



Network Space

FARADAY ROAD, KNOWSLEY

Arboricultural Report





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Arboricultural Report

TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. 70073657

OUR REF. NO. 70073657-003

DATE: MAY 2023

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	First Issue	Second Issue	Third issue	Minor edit to Appendix E
Date	17/07/2020	28/07/2020	03/02/2023	30/05/2023
Prepared by	Elva Preston	Elva Preston	Steven Calderbank	Jacob Giles
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Signature			28/02/2023	Proctor, Sarah (UKSLP003) Proctor, Sarah (UKSLP003) 2023.05.30 15:12:31 +01'00'
Project number	70073657	70073657	70073657	70073657
Report number	70073657	70073657-001	70073657-002	70073657-003

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1 INTRODUCTION

- 1.1.1. WSP UK Ltd (WSP) was commissioned on 8th June 2020, by Network Space, to provide arboricultural services to inform a Planning Application for the development of a site for the storage of operational vehicles including; resurfacing, ancillary parking, and ancillary infrastructure at Faraday Road, Knowsley. The site is approximately 3.5 hectares in size and located at central OS Grid Reference: SJ 42904 97169 (hereby referred to as 'the Proposed Development').
- 1.1.2. The purpose of this report is to identify all trees which may reasonably be affected by the Proposed Development, to assess the direct and indirect impact of the development upon those trees and to recommend such protection measures as are necessary to ensure the long-term wellbeing of trees which are to be retained.
- 1.1.3. The scope and level of detail included within this report is commensurate with that required for the adequate consideration of arboricultural features as part of an outline design. Information provided complies with the requirements of BS 5837 Table B.1 and includes reference to the following:
- Tree survey
 - Arboricultural Impact Assessment
 - Arboricultural Method Statement (heads of terms)
 - Tree protection plan

1.2 VALIDITY PERIOD

- 1.2.1. Trees are dynamic organisms which are influenced by a variety of environmental variables and whose health and condition can rapidly change. Because of this any recommendations made within this report are valid for a period of 24 months from the date of issue.

1.3 LIMITATIONS

- 1.3.1. This report in no way constitutes a health and safety survey. Where concerns for tree health and safety exist the necessary and appropriate tree inspections should be carried out.

1.4 SITE DESCRIPTION

- 1.4.1. The site of the Proposed Development is situated within Britonwood Trading Estate in Knowsley Borough. It is currently a disused greenfield site with a mixture of semi-mature and mature vegetation at the boundaries.
- 1.4.2. The tree features across the Proposed Development are confined to the boundaries, most notably the north eastern boundary includes a mature, predominantly broadleaf woodland. The western boundary was absent of any tree cover whilst the southern and eastern boundaries include further low and moderate quality groups of trees. The three vegetated boundaries provide substantial tree cover and screening value within a predominately commercial landscape setting.

2 LEGISLATIVE FRAMEWORK AND GUIDANCE

2.1 LEGISLATIVE FRAMEWORK

2.1.1. Legislation of specific relevance to this report is outlined below:

TREE PRESERVATION ORDERS

2.1.2. The Town and Country Planning Act 1990 places a duty upon local planning authorities to make provision for the preservation and planting of trees when granting permission for new development¹. It also affords local planning authorities with the power to make a Tree Preservation Order (TPO) where it is expedient in the interests of amenity to make provision for the preservation of trees and woodlands².

Purpose of a TPO

2.1.3. The purpose of a TPO is to protect specific trees, groups of trees and woodlands for the purpose of amenity. In the Secretary of State's view 'Orders should be used to protect trees and woodlands if their removal would have a significant negative impact on the local environment and its enjoyment by the public'³.

2.1.4. A TPO does not prevent the removal of trees in order to implement development. It does however prevent their unauthorised removal and ensures that they can be fully considered when determining whether development is appropriate and acceptable.

2.1.5. A TPO makes it a statutory offence to carry out any of the following works to trees without the formal consent of the Local Planning Authority (LPA):

- felling;
- pruning
- uprooting;
- wilful damage; and
- wilful destruction.

