

AtkinsRéalis



HAVANT THICKET RESERVOIR PROJECT

Pipeline Phase 1 (Shaft 1) Planning Conditions

Arboricultural Impact Assessment Update (Condition 16)

Portsmouth Water

March 2024

Notice

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1. Introduction

Terms of reference

- 1.1 AtkinsRéalis Limited (formerly Atkins) has been commissioned to undertake a tree survey in accordance with the British Standard BS 5837:2012 'Trees in Relation to Design, Demolition and Construction – Recommendations' on behalf of Portsmouth Water to discharge Planning Conditions relating to Phase 1 (Shaft 1) of the outline planning permission for a Pipeline (Ref. APP/20/00991) to transfer water to and from Bedhampton Pumping Station to Havant Thicket Reservoir. The planning applications for the Pipeline and Reservoir (Ref. APP/20/00990 and 51680/001) were approved in October 2021.
- 1.2 This report is an Arboricultural Impact Assessment (AIA) prepared to discharge Planning Condition 16 of the Approved Pipeline Scheme. It reports on the impacts on the recorded trees and is supplemented by a Tree Protection Plan (TPP) which is included within Appendix D of this report. It also confirms whether any of the recorded trees could be classified as veteran specimens. The veteran classification includes trees which might also be classified as ancient.
- 1.3 The survey data captured follows BS5837:2012 guidance as set out in Appendix A of this report. The survey data is presented in a schedule in Appendix B. A glossary of relevant terms is included in Appendix C.
- 1.4 Planning Condition 16 also seeks landscape details, however the permanent footprint resulting from the works will be the new access road required and manhole covers to be installed in the slab cover for Shaft 1. The landowner of the shaft site (Bellway Homes) is seeking planning permission to develop the site for residential use, if this is successful the remaining area of the shaft site will be redeveloped (as a parking area for the housing). On that basis there is no requirement for landscape re-instatement.

Scheme location

- 1.5 The approved pipeline starts from Bedhampton Pumping Station and runs east across the top of open grassland area within Portsmouth Water's land to Shaft 1.
- 1.6 The Shaft 1 site is positioned to the north east of the pumping station and to the south of Bedhampton Train Station, at Grid Reference SU 7006 7349.
- 1.7 The site is located within the jurisdiction of Havant Borough Council.

The Phase 1 Scheme

- 1.8 The Phase 1 Scheme is shown on the TPP (Appendix D) and includes a shaft and a permanent access to the Shaft site from the west, all within the Approved Pipeline Scheme red line boundary. The scheme red line boundary has been used to confirm the impacts of the current proposals on the tree stock within the site extents.
- 1.9 For the construction of the shaft, an open-dug cast in-situ reinforced concrete caisson technique will be utilised. This method allows for adaptation to different ground and groundwater. A temporary vehicle access will be installed to facilitate construction access. The shaft site is positioned in an area of existing hard standing.

Scope of works

- 1.10 This report presents arboricultural information captured by AtkinsRéalis' Associate Arboriculturist and Landscape Manager BSc (Hons), Cert Arb L6 (ABC), M.Arbor.A. He has over 18 years' experience, and is a Professional Member of the Arboricultural Association with a Level 6 qualification in Arboriculture.

- 1.11 The scope of works includes; the survey of trees that could be impacted by the Phase 1 Scheme; the preparation of a TPP which displays in graphic form the trees surveyed and the impact of the works; and the preparation of an AIA which incorporates Arboricultural Method Statement information.

2. Methodology

General

- 2.1 This tree survey has been undertaken in accordance with BS5837:2012 Trees in Relation to Design, Demolition and Construction – Recommendations. The standard gives recommendations and guidance on the relationship between trees and the design, demolition and construction process, setting out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and structures.
- 2.2 BS5837:2012 does not set explicit parameters for measuring the sensitivity of an arboricultural resource; nor does it assess the magnitude of impact of a scheme on trees (other than by providing a record of the number or area of trees that would need to be removed to facilitate the development as presented at time of submission). Rather, the British Standard provides parameters which enable the Arboriculturist to assess the quality of all the trees and other arboricultural features that may be affected by the development that is proposed.
- 2.3 Whilst the BS categories are open to varied interpretation, the guidelines in the cascade chart of BS 5837:2012 (see insert A.1 in Appendix A of this report) provide details on how to determine tree qualities and can be used to inform the design process to retain those trees of higher quality where possible.

Planning policy and definition of veteran trees

- 2.4 The definition of veteran trees for the purposes of this assessment follows the core standing advice and planning policy.
- 2.5 The ‘Standing Advice’ 1 on ancient woodland, ancient trees and veteran trees provides guiding principles for the classification of ancient and veteran trees. These principles are also covered within the Forestry Commission and Natural England (NE) guidance.
- 2.6 The standing advice clearly defines veteran trees as:
- “All ancient trees are veteran trees, but not all veteran trees are ancient. A veteran tree may not be very old, but it has decay features, such as branch death and hollowing. These features contribute to its biodiversity, cultural and heritage value”.*
- 2.7 There is a degree of ambiguity in its definition but it does provide clear guiding principles, namely that veteran trees have:
- Decay features, such as branch death and hollowing; and
 - These features contribute to its biodiversity, cultural and heritage value.
 - The definition of ancient trees supplements this by focusing the definition of veteran trees arguably (but not definitively) on:
 - Great age;
 - Size;
 - Condition;
 - Biodiversity value as a result of significant wood decay and the habitat created from the ageing process; and

¹ <https://www.gov.uk/guidance/ancient-woodland-and-veteran-trees-protection-surveys-licences>

