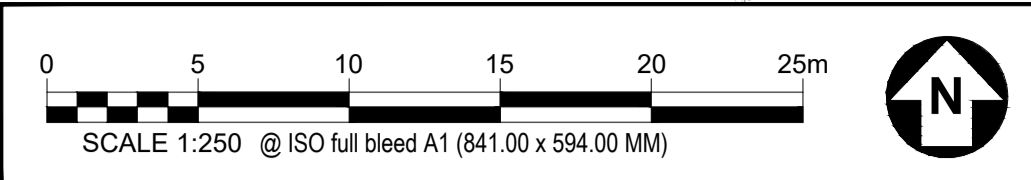
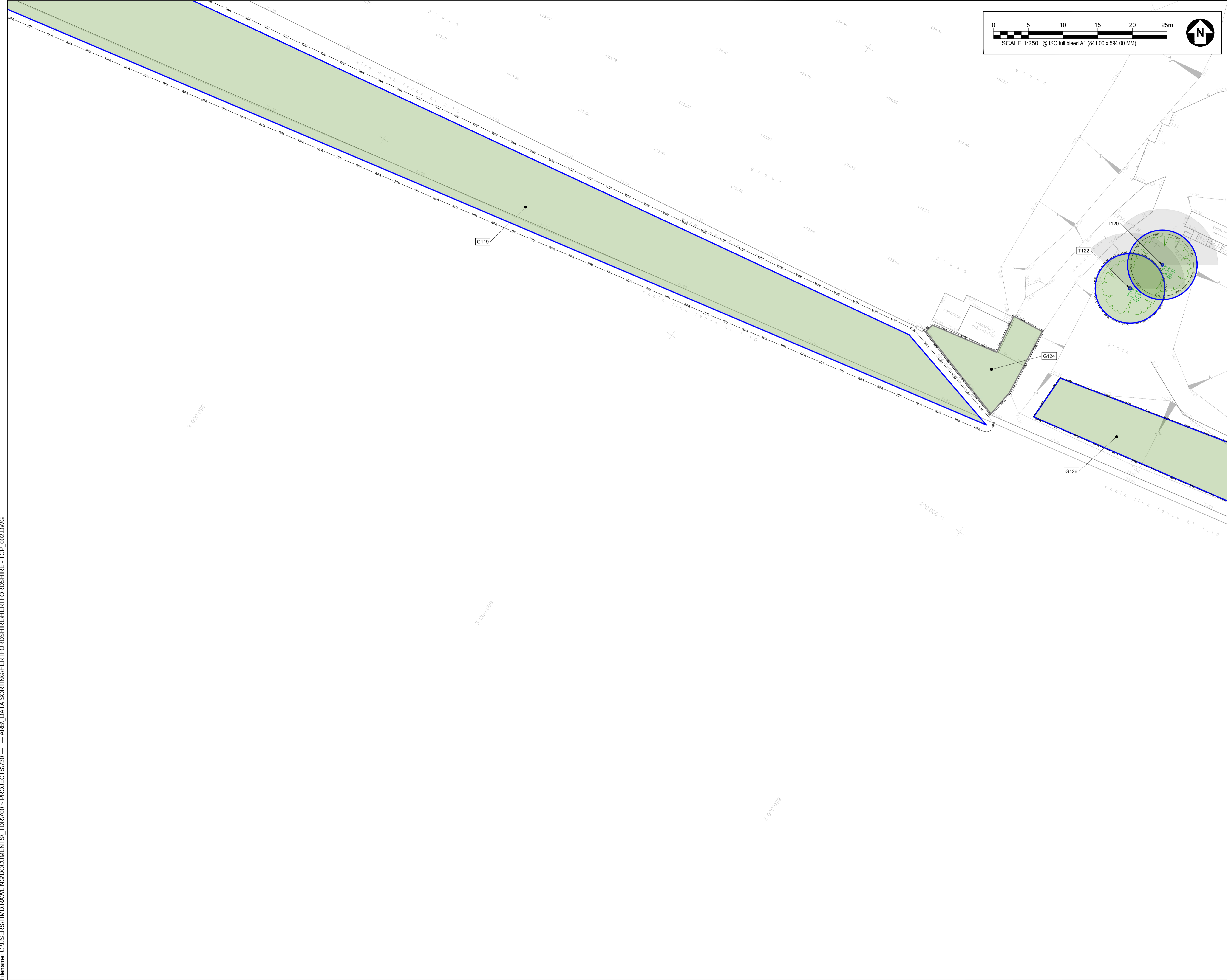
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PROJECT NUMBER
60600329