Amenity Value

2.1.6. Trees which are to be included within a TPO should exhibit a minimum level of current or future amenity value. This should be assessed by the LPA in a structured and consistent manner with Government advice referring to the following requirements.

Visibility

2.1.7. Trees should be visible, in whole or in part, from a public place such as a road, footpath or publicly accessible land.

¹ Town and Country Planning Act 1990. s.13(197)(a)(b). Norwich: TSO

² Town and Country Planning Act 1990. s.13(198). Norwich: TSO

³ Department for Communities and Local Government, 2014. Conserving and Enhancing the Historic Environment. [Online] Available at: <https://www.gov.uk/guidance/conserving-and-enhancing-the-historic-environment#what-is-a-conservation-area> [Accessed 14 November 2017]

Value

2.1.8. Public visibility is in itself not sufficient to warrant inclusion within a TPO. Arboricultural features should also exhibit merit in terms of one or more of the following criteria:

- Size and form;
- Future potential;
- Rarity, cultural or historical value;
- Contribution to, and relationship with, the landscape; and
- Contribution to the character or appearance of a conservation area.

Other Factors

2.1.9. Other factors such as nature conservation may be considered when making a TPO but on their own would not warrant making an Order.

CONSERVATION AREAS

2.1.10. Conservation areas are designated under the Planning (Listed Buildings and Conservation Areas) Act 1990. A conservation area is an area which has been designated because of its special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance⁴. Trees can positively contribute towards the character, appearance or general amenity of a conservation area and, if not protected by a TPO, are protected by provisions in section 211 of the Town and Country Planning Act 1990.

2.1.11. Section 211 of the Town and Country Planning Act 1990 makes it a statutory offence to carry out any of the following works to trees⁵ located within a conservation area without first providing the Local Planning Authority (LPA) with six weeks' notice of intent⁶.

- felling;
- pruning;
- uprooting;
- wilful damage; and
- wilful destruction.

2.1.12. Although the LPA must normally be given six weeks' notice of intent to carry out work to trees within conservation areas certain exemptions do exist. These include, but are not limited to, the following criteria:

- The making safe of dangerous trees where there is an immediate risk of serious harm;
- The removal of dead wood or dead trees;

⁴ Department for Communities and Local Government, 2014. Conserving and Enhancing the Historic Environment. [Online] Available at: <https://www.gov.uk/guidance/conserving-and-enhancing-the-historic-environment#what-is-a-conservation-area> [Accessed 14 November 2017]

⁵ Except for trees whose stem diameter at 1.5 metres (m) above ground level:

- does not exceed 75mm; or
- has a stem diameter of 100mm or less and is to be removed for the sole purpose of improving the growth of other trees (e.g. thinning as part of forestry operations).

⁶ This does not apply to trees which are already protected by a TPO; these trees are subject to the procedures and controls for any tree covered by such an Order.

- Work necessary to abate an actionable legal nuisance; and
- Where work is necessary to implement a grant of full planning consent.

2.1.13. It is therefore essential that, unless a valid exemption applies, Knowsley Council is given six weeks' notice prior to undertaking any pruning or felling works to, or any development activities within the Root Protection Area (RPA), of any tree protected by virtue of a conservation area.

TREES ON THIRD-PARTY LAND

2.1.14. Under Common Law any roots or branches which cross a property boundary and encroach onto neighbouring land are deemed to be a nuisance. They are deemed to be a nuisance as they have the potential to affect the owner occupier's reasonable enjoyment of their land. This nuisance may be legally abated by the landowner or occupier cutting back encroaching roots or branches to the edge of their property if they so desire.

2.1.15. However, when abating a nuisance in this manner the owner/occupier must ensure that they that they are aware of and/or adhere to the following requirements:

- there is no duty to give notice to the tree owner although it would be considered courteous to do so;
- unless otherwise agreed with the tree owner all work must be undertaken without trespass onto the neighbouring property;
- all arising's remain the property of the tree owner and should be both offered back and only disposed of with their permission; and
- a duty of care is owed to the landowner at all times meaning that all work should be undertaken with reasonable skill and in accordance with any relevant best practice guidance.