- Cultural and heritage value.
- 2.8 Very few trees of any species become ancient. As such this assessment has proceeded on the basis that the classification of veteran trees should take account of the specific features of trees (size and condition) alongside their biodiversity, cultural and heritage value.
- 2.9 The relevant planning policy is detailed within the National Planning Policy Framework (NPPF) 2018 (and subsequently updated so the latest published version is July 2021). The NPPF provides a joint definition of an ancient or veteran tree:
- Ancient or veteran tree:*** ‘a tree which, because of its age, size and condition, is of exceptional biodiversity, cultural or heritage value. All ancient trees are veteran trees. Not all veteran trees are old enough to be ancient but are old relative to other trees of the same species. Very few trees of any species reach the ancient life-stage’.
- 2.10 This definition extends that within the standing advice to include additional criteria:
- Exceptional biodiversity, cultural or heritage value
 - Old relative to other trees of the same species.
- 2.11 Therefore, in line with this policy veteran trees have been classified in accordance with:
- Size
 - Condition (decay features, such as branch death and hollowing, plus associated species)
 - Exceptional biodiversity value as a result of significant wood decay and the habit created from the ageing process
 - Exceptional cultural and heritage value
 - Old relative to other trees of the same species.
- 2.12 Further guidance to assist in classifying trees as old for their species based on stem size criteria was obtained from Figure 1.3 ‘Chart of girth in relation to age and developmental classification of trees’ from the *Ancient and other veteran trees: further guidance on management* (Lonsdale, 2013). This lists tree species against ascending girth measurements to help define whether a tree is locally notable; veteran/notable; ancient or late ancient.
- 2.13 This chart is not definitive and further criteria as detailed previously is also used in the classification of the trees as veteran or locally notable.
- 2.14 Locally notable trees for the purposes of this assessment include those that can be defined as mature and standing out locally because of large size in comparison to other trees in locality or given the presence of veteran habitat features, but do not meet the criteria to be deemed a veteran tree in line with the approach adopted.
- 2.15 The Woodland Trust’s Ancient Tree Inventory was also accessed (December 2023) to identify if any trees with the Scheme extents have been registered on the Trust’s inventory as veterans or ancient specimens. This is a material consideration as part of this assessment. However, it does not imply the Arboriculturist agrees with their classification, as the approach may have differed to that applied by the Arboriculturist and author of this report.
- 2.16 The NPPF was updated in July 2018 to provide greater protection for veteran trees (and subsequently updated so the latest published version is 2021). The pertinent section is paragraph 180 c), which states: ‘Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused unless there are wholly exceptional reasons and a suitable compensation strategy exists’.
- 2.17 Further planning policy in relation to trees and their impacts is covered within Local Planning Policy set by Havant Borough Council (HBC) detailed within their Local Plan.

Statutory protection

- 2.18 Trees may be protected through a Tree Preservation Order (TPO) or through being located within a Conservation Area. The law on TPOs is in Part VIII of the Town and Country

Planning Act 1990 as amended and in the Town and Country Planning (Tree Preservation) (England) Regulations 2012.

- 2.19 A TPO is made by a local authority in respect of a tree(s) as the tree is considered to bring amenity value to the surrounding area. A TPO makes it an offence to cut down, uproot, lop, top, wilfully damage or wilfully destroy a protected tree without authorisation.
- 2.20 The online mapping resource provided by HBC was accessed (December 2023) to confirm the presence of any TPOs or Conservation Areas within the Scheme extents.

Spatial scope

- 2.21 The survey works focused on trees within the Phase 1 Scheme extent.
- 2.22 This AIA is targeted at the impacts on the trees. It does not cover the subsequent impacts such tree removal would have on ecological or landscape receptors which are outlined in specialist documentation provided by these professional disciplines.
- 2.23 The TPP (see Appendix D) illustrates the trees that have been surveyed.

Survey

- 2.24 The approach to the survey involved a ground-level walked assessment by qualified and experienced Arboriculturists, where access permitted.
- 2.25 The locations of individual trees and the start and end points of groups were, where possible, plotted using proprietary GIS data capture software on Trimble hand-held mobile mappers. These locations were verified using available aerial imagery and topographical survey data showing tree locations.
- 2.26 The extents of groups not surveyed as part of ground level walked assessments were plotted using available aerial imagery.
- 2.27 The arboricultural features are taken from a wider tree survey undertaken for the main pipeline route. Accordingly, their numbers are not sequential, however, they are unique. Individual trees recorded were prefixed with a 'T' (e.g. T001) and groups of trees with a 'G'.
- 2.28 No numbered tree tags were used for the survey, but where already fixed to trees these were noted within the survey schedule.

Data gathering

- 2.29 Data was collected following the guidance of BS5837:2012, as outlined in Appendix A of this report. The purpose of the tree categorisation method applied by the Arboriculturist was to identify the quality and value (in a non-fiscal sense) of the existing tree stock, allowing informed decisions to be made concerning which trees should be removed or retained if development is to occur.
- 2.30 For a tree to qualify under any given category, it should fall within the scope of that category's definition as defined in Appendix A of this report (categories U, A, B, C) and, for trees in categories A to C, it should qualify under one or more of the three subcategories (1, 2, 3). Subcategories 1, 2 and 3 are intended to reflect arboricultural and landscape qualities, and cultural values, respectively.
- 2.31 Trees were recorded as individual specimens or as groups. Where trees were not recorded as an individual specimen, the tree survey data within the schedule is based on what is a reasonable average measurement of the trees/shrubs within the group extents or it's taken from one of the largest specimens within the group.
- 2.32 This level of survey meets the requirements of BS5837:2012, which states that *'trees growing as groups or woodland should be identified and assessed as such'*. The standard defines the term group as *'trees that form cohesive arboricultural features either aerodynamically (e.g., trees that provide companion shelter), visually (e.g. avenues or screens) or culturally including for biodiversity (e.g. parkland or wood pasture)'*.

- 2.33 Crown spreads of the surveyed trees were given as an average measurement where the tree's crowns were balanced or where recorded as a group, woodland or hedgerow. If there was a notable difference in crown spread to a cardinal point, these were recorded. The average measurement was taken from the cardinal point relevant to the direction of the Scheme.
- 2.34 This level of survey is deemed sufficient by the Arboriculturist to establish the extent of the crown spread in the direction of the Scheme. All crown spread measurements should be taken from the tree survey schedules (see Appendix B). The method of measuring diameters is defined in Appendix A of this report and has been applied where access permitted.

Limitations to survey

- 2.35 Where access permitted, trees were identified and inspected from ground level only and were not climbed. No invasive examination techniques (such as increment boring, or internal decay detection) were carried out and as such no assessment of the internal condition of the wood of these trees can be given.
- 2.36 Some trees have not been surveyed as part of ground-level walked assessments due to the trees being within areas not readily accessible or due to Scheme access limitations. The tree data in these areas, where within or adjacent to the Scheme, have been estimated using available imagery and supplementary information taken from points of safety. These trees were largely recorded as groups, in line with the BS5837 guidance on what constitutes a 'group' of trees. Therefore, an outline of the groups was plotted using available aerial imagery to capture the combined crown extents of the groups, meaning the use of exact measurements was not required.
- 2.37 The tree survey undertaken is not intended to be a tree risk management survey targeting safety-related issues. However, where specific hazards have been identified these have been recorded and management recommendations provided. These are detailed within the tree survey schedules (see Appendix B).
- 2.38 Validity, accuracy, and findings of the tree locations will relate directly to the accuracy of the supplied topographical survey data, available aerial imagery and the GIS data capture software used by AtkinsRéalis. As such the accuracy of the tree locations is potentially open to discrepancies and their locations should be checked via measured survey prior to construction.
- 2.39 Where tree groups have been illustrated as an outline, this covers the extents of the tree group. It does not always illustrate individual trees within the groups. Where individual trees were identified they were plotted separately.
- 2.40 The report does not comment on possible effects of trees on neighbouring properties, including in relation to subsidence or heave, or with regard to possible hazards presented by trees surveyed.
- 2.41 Trees are living organisms subject to changes outside human control. Trees and their environment alter with the seasons, and it is as well to inspect trees whilst in full leaf and when out of leaf. Following harsh or unexpected weather conditions, or heavy storms it is also prudent to inspect trees. Changes to ground water conditions will affect the root growth of a tree. Such changes are not always the result of human influence and other factors may be involved.