SHEET TITLE
TREE CONSTRAINTS PLAN
(Sheet 07)

SHEET NUMBER **REV.**
ACM-606003290-TCP-007 P01

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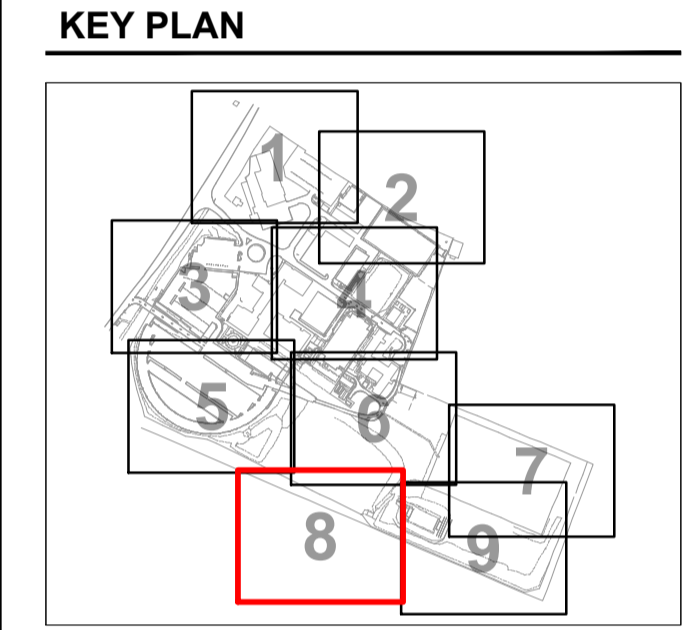


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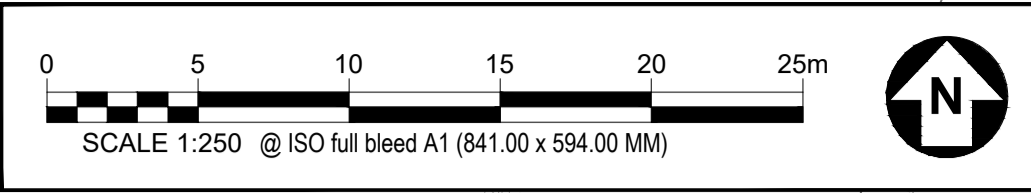
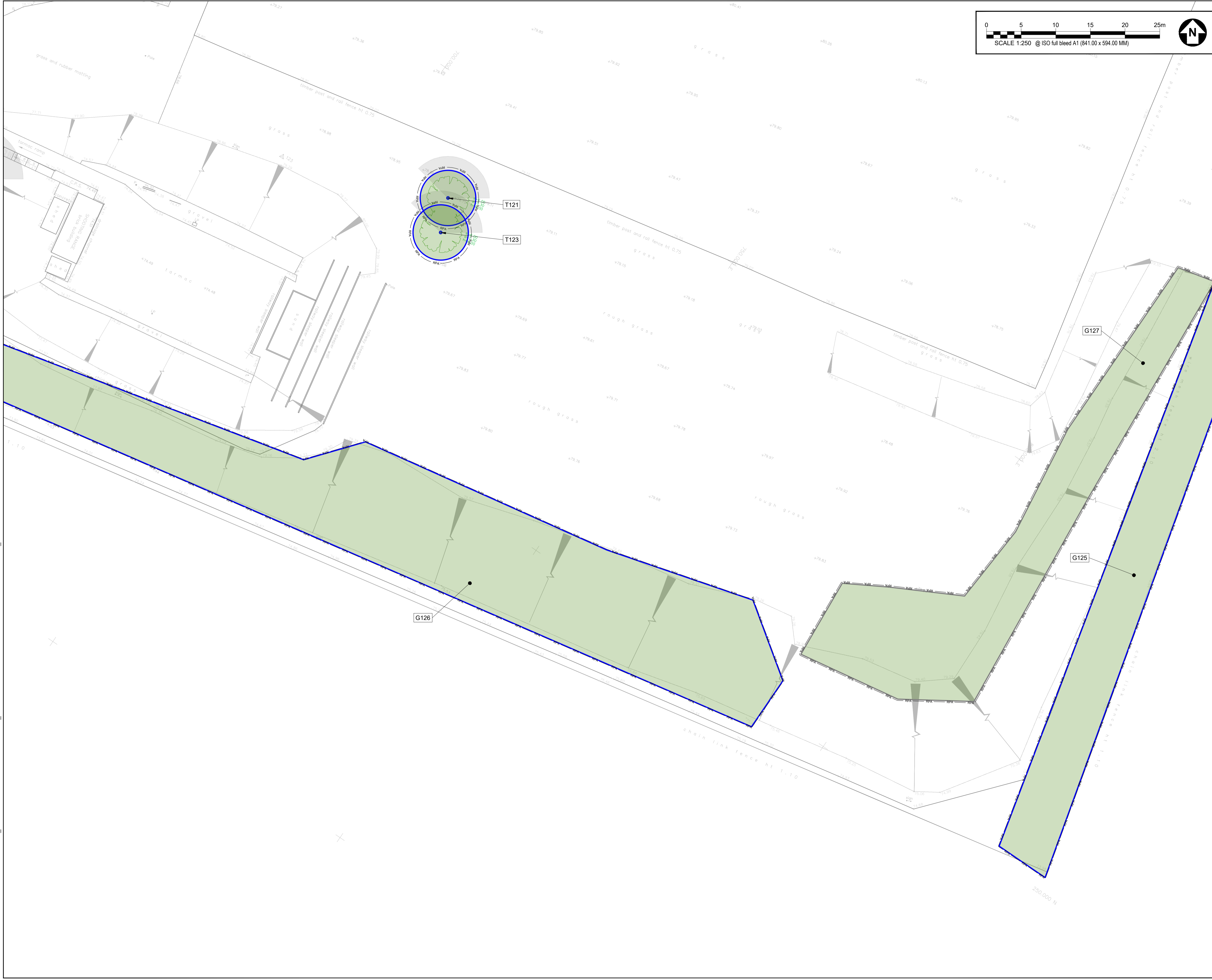
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PROJECT NUMBER
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SHEET TITLE
 TREE CONSTRAINTS PLAN
 (Sheet 08)