2.1.16. The potential for future nuisance must be considered when undertaking new tree planting with due regard given to the likely effects of encroaching roots and branches on neighbouring land. The possibility of direct physical damage to boundary walls and fences should be avoided by allowing sufficient room for future growth and movement due to wind.

2.2 PLANNING POLICY

2.2.1. National and local planning policies of specific relevance to this report are outlined below:

NATIONAL POLICY

National Planning Policy Framework 2021

2.2.2. The National Planning Policy Framework (NPPF) includes relevant guidance in chapter 15: Conserving and Enhancing the Natural Environment. Guidance provided includes:

- Paragraph 174(b) recognises the economic and other benefits that trees and woodlands provide and the fact that they should be considered as part of a planning decision.
- Paragraph 180(c) identifies the principle that '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'.

National Planning Policy Statement for National Networks

2.2.3. The National Policy Statement for National Networks (NN NPS) also includes relevant guidance in chapter 5: Generic impacts. Paragraph 5.32 of this chapter supports the NPPF by stating:

- 2.2.4. 'The Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the national need for and benefits of the development, in that location, clearly outweigh the loss.'
- 2.2.5. Paragraph 5.32 of the NN NPS further states that in instances where such trees would be affected by the proposed development then the applicant should either provide proposals for their conservation or give reasons for their loss.

LOCAL PLANNING POLICY

- 2.2.6. Planning controls within the study area are administered by Knowsley Council. The Knowsley Replacement Unitary Development Plan (UDP) was adopted in June 2006. These policies are to remain in place until they are replaced by new policies in the Local Plan.
- 2.2.7. Knowsley Local Plan: Core Strategy was adopted in 2016, and also has local planning policies relevant to this development.

UDP Policy CP2: ENVIRONMENTAL ASSETS

- 2.2.8. This policy includes elements relevant to this report as summarised below:
- All development should seek to either preserve or where possible enhance (both quantitatively and qualitatively) Knowsley's stock of trees, woodland and hedges.

UDP Policy DQ1: DESIGN QUALITY IN NEW DEVELOPMENT

- 2.2.9. This policy includes elements relevant to this report as summarised below:
- New development should be of a high-quality design which will preserve and manage any existing important natural features such as trees, hedgerows and greenspace and where possible make use of these as design features.

2.2.10. UDP Policy DQ4: TREES AND DEVELOPMENT

- 2.2.11. This policy states:
- Proposals for new development should include appropriate planting of trees or other soft landscaping, the location and details of which should be determined as an integral part of the development, and which shall have regard to the character of the surrounding area.
 - Development proposals affecting existing trees, woodlands and other vegetation, which make a positive contribution to amenity, should make provision for their retention.
 - Applicants for planning permission will be required to provide a detailed survey of all existing trees on the site and the likely effects on them of the proposed development, as outlined in the Council's technical advice note "Trees and Development".
 - Where the Council accepts that tree loss will be unavoidable the applicant will be required to make adequate provision for their replacement, normally including two new trees for each tree lost. Replacement planting will take into account the number; size and species of trees lost and should contribute to the extension of tree and woodland cover across the Borough.
 - All new development should be consistent with the aims and objectives of the Mersey Forest Plan.