3. Existing site conditions

Existing land use

- 3.1 The site is currently an expanse of hard standing used to store construction materials. The site has no public access and is bordered by a railway line to the north, further hard standing to the south and east, and a solar field to the west and the grounds of the Bedhampton Pumping Station.

Existing trees

- 3.2 The existing trees are a mixture of individually recorded specimens and groups of trees. These are growing on or adjacent to the boundaries of the site extents. The species present is varied, and ages limited between young to mature specimens.
- 3.3 No trees categorised under BS criteria as being 'Category A' were recorded. These being trees "of high quality with an estimated remaining life expectancy of at least 40 years".
- 3.4 The trees categorised under BS criteria as being Category B' are trees "of moderate quality with an estimated remaining life expectancy of at least 20 years". The survey recorded a few Cat B trees (references G164, G168A, G168B and G168D), these being either Common Oak or Silver Birch specimens growing within and outside of the site extents.
- 3.5 The trees in G164 are a planted group of semi-mature Oak trees growing centrally to the site. At the time of the survey, they were in good vitality, with mutual crown suppression occurring due to the relatively close spacing between the trees. The remaining moderate quality trees were Silver Birch specimens ranging from semi-mature to mature trees. All were showing good vitality at the time of the survey with no apparent significant structural defects recorded.
- 3.6 Trees categorised under BS criteria as being 'Category C' are trees "of low quality with an estimated remaining life expectancy of at least 10 years or young trees with a stem diameter below 150mm". These trees formed groups or sporadic trees on or close to the north boundary of the site (references T162, G163, G168C and T169).
- 3.7 Tree T162 is a semi-mature Common Oak growing within Network Rail land. The tree appears to have self-established given its constrained growing location. The root zone of the tree is likely to be highly modified given the existing extensive hard surfacing within the site. It is likely the roots are concentrated laterally within the bank the tree is growing on, see Figure 3-1 below. The other individually recorded Cat C trees are heavily suppressed and growing as part of the planted group of trees close to the western extents of the site.

Figure 3-1 – Tree T162



- 3.8 The remaining Cat C trees form part of the linear group along the northern boundary of the site as part of a lapsed hedgerow group. There is some evidence of past management with crowns having been cut back away from the site and from the railway line.

- 3.9 The survey schedule provided in Appendix B provides all the information on the recorded trees and includes preliminary management recommendations. These recommendations being in relation to tree risk management operations, including if the Scheme were to proceed and where this would bring people or property in closer proximity to the trees.

Ancient woodland and priority habitats

- 3.10 On review of the MAGIC mapping facility (December 2023) provided by DEFRA (www.defra.gov.uk), no registered Ancient and Semi-Natural Woodlands have been identified adjacent to the Scheme extents.
- 3.11 The MAGIC mapping also identifies areas of deciduous woodland recorded as part of the Priority Habitat Inventory, none are within or adjacent to the site extents.

Veteran trees

- 3.12 No veteran trees have been recorded by AtkinsRéalis' Arboriculturists as part of their survey.
- 3.13 No veteran trees have been registered on the Ancient Tree Inventory within the site extents. [Tree Search - Ancient Tree Inventory \(woodlandtrust.org.uk\)](http://www.woodlandtrust.org.uk).

Statutory protection

- 3.14 The online mapping facility provided by HBC ([Where I Live | Havant Borough Council](http://www.havant.gov.uk)) has been reviewed (December 2023) to confirm the presence of any TPOs or Conservation Areas that maybe impacted upon by the Scheme and those directly adjacent.
- 3.15 There are no trees covered by a TPO and no trees within or in proximity to the Scheme are located within a Conservation Area.
- 3.16 Trees should be checked for protected species before works are undertaken. While it is outside of the scope of this tree survey to comment on the confirmed or likely presence of protected animal species, it is against the law to disturb bats or their roosts under the Conservation of Habitat and Species Regulations (2010). Likewise, nesting birds are protected by the Wildlife and Countryside Act (1981) (as amended).

4. Arboricultural impacts

General

- 4.1 This report determines the impact of the works on the recorded tree stock. It provides details on the recorded trees including their condition and in some cases suitability for retention.
- 4.2 The report is supplemented by the TPP (Appendix D) that illustrates the Scheme and the recorded trees and trees that would require removal to facilitate the works.
- 4.3 The TPP is drawing number HTR-ATK-PZ-BR-DR-L-0014.
- 4.4 The tree survey schedules within Appendix B of this AIA cover all the trees recorded as part of this assessment in line with the BS5837:2012 guidance.

Root protection areas

- 4.5 The root protection area (RPA), as defined in the BS5837:2012, is the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority. This area should be protected from disturbance "in order to avoid unacceptable damage to the tree as a result of severance or asphyxiation of the root system."
- 4.6 The recommended minimum area (m²) to avoid potentially harmful disturbance has been calculated and entered into the tree schedules (see Appendix B) for all trees. The RPA for

each individual tree has been illustrated on the TPPs as a circle centred on the tree's stem, while the RPAs of the tree groups and woodlands have been illustrated as an offset from the canopy extents, unless trees have specifically been recorded within the groups.

- 4.7 The calculation of the RPA does not consider existing site conditions that could affect the morphology of the tree roots, and 'modifications to the shape of the RPA' (para 4.6.2; BS5837:2012) can be undertaken through arboricultural assessment. However, as part of this assessment no modifications have been undertaken. Where existing ditches or hard surface infrastructure are located the spread of the tree roots is likely to be highly modified.

Scheme site

- 4.8 The shaft site has been positioned to avoid trees where possible. Access to the site is illustrated on the TPP and again has been positioned where possible to avoid trees.