SHEET NUMBER **REV.**
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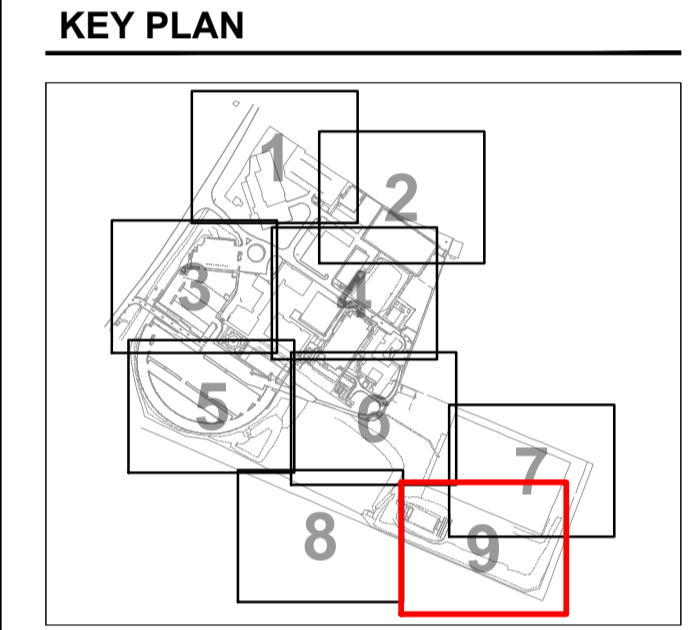


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SHEET TITLE
 TREE CONSTRAINTS PLAN
 (Sheet 09)

SHEET NUMBER **REV.**
 ACM-606003290-TCP-009 P01

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Appendix B Tree Survey Schedule