Core Strategy Policy CS 21: GREENSPACES AND TREES

- New development which would result in the loss of urban greenspace, will not be permitted unless at least one of the following criteria are met:
 - a. A surplus of provision for all types of greenspace would be maintained relative to local standards;
 - b. The land is considered unsuitable in terms of size, location or character to prevent or address individual deficiencies of different types of greenspace relative to local standards;
 - c. Appropriate mitigation is provided through replacement facilities of at least an equal quantity, quality and accessibility;
 - d. The development is required to improve greenspace provision or for ancillary facilities to support sport or recreation.
- Irrespective of whether criteria above are met, loss of urban greenspace will be resisted where it would result in significant harm to one or more of the following existing or potential special qualities of greenspace:
 - a. Visual amenity;
 - b. Residential amenity;
 - c. Biodiversity and environmental benefits;
 - d. Historical, cultural or community value;
 - e. Recreational benefits; or,
 - f. Physical and / or visual linkages between adjoining urban greenspaces.
- The Council will require proposals for new development to incorporate:
 - a. Retention of existing trees, woodland, vegetation and other habitat features which offer a positive contribution to the local environment in terms of visual amenity, recreation value or biodiversity/wildlife interest;
 - b. Appropriate planting of trees, other soft landscaping and installation of habitat features for the benefit of biodiversity; and
 - c. Adequate replacement provision where tree loss is unavoidable, comprising two additional trees for every tree lost and taking account of species and size.

OTHER GUIDANCE

2.2.12. Other guidance of specific relevance to this report is outlined below:

British Standard BS 5837:2012

2.2.13. British Standard BS 5837 provides recommendations and guidance on the relationship between trees and design, demolition and construction processes. It sets out principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and structures and is applicable whether or not planning consent is required.

3 BASELINE ARBORICULTURAL RESOURCE

3.1 STUDY AREA

- 3.1.1. The study area has been defined as the area within which arboricultural features may be impacted by the Proposed Development and comprises of the Proposed Development Boundary plus a buffer of up to 15 metres⁷. The purpose of the buffer is to ensure that arboricultural features which are outside the footprint of the Proposed Development but whose root protection areas extend into the developable area are recorded and considered.

3.2 METHOD OF BASELINE DATA COLLECTION

- 3.2.1. Baseline data collection has been undertaken with reference to BS 5837 and has been undertaken using the following data sources:

- An arboricultural desk study, and;
- A walkover survey of all arboricultural features within the study area.

DESK STUDY

- 3.2.2. A desk-study has been undertaken as a means of identifying any statutory and non-statutory constraints which may apply to arboricultural features within the Study Area. The desk-based review has considered the following sources:

TPOs and Conservation Areas

- 3.2.3. Knowsley Council is responsible for implementing any legal controls imposed through TPOs and conservation areas within the study area. The statutory status of arboricultural features within the study area was checked using the Council's online mapping system⁸.

Notable, Ancient and Veteran Trees

- 3.2.4. The presence of locally notable, ancient and veteran trees within the study area was checked using the Woodland Trust's Ancient Tree Inventory⁹.

Ancient Woodland

- 3.2.5. The presence of ancient woodlands within the study area was checked using Natural England's Multi Agency Geographical Information for the Countryside (MAGIC) map¹⁰.

SITE VISIT / SURVEYS

- 3.2.6. A walkover survey of all arboricultural features within the study area was undertaken on 13th July 2020. The survey was undertaken by Elva Preston (Arboricultural Consultant). A secondary onsite

⁷ British Standard BS 5837:2012 Clause 4.6

⁸ Knowsley Council, 2020. *My Neighbourhood* [online] Available at: < <https://secured.knowsley.gov.uk/myneighbourhood#>> [Accessed 15 July 2020].

⁹ Ancient Tree Inventory, 2018. *Ancient Tree Inventory* [online] Available at: < <https://ati.woodlandtrust.org.uk> > [Accessed 15 July 2020].

¹⁰ Magic (DEFRA), 2018. *Multi Agency Geographic Information for the Countryside* [online] Available at: < <https://magic.defra.gov.uk/MagicMap.aspx> > [15 July 2020].

inspection was undertaken on the 23rd January 2023 to reinspect the trees and any changes that may have occurred within the study area. This secondary inspection was undertaken by Steven Calderbank (Assistant Arboricultural and Forestry Consultant)

3.2.7. Details of the survey methodology are provided in Appendix C of this report.

3.3 BASELINE CONDITIONS

DESK STUDY

3.3.1. The desk study confirmed the presence of a woodland subject to a TPO adjacent to the site, as well as the presence of a Priority Habitat Inventory and National Forest Inventory deciduous woodland.

3.3.2. The desk study confirmed the absence of any conservation areas, veteran, ancient or notable trees and ancient woodland.