Arboricultural impacts and mitigation

- 4.9 The impacts of the works have been assessed and no trees would need to be felled to accommodate the Scheme. G165 would need to be cut back to facilitate the access route, and this has been reflected on the TPP. This group forms part of a lapsed hedgerow and the cutting back or flailing of the area within the proposed access route will have no determinantal impact of the remaining trees/shrubs in the group. The area to be cut back would need to be confirmed on site with the supervising Arboriculturist or the Ecological Clerk of Works who has been briefed by the Arboriculturist, and once protective fencing has been installed to protect the remaining trees in the group and other trees within the site extents.
- 4.10 Given the presence of the existing hard surfacing within the shaft site no tree impacts have been identified to facilitate the works. The hard surfacing will protect any roots that could be extending into the site.

Preliminary management recommendations

- 4.11 The tree survey schedules (see Appendix B) show management recommendations for those trees which at the time of the survey were identified as requiring management intervention. These works are in response to hazards recorded during the tree survey.
- 4.12 The works are recommendations and tree owners and managers are advised to seek further guidance should a tree on their land require management outside of the Scheme.

5. Outline Arboricultural Method Statement

General

- 5.1 The purpose of this Outline Arboricultural Method Statement (Outline AMS) section is to describe the tree protection measures required during the implementation of the Scheme in line with guidance from the British Standard BS5837:2012 'Trees in Relation to Design, Demolition and Construction – Recommendations'.
- 5.2 It sets out the following information:
- Requirements and information for pre-commencement briefings
 - The roles and responsibilities associated with the delivery of the protection measures, control and communication
 - Mitigation measures to be recorded and implemented
 - Review and monitoring mechanisms

Pre-commencement operations and site briefings

- 5.3 Where trees previously identified for retention are required to be removed as part of construction phase then this information shall form part of the consultation process with the relevant stakeholders. The appointed Principal Contractor would need to ensure that such changes do not give rise to any materially new or materially different environmental effects in comparison with those reported in this AIA.

Work package plans and task briefing sheets

- 5.4 The requirements for tree protection measures shall be included within Work Package Plans (WPPs) and Task Briefing Sheets (TBSs) produced by the appointed Principal Contractor as part of the planning of construction activities. All pre-commencement briefings shall make sure all members of staff working or visiting the area of site being worked upon are aware of the individual responsibilities regarding trees and the tree protection measures required to be in place to continue construction.
- 5.5 In the approval of WPPs and TBSs the reviewer shall make sure any protection of trees has been considered within the area and seek confirmation with either the supervising Arboriculturist or Ecological Clerk of Works (ECoW) if further clarification is required.
- 5.6 The pre-commencement site briefings shall be attended by the construction manager or suitable delegate. They shall raise awareness with the relevant parties of the trees within the working extents and confirm the requirements for tree related information to be included within induction material and daily briefings to members of staff working or visiting that area of the Scheme.
- 5.7 The briefings shall also confirm the following:
- The location of tree protective barriers
 - Tree works to facilitate that phase of the Scheme
 - Site specific mitigation measures
 - Where/when arboricultural supervision will be required
 - Contact details
- 5.8 Overseeing management of the site will be directed by the Applicant (Portsmouth Water).

Site supervision

- 5.9 The supervisory role shall be performed by a suitably qualified Arboriculturist. The frequency of these visits should align with key milestones identified in Table 5-1 below and shall be undertaken as required during the progression of the Scheme to enable an auditable succession of monitoring events for a review of the protection measures implemented for the trees.

Table 5-1 – Programme of site supervision

Programme	Arboriculturist or delegate	Supervision
Pre-commencement site meeting	Arboriculturist	a) Confirm location and specification of tree protective barriers b) Confirm tree works to be undertaken c) Confirm requirements for tree protection information to be included in induction details for the site d) Confirm requirements for reporting any tree related incidents

Programme	Arboriculturist or delegate	Supervision
		e) Confirm ongoing arboricultural monitoring and contact details.
Setting out of protective barriers	Arboriculturist	a) Review location and specification of tree protective barriers b) Confirm any additional tree protection measure requirements c) Submit site monitoring pro forma to the Client.
Post-construction	Arboriculturist	a) Inspect all retained trees to make sure they have not been damaged during the construction operations b) To instruct any remedial works that may be required should a tree defect be identified as a result of the construction operations.

5.10 On completion of each site visit a report or site note should be completed by the arboricultural specialist.

5.11 Where emergency matters arise regarding trees, e.g. unexpected access required within construction exclusion zones or damage to retained trees, then an Arboriculturist is to co-ordinate a visit to the site in person or delegate their powers to a suitably qualified person.

5.12 Any variations or incidents related to trees shall be reported in writing to the Applicant, or the Project Management Consultant appointed by the Applicant. Details of the variation(s) or incident(s) shall incorporate photographic evidence and site note(s) as appropriate. Suitable remedial measures, including potentially the provision of new planting where deemed appropriate.

Tree Protection Plans (TPPs)

- 5.13 The tree protection plan (TPP) (Appendix D) includes the locations of protection fencing to be required during the construction stage.
- 5.14 The protected areas once installed shall not be moved or altered without approval by the Arboriculturist and, where necessary following consultation with the local planning authority.

Construction Exclusion Zone (CEZ)