Tree ID	Species	Estimated Height (m)	Stem Diameter (mm)	Canopy Spread (N)	Canopy Spread (S)	Canopy Spread (E)	Canopy Spread (W)	First Significant Branch (m)	Canopy Clearance (m)	Physiological Condition	Life Stage	Structural Condition	Condition Comments	Preliminary Management Comments	Tree Works to Facilitate the Development	Estimated Remaining Contribution	Category
T1	Ash (<i>Fraxinus excelsior</i>)	18	800	7	7	7	7	2.5/N	5	Good	M	Poor	Twin stemmed from 0.5m with stems fused up to 1.5m. included union between stems increased risk of failure. Situated within green space beyond Stanborough Road			10+	C1
T2	Ash (<i>Fraxinus excelsior</i>)	14	800#	7	7	2	7	1.5/S	5	Fair	M	Fair	Situated offsite within narrow verge between footpath and carriageway. has been reduced in height and spread leaving several branch stubs. Dense ivy cover obscures main stem and base	Remove dead branch from above footpath (< 1 month)		10+	C1
T3	Common Oak (<i>Quercus robur</i>)	16	1000#	8	8	8	8	5.0/S	3	Good	M	Good	Situated beyond boundary fence on steep embankment. Past pruning. Large diameter dead branches noted. Unable to access base			40+	A1
T4	Common Oak (<i>Quercus robur</i>)	16	1000#	9	9	9	9	5.0/N	3	Good	M	Good	Situated beyond boundary fence on steep embankment. Past pruning. Large diameter dead branches noted. Unable to access base			40+	A1
G5	Ash (<i>Fraxinus excelsior</i>), Blackthorn (<i>Prunus spinosa</i>), Hawthorn (<i>Crataegus monogyna</i>)	4	200#	2	2	2	2	n/a	n/a	Fair	M	Fair	Unmanaged tree group situated beyond boundary fence on steep embankment. Dense ivy cover obscures main stems. Unable to access stems. Limited screening value			10+	C2
G6	Hawthorn (<i>Crataegus monogyna</i>), Ash (<i>Fraxinus excelsior</i>)	4	200	1	1	1	1	n/a	n/a	Fair	SM-EM	Fair	Self-seeded tree between car park and boundary fence. Maintained to provide clearance from car park. Limited screening value			10+	C2
G7	Ash (<i>Fraxinus excelsior</i>)	10	400	5	5	5	5	n/a	n/a	Good	EM	Fair	Group of 3 trees situated beyond boundary fence on steep embankment. Dense ivy cover obscures main stems. Moderate screening value			20+	B2

Tree ID	Species	Estimated Height (m)	Stem Diameter (mm)	Canopy Spread (N)	Canopy Spread (S)	Canopy Spread (E)	Canopy Spread (W)	First Significant Branch (m)	Canopy Clearance (m)	Physiological Condition	Life Stage	Structural Condition	Condition Comments	Preliminary Management Comments	Tree Works to Facilitate the Development	Estimated Remaining Contribution	Category
G8	Common Oak (<i>Quercus robur</i>), Ash (<i>Fraxinus excelsior</i>), Hawthorn (<i>Crataegus monogyna</i>), Elder (<i>Sambucus nigra</i>)	8	500	4	4	4	4	n/a	n/a	Good	EM	Good	Offsite tree group forming areas of woodland. Occasional gaps within group. Good landscape and screening value			20+	B2
G9	Ash (<i>Fraxinus excelsior</i>)	17	700#	7	7	7	7	n/a	n/a	Fair	M	Fair	Group of 3 trees situated beyond boundary fence on steep embankment. Dense ivy cover obscures main stems. Unable to access stems. Die back noted with small diameter dead branches possibly ash die back. Provides moderate screening value			20+	B2
T10	Common Oak (<i>Quercus robur</i>)	12	600#	6	4	6	4	5.0/N	3	Good	M	Fair	Situated beyond boundary fence on steep embankment. Unable to access base. Dense ivy cover obscures main stem. Proximity to adjacent tree has resulted in uneven crown formation.			20+	B1
T11	Common Oak (<i>Quercus robur</i>)	14	800#	4	4	7	7	7.0/W	5	Good	M	Fair	Situated beyond boundary fence on steep embankment. Unable to access base. Dense ivy cover obscures main stem. Proximity to adjacent tree has resulted in uneven crown formation. Dead branch above footpath.	Remove dead branch from above footpath (< 1 month)		20+	B1
T12	Laburnum (<i>Laburnum anagyroides</i>)	4	150,150,50	2.5	2.5	2.5	2.5	0.5/W	1.5	Good	EM	Fair	Former garden tree. Second leader develops from base horizontally to west. Within 1m of wall.			10+	C1
T13	Silver Birch (<i>Betula pendula</i>)	10	380	4	4	4	4	3.5/W	1.5	Good	M	Good	Situated within former garden. Past pruning to raise crown with occasional branch stubs			20+	B1
H14	Cypress (<i>Chamaecyparis sp</i>)	4	200	1	1	1	1	n/a	n/a	Good	EM	Good	Maintained hedgerow group, gaps created to allow access, limited screening value		Fell	10+	C2