Tree Preservation Orders

3.3.3. The arboricultural features listed in **Table 3-1** have been identified as being afforded statutory protection by virtue of a TPO.

Table 3-1 - Arboricultural features covered by a TPO

Reference number on 1 st Schedule ¹¹ TPO	TPO Name and Reference
W1	TREE PRESERVATION ORDER No 6-2006 (06/00006/TPO)

3.3.4. The TPO covers the mature woodland (WSP ref. W5), situated adjacent to Faraday Road and to the rear of 1-5 Abercrombie Road, Kirkby.

SITE VISIT / SURVEY

3.3.5. A total of eight arboricultural features were surveyed, details of which are provided within the Arboricultural Survey Schedule included in **Appendix D** of this report. A summary of the surveyed features including their category and designation is provided in **Table 3-2**.

Table 3-2 - Summary of surveyed arboricultural features

BS 5837 Category	Quality	Trees	Tree Group	Wooded Areas
A	High	0	0	0
B	Moderate	2	1	2
C	Low	0	3	0
U	Very Low	0	0	0
TOTALS		2	4	2

¹¹ The first schedule forms part of the TPO document and includes a written description of the trees and their location

MODERATE QUALITY ARBORICULTURAL FEATURES

- 3.3.6. A total of five moderate quality arboricultural features were recorded and include two individual trees, one tree group and two woodlands.

Individual Trees

- 3.3.7. Of the two individual trees surveyed, T2 was an English oak (*Quercus robur*) and T7 was a sycamore (*Acer pseudoplatanus*). The oak was semi-mature of age and the sycamore was a mature specimen; both were situated along the site's southern boundary. The heights of the trees were 9 metres and 11 metres respectively and both trees had multiple stems from their bases.

Tree Groups

- 3.3.8. One tree group was identified as having moderate arboricultural quality. Group G3 was situated along the site's southern boundary and comprised English oak, goat willow (*Salix caprea*), silver birch (*Betula pendula*) and poplar (*Populus sp.*).
- 3.3.9. This group provided dense and established screening value with heights ranging from 10 metres to 18 metres. Some suspended major deadwood (>75mm diameter) was observed within some of the tree crowns along with pruning wounds noted on the northern side of the group.
- 3.3.10. In 2020 it was noticed that arech had been recently dug within the site, approximately 30cm away from the stems of the trees in the group. This had caused severance to predominantly minor roots (below 25mm diameter) from trees within the group, which will influence the physiological quality of the some of the trees. Given the size of the roots damaged, this should not immediately compromise their structural integrity however, subsequent physiological damage may affect the overall condition of the tree's health over the long term. Upon reinspection in 2023 there was no sign of trenching due to overgrown vegetation and no adverse changes in the trees health could be seen. However, due to the time of year of the reinspection, leaf morphology and seasonal defects could not be observed
- 3.3.11. It would be suggested the trees are monitored to see if they display any changes physiological defects. This includes changes in crown architecture and premature leaf fall. Monitoring the tree will enable informed management decisions to be made to ensure the safe longevity of the tree group.

Wooded Area

- 3.3.12. Both woodlands were located on the northern and north eastern extents of the site. The woodlands composition varied and included English oak, sycamore, goat willow, blackthorn (*Prunus spinosa*), cherry (*Prunus avium*), rowan (*Sorbus aucuparia*), hawthorn (*Crataegus monogyna*), yew (*Taxus baccata*), Swedish whitebeam (*Sorbus intermedia*) and ash (*Fraxinus excelsior*).
- 3.3.13. Woodland W5 had an average stem diameter of 400mm, an average height of 12 metres and was composed of mature specimens. Woodland W8 had a smaller average stem of 250mm, an average height of 7 metres and was younger in age (semi-mature).
- 3.3.14. A summary of the statutory and non-statutory status of these features is included in **Table 3-3**.