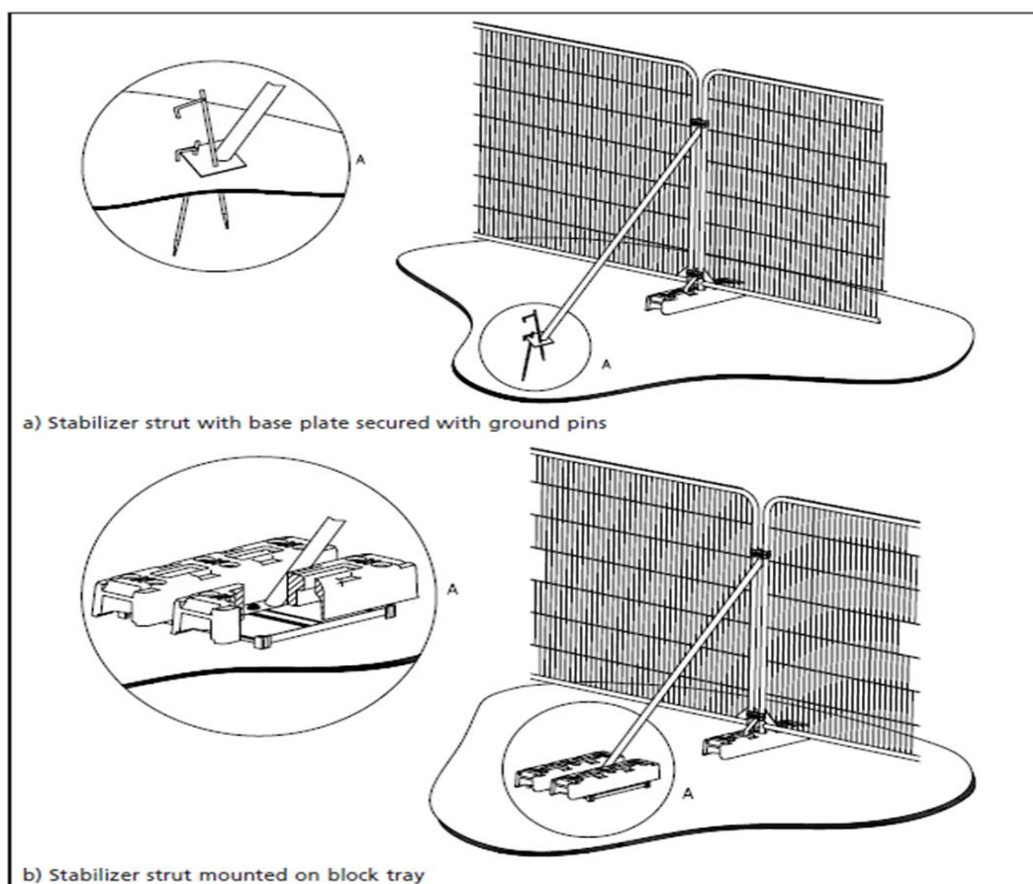
- 5.15 The CEZs can be defined as all the soft surfaces within the RPAs of retained trees outside of the works areas and the areas behind the tree protection fencing or site hoarding.
- 5.16 Site operations not permitted in the CEZs without consultation with an Arboriculturist include storage of plant, equipment or materials, vehicular or plant access, washing down of vehicles or machinery, handling, discharge or spillage of any substances, including cement washings, and actions likely to cause localised waterlogging. No mechanical digging, scraping or excavation shall be permitted in the CEZs, nor earthworks or changes in the finished ground levels other than those agreed by an Arboriculturist.

Tree protective barriers

- 5.17 The fencing should be erected before the commencement of works and kept in place throughout the duration of the works.
- 5.18 The protective barriers could comprise a heras type fencing, i.e. 2m tall welded mesh panels on rubber or concrete feet. The panels are to be joined together using a minimum of two anti-tamper couplers, installed so they can only be removed from inside the fence. The distance between the fence couplers is to be at least 1m and is to be uniform throughout the fence; the

panels are to be supported by inner side stabiliser struts attached to a base plate secured on a block tray. See Figure 5 below.

Figure 5-1 - Tree protection fencing



- 5.19 The protected areas shall be seen as sacrosanct and once installed shall not be moved or altered without recommendation by an Arboriculturist.

Compound areas

- 5.20 The locations of site accommodation, temporary buildings and areas used for storage of materials are to be located outside of the CEZ' of retained trees as defined within the TPPs.

Tree works

- 5.21 All tree works are to be undertaken in line with current recommendations in accordance with BS3998:2010 Tree Work – Recommendations, and comply with the current Arboriculture and Forestry Advisory Group (AFAG) or applicable Forestry Industry Safety Accord (FISA) advice published by the Health and Safety Executive (HSE) or FISA.
- 5.22 Tree works are to be planned to ensure protection of people, property and wildlife. If the works are to be undertaken during the bird nesting season, then advice is to be sought from the ECoW prior to undertaking tree works.
- 5.23 The trees to be removed or worked upon for facilitation, such as pruning, shall be clearly marked by the supervising Arboriculturist prior to any tree works commencing on site. These works are to be agreed with the supervising Arboriculturist. and ECoW where required. The method of removal shall be informed by the site and ecological constraints.

Tree works schedule

- 5.24 All current trees and areas of trees for removal are illustrated on the TPP.
- 5.25 The method of removal shall be informed by the site constraints.

APPENDICES

A. Key & British Standard 5837:2012 Survey Table

Survey key

Tree No: Sequential reference number given to the tree or group of trees as shown on the tree survey drawings.

Species: This is the common name given to the tree. The botanical name is sometimes given.

Height (Ht.): tree height from the base of the tree to its full stem height, measured in metres (m). Measurements are taken to the nearest half metre.

Stem diameter (mm): measured in accordance with Figure A2 below. Measurements are rounded to the nearest 10mm in some cases.

Branch spread (m): measurement of crown spread to the four cardinal points; if the crown is balanced a single measurement is given. Crown spread plotted on the tree survey drawings. Measurements are taken to the nearest half metre.

1st significant branch and direction of growth (m): measurement of the height of the first significant branch above ground level, given in metres and direction of growth e. g. 2. 4-N

Canopy height (m): height of the canopy above ground level. Measurements are taken to the nearest half metre.

Life stage: The following abbreviations are used:

Y = Young trees <1/5 life expectancy.

SM = Semi-Mature trees 1/5 – 2/5 life expectancy.

EM = Early Mature trees 2/5 – 3/5 life expectancy.

M = Mature trees 3/5 – 4/5 life expectancy

OM= Over-Mature trees >4/5 life expectancy

VET = veteran tree

Vitality: Good, fair, poor or dead

Good – a tree with little or no obvious physiological defects; leaf density and colour are typical for the species, bud, flower and fruit production are good and there are no signs of dieback at any point throughout the crown.

Fair – a tree with moderate physiological defects; leaf density is less than typical for the species, leaf cover is chlorotic, bud, flower or fruit production are deficient, there are signs of minor dieback within the crown, there is a moderate degree of deadwood within the crown.

Poor – a tree with major or multiple physiological defects; evidence of extensive crown thinning, bud, flower or fruit production is poor or missing, there are signs of advanced dieback throughout the crown, there is extensive or major deadwood throughout the crown.

Dead – a tree that has died due to either old age, drought, disease, pest infestation, physical damage to the main stem or rooting system, or a combination of these factors.

General observations, particularly of structural and/or physiological condition: e. g. observations of any decay and physical defect.

Preliminary management recommendations: any identified preliminary management to rectify defects recorded in general observations. These may include the need for further detailed inspection, or works to address immediate hazard to life or property.

Estimated remaining contribution, in years:

<10

10+

20+

40+

Category grading: As per BS 5837:2012 chart in accordance with Figure A3 below.

A – Illustrated as light green (RGB code 000-255-000)

B – Illustrated as mid blue (RGB code 000-000-255)

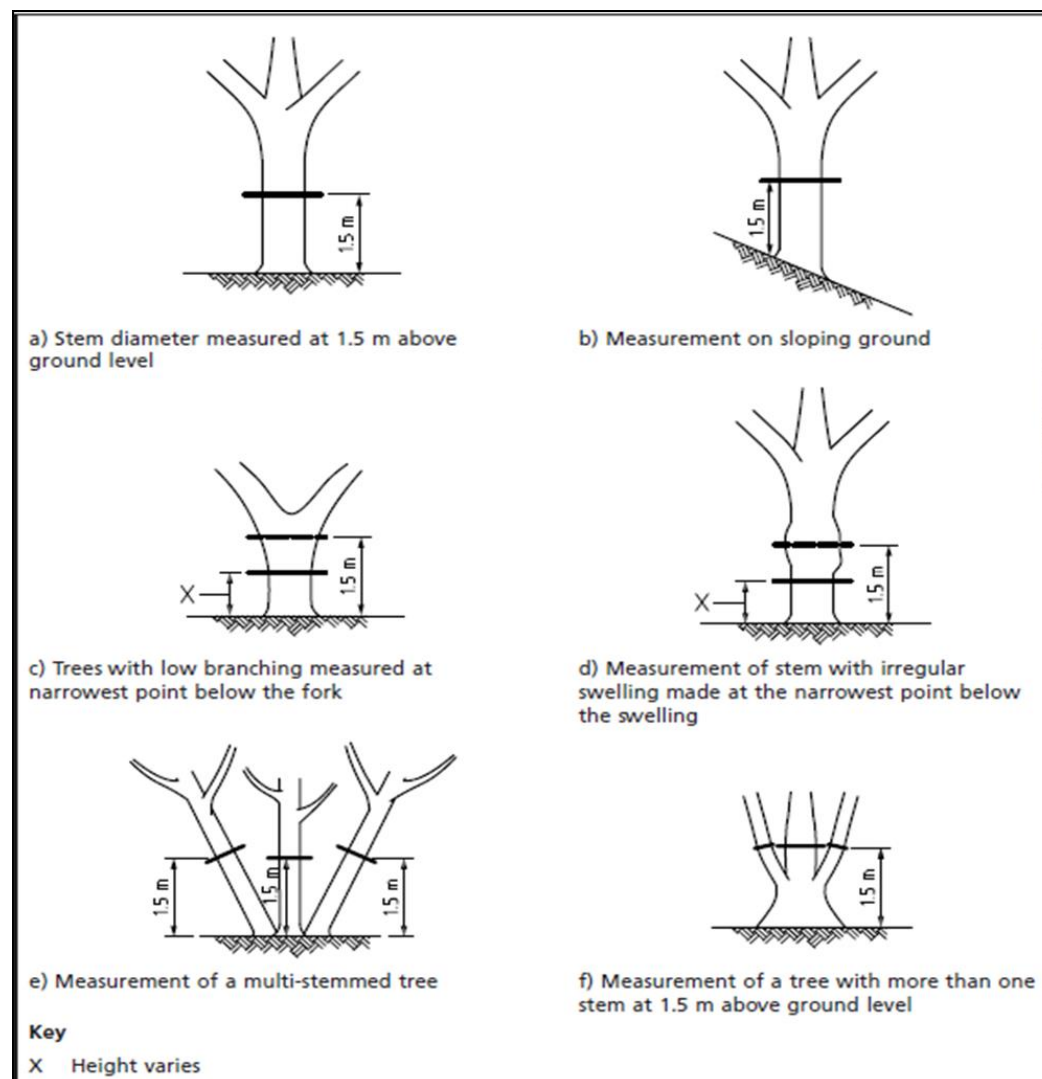
C – Illustrated as grey (RGB code 091-091-091)

U – Illustrated as dark red (RGB code 127-000-000)

Root Protection Area (m): plotted around each of the trees on relevant drawings, illustrating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability. The protection of the roots and soil structure is treated as of paramount importance.

Measuring table

Measurement of tree stems dependant on tree form.



BS 5837:2012 cascade chart

Cascade chart for tree quality assessment from BS 5837:2012

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)	Identification on plan
Trees unsuitable for retention (see Note)		
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	- Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) - Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline - Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality <i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i>	See Table 2
Trees to be considered for retention		
1 Mainly arboricultural qualities		
2 Mainly landscape qualities		
3 Mainly cultural values, including conservation		
Trees to be considered for retention		
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees with material conservation or other cultural value
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees with no material conservation or other cultural value

B. Tree survey schedule

Tree ID	Species	Height (m)	Stem Dia (mm)	Branch sp'd N (m)	Branch sp'd E (m)	Branch sp'd S (m)	Branch sp'd W (m)	1st significant branch ht (m)	Canopy height (m)	Life Stage	Vitality	General observations	Preliminary management recommendations	Est'd Remaining Contribution (Yrs)	Cat Grading	RPA Radius (m)
T162	Common Oak	8	350	6	6	6	6.0	2-S	1.5	SM	Good	Growing railway side of fence. Existing hard surface to south of tree. No obvious direct damage recorded from surface root activity. Root zone highly modified. Railway infrastructure to north. Low crown height. Goblet shaped crown.	No works presently required	10+	C2	4.2
G163	Ash, walnut, bay	5	250	4	4	4	4.0	N/A		Y to SM	Fair	Informal group. Growing on railway land. Bases not accessible or visible. Dense ivy on chain link fence. Existing hard surface site side of trees. No obvious direct damage recorded from surface root activity.	No works presently required	10+	C2	3.0
G164	Common Oak	12	300	4	4	4	4.0	N/A	1.5	SM	Good	Group of four planted trees. Redundant tree stakes present. Bases inaccessible. Mutual crown suppression. Approx 10m from chain link site fence.	No works presently required	20+	B2	3.6
G165	Hawthorn, blackthorn, elder	3.5	100	2	2	2	2.0	N/A	0	SM	Fair	Lapsed hedgerow at east extents. Standing water to south form part of east extents.	No works presently required	10+	C2	1.2
G168A	Silver Birch	14	480	5	5	5	3.0	3-NE	1	M	Good	Part of informal planted group.	No works presently required	20+	B2	5.8
G168B	Silver Birch	17	550	6	6	6	4.0	4-NE	0.5	M	Good	Slight lean to east. Correcting in upper crown. Decay entry point at hold branch wounds.	No works presently required	20+	B2	6.6
G168C	Silver Birch	6	400	4	3	2	6.0	N/A	2	EM	Fair	Dieback in upper crown. Hanging broken branches to north.	Remove hanging broken branches. Remove dead wood.	10+	C2	4.8
G168D	Silver Birch	10	400	2	3	6.5	5.0	0.5-S	0.5	EM	Good	Co-dominant stems from approx. 1.5m. Union appears sound. Mutual crown suppression.	No works presently required	20+	B2	4.8
T169	Ash	16	600	0	8	8	8.0	N/A	0	M	Fair	Growing on railway land. Crown cut back to north. Remaining crown extending into site. Extensive pruning wounds. Limited long term useful remaining life expectancy	No works presently required	10+	C2	7.2