Table 3-3 – Summary of moderate value features – statutory and non-statutory status

Tree No	Species (Common Name)	Statutory Status	Reference 1st Schedule of TPO	Non-statutory Habitat Designation
W5	Predominantly broadleaf woodland	TPO No 6-2006	W1	Priority Habitat Inventory Deciduous Woodland National Forest Inventory
W8	Predominantly broadleaf woodland	N/A.	N/A.	Priority Habitat Inventory Deciduous Woodland National Forest Inventory

LOW QUALITY ARBORICULTURAL FEATURES

- 3.3.15. The walkover survey identified three low quality tree groups (G1, G4 and G6).
- 3.3.16. Low quality tree groups were semi-mature specimens with heights of six to ten metres, stem diameters ranging from 150mm to 250mm and retention spans in excess of 10 years under current site conditions.
- 3.3.17. In 2020 it was observed that tree group G4 also had the trench previously mentioned dug along its length, damaging and exposing minor (below 25 mm diameter) roots of some of the trees in the group. As with group G3, this may lead to the decline in the physiological condition of some of the trees within the group.

4 ARBORICULTURAL IMPACT ASSESSMENT

- 4.1.1. The following Arboricultural Impact Assessment (AIA) evaluates the direct and indirect effects of the Proposed Development on existing trees and identifies the necessary mitigation measures where these are deemed appropriate.

4.2 ARBORICULTURAL FEATURES TO BE REMOVED/RETAINED

- 4.2.1. Arboricultural features selected for retention and removal are clearly identified on the Tree Retention and Protection Plan (TRPP) included in **Appendix E** of this report. Details of the arboricultural features to be removed are summarised in **Table 4-1**.

Table 4-1 - Arboricultural features to be removed sub-divided by type and quality

BS 5837 Category	Quality	Tree Group	Wooded Areas
A	High	0	0
B	Moderate	0	Partial removal of W8 - 2181m ² of 2655m ²
C	Low	0	0

- 4.2.2. The Proposed Development will result in the loss of 82% canopy cover of the semi-mature moderate quality woodland (W8) to facilitate the proposed Cellular Attenuation as set out in the Proposed Drainage Strategy. The remaining three tree groups, two moderate quality individual trees and the TPO woodland are all to be retained in full.
- 4.2.3. As the sites highest quality features are going to be retained and no tree features are going to be removed in full, it can be concluded the Proposed Development will have minimal impact on the sites arboricultural quality.

4.3 OTHER ARBORICULTURAL IMPACTS

- 4.3.1. Other identified arboricultural impacts associated with the construction of the Proposed Development are recorded in **Table 4-2**. Included are recommendations for the mitigation of identified impacts and a brief assessment of likely residual effects. Residual effects have been calculated based upon the implementation of all mitigation measures and the exclusion of any additional construction activities from the remainder of the root protection area.

Table 4-2 – Other identified arboricultural impacts, proposed mitigation and likely effects

Feature / Category	Cause of Impact (construction of)	Impact	Mitigatory Measures
W5 (B)	Encroachment of construction work into Root Protection Areas. Excavation works needed on the southwest extent of the boundary.	Severance of roots that extend beyond the proposed soft landscaped area.	Excavation works to be carried out with hand tools and under arboricultural supervision. This is to ensure no roots are damaged given the woodland is protected under a TPO. If roots are found the local council 's Tree Officer will be consulted, and appropriate and pragmatic contingency measures shall be implemented. If deemed necessary, an application for works to a TPO tree will be submitted.

4.4 TREE PROTECTION PLAN

4.4.1. A Tree Retention and Protection Plan (TRPP) is included within **Appendix E** of this report. The purpose of the TRPP is to identify trees for retention and show the location and extent of any proposed tree protection measures.

4.4.2. The TRPP has been compiled in accordance with the following specification:

General

- The TRPP shows the position of each feature including its stem/extent, current crown spread and its root protection area. The features have also been colour coded based upon the quality category within which they have been placed.

Location / extent of arboricultural features

- Arboricultural features have been located using topographical survey data where stem locations have been provided. In instances where topographical data is unavailable, features have been positioned using Ordnance survey data and/or aerial imagery. In these instances, locations should be considered as approximate only and will have an assumed accuracy of two to five metres.
- Arboricultural features not plotted using topographical survey data include G1, T2, G3, G4, G6.