C. Glossary of terms

Term	Description
Access Facilitation Pruning	One-off tree pruning operation, the nature and effects of which are without significant adverse impact on tree physiology or amenity value, which is directly necessary to provide access for operations on site.
Adaptive Growth	The process whereby wood formation is influenced both in quantity and in quality by the action of gravitational force and mechanical stresses on the cambial zone
Amenity Value	The environmental and landscape benefits of trees as opposed to their commercial value for timber
Ancient Woodland	Sites which have been wooded since at least 1600, as defined by English Nature and recognised as being of high nature conservation value, whether managed or not. They may be semi-natural or replanted.
Arboricultural Method Statement	Methodology for the implementation of any aspect of development that is within the root protection area, or has the potential to result in loss of or damage to a tree to be retained.
Arboriculture	The study and care of trees and other woody vegetation
Arboriculturist	A person who has, through relevant education, training and experience, gained expertise in the field of trees in relation to construction.
Cavity	An open wound, characterised by the presence of decay and resulting in a hollow
Co-dominant stems	Where a tree's main stem splits into two leaders, can also be called twin-stemmed.
Competent person	A person who has training and experience relevant to the matter being addressed and an understanding of the requirements of the particular task being approached.
Construction	Site-based operations with the potential to affect existing trees.
Construction Exclusion Zone	The area based on the root protection area to which access is prohibited for the duration of a project.
Coppice	A traditional method of woodland management in which young tree stems are repeatedly cut down to near ground level. In subsequent growth years, many new shoots will emerge, and, after a number of years the coppiced tree, or stool, is ready to be harvested, and the cycle begins again
Crown clearance	This is the removal of all dead, dying and diseased branches; in addition branches that are cleared away from a specific hazard e. g. live railway line.
Crown lifting	The removal of lower branches to provide a desired amount of clearance above ground level. This can be achieved either by the complete removal of a branch or only parts of which extend below the desired height
Crown reduction	The overall reduction of both the height and spread of the crown.
Decay	Process of degradation of woody tissues by fungi and bacteria through decomposition of cellulose and lignin.

Deadwood	Deadwood is often present within the crown or on the stems of trees. In some instances it may be an indication of ill health; however, it may also indicate natural growth processes. If a target is present beneath the tree, and falling deadwood may cause injury or damage it should be removed; if no target is present the deadwood may be retained intact for conservation purposes (insects, fungi, birds etc.).
Epicormic growth	A secondary growth from dormant adventitious buds on the stem or main branches.
Failure	In connection with tree hazards, a partial or total fracture within woody tissue or loss of cohesion between roots and soil.
Hazard beam	A branch that has over-extended in which strong internal stresses may occur without the compensatory formation of extra wood (longitudinal splitting may occur in some cases).
Hung-up limb	Dead or fallen branch from within the crown or from another tree's crown that has failed and been caught up by, and resting on, branches of a tree
Included Bark Junction	Pattern of development at branch junctions where bark is turned inward rather than pushed out. Potential weakness due to a lack of a woody union.
Ivy Growth	Ivy growth may ascend into the tree's crown, increasing wind resistance, concealing potential defects and reducing the tree's photosynthetic capacity. Ivy growth is often acceptable in woodland areas as a conservation benefit.
Monolith	A large bulk of standing dead wood. Usually the trunk of the tree or the trunk with the base of the branch frame work. These should be retained for wildlife habitat when the risk is appropriate for the location.
Pollarding	This involves the removal of whole branches to leave only the main trunk. In species such as willows and poplars such significant pruning is acceptable with new branches developing from the pollard heads. Secondary pruning of the new wood can help form a new canopy to the tree several years after the initial pollard
Reaction Wood	Specialised secondary xylem, which develops in response to a lean or similar mechanical stress, attempting to restore the stem to the vertical.
Root Protection Area (RPA)	The layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority.
Service	Any above or below ground structure or apparatus required for utility provision.
Stem	The principal above-ground structural component(s) of a tree that supports its branches.
Structure	A manufactured object, such as a building, carriageway, path, wall, service run, and built or excavated earthwork.
Structural Defect	Internal or external points of weakness, which reduce the stability of the tree
Sub-dominant stem	A branch within the crown that is not the dominant leader
Suppressed	Trees which are dominated by surrounding vegetation and whose crown development is restricted from above.
TPO	A Tree Preservation Order is an order made by a Local Planning Authority which in general makes it an offence to cut down, lop, top, uproot, wilfully

	damage or wilfully destroy a tree without first getting permission. Tree Preservation Orders are usually made to protect trees that make a significant contribution to the amenity of an area. They may particularly be made when it is felt that a tree may be under threat.
Tree Constraints Plan	Abbreviated to TCP. Plans showing specific tree constraints including Root Protection Areas and Crown spread.
Tree Protection Plan	Abbreviated to TPP. Scaled drawing, informed by descriptive text where necessary, based upon the finalised proposals, showing trees for retention and illustrating the tree and landscape protection measures.
Visual Tree Assessment	A non-invasive method of examining the health and structural condition of trees. Developed by Claus Mattheck and David Breloer 1994
Wound	Any injury, which induces a compartmentalisation response
Wound Wood	Wood with atypical anatomical features, formed in the vicinity of a wound and a term to describe the occluding tissues around a wound as opposed to the ambiguous term “callus.”

D. Tree protection plan

100
0 10
Millimetres



DO NOT SCALE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

Refer to designer's risk assessment

MAINTENANCE/CLEANING

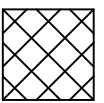
Refer to designer's risk assessment

DECOMMISSIONING/DEMOLITION

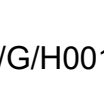
Refer to designer's risk assessment

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

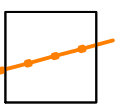
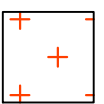
SCHEME PROPOSALS

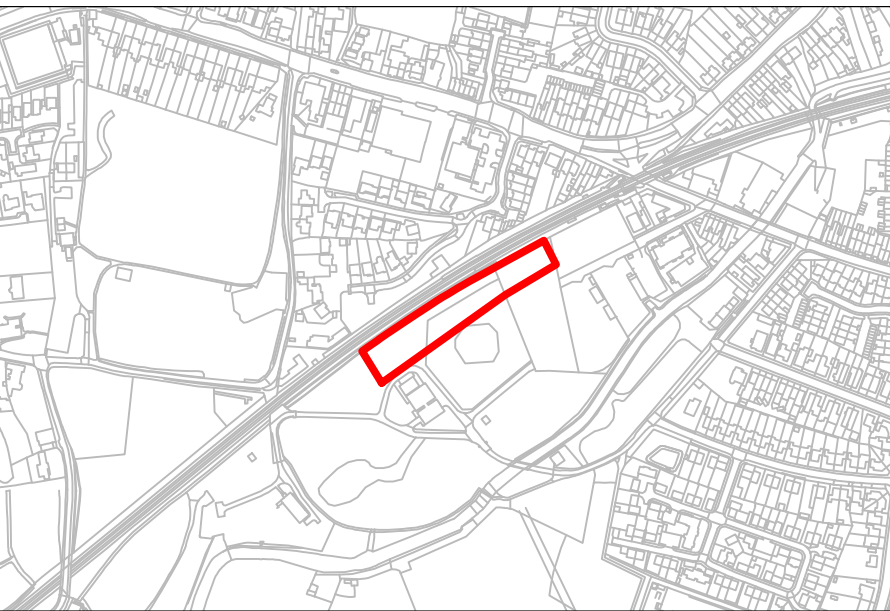
-  Scheme red line boundary
-  Works area

TREE SURVEY

-  Category A tree
-  Category B tree
-  Category C tree
-  Category U tree
-  Tree group (colour to BS)
-  T/G/H001 Tree / group / hedge ref. no.
-  Root Protection Area (RPA)

TREE PROTECTION & REMOVALS

-  Protective fencing
-  Tree group / hedge to facilitate works



Rev.	Date	Description	By	Chk'd	App'd
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Suitability	SUITABLE FOR INFORMATION	Status	S2
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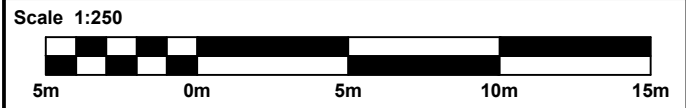
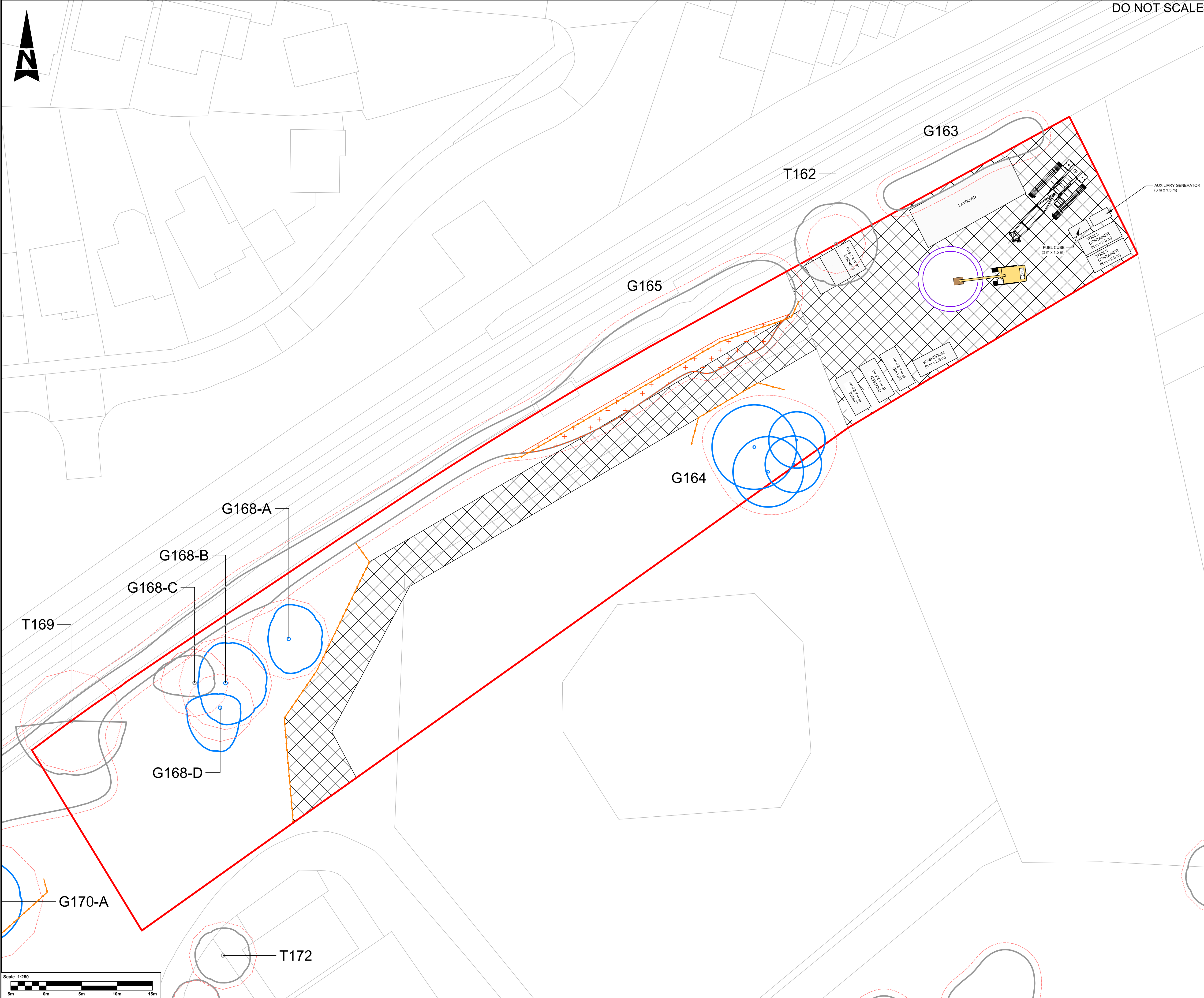


Project Title	HAVANT THICKET RESERVOIR
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Drawing Title	SHAFT 1 SITE COMPOUND LAYOUT RESERVED MATTERS
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Scale	Designed	Drawn	Checked	Authorised
1:250	X	NA	TD	JH
Original Size	Date	Date	Date	Date
A1	--/--	15/12/2023	15/12/2023	15/12/2023

Drawing Number	Revision
HTR-ATK-PZ-BR-DR-L-0014	P01



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