Tree protection measures

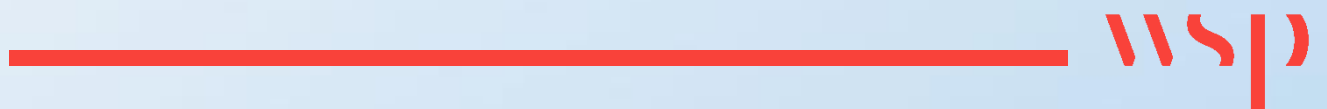
- The TRPP shows the location and extent of the following tree protection information:
 - Tree retention and removals (RPAs shown for all retained trees);
 - Protective barriers (fencing and/or temporary ground protection);
 - Special engineering and other relevant construction details.

4.5 ARBORICULTURAL METHOD STATEMENT

- 4.5.1. An Arboricultural Method Statement (AMS) should adopt a precautionary approach to tree protection and should address any activities which have the potential to cause damage to retained trees. For the purposes of the Proposed Development, these should reasonably include reference to the following matters:
- arboricultural monitoring;
 - removal of arboricultural features;
 - protective barriers; and
 - special engineering and other relevant construction details:
 - new permanent hard surfacing within root protection areas
 - construction (excavation) within root protection areas – permanent loss of root protection area
- 4.5.2. The matters identified above are addressed within the AMS included within **Appendix B** of this report.

Appendix A

GLOSSARY OF TERMS AND ACRONYMS



GLOSSARY OF TERMS

Table A-1 - Glossary of Terms

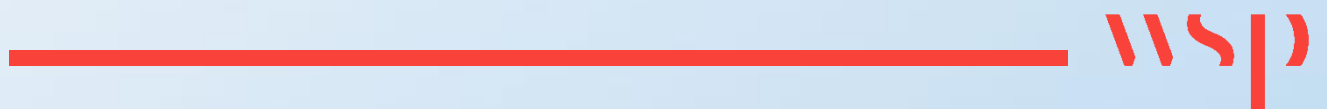
Term	Definition
Ancient Tree	A tree that has passed beyond maturity and is old, or aged, in comparison with trees of the same species. Characterised by biological, cultural or aesthetic features of interest.
Ancient Woodland	Any wooded area that has been continuously wooded since 1600 AD
Arboriculturist	A person who has, through relevant education, training or experience, gained expertise in the field of trees in relation to construction.
Arboricultural Method Statement	A methodology for the implementation of any aspect of development which is within the root protection area, or has the capacity to adversely affect, any retained tree.
British Standard BS 5837:2012	Provides guidance and recommendations for the integration of trees and development. To be interpreted by appropriately qualified and experienced persons.
Conservation Area	An area of special architectural or historic interest identified by the Local Planning Authority.
Crown	The upper part of a tree, measured from the lowest branch, including all branches and foliage.
Notable Tree	A tree that is very large but might not qualify as ancient or veteran.
Proposed Development	All works associated with the proposed development of the Site
Root Protection Area	Layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's vitality.
Tree Preservation Order	An order made by the Local Planning Authority to protect specific trees, groups of trees or woodlands in the interests of amenity.
Veteran Tree	A tree that has the biological or aesthetic characteristics of an ancient tree but is not ancient in years compared with others of the same species.

Table A-2 – List of acronyms used within this report

Acronyms	
AIA	Arboricultural Impact Assessment
AMS	Arboricultural Method Statement
BS 5837	British Standard BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations
RPA	Root Protection Area
TPO	Tree Preservation Order
TRPP	Tree Protection Plan

Appendix B

ARBORICULTURAL METHOD STATEMENT



INTRODUCTION

This AMS describes the arboricultural protection measures identified as part of an outline design. It presents in principle the arboricultural protection measures which will be applied, and which will be expanded upon during detailed design.

This AMS must be read in conjunction with the TRPP included within **Appendix E** of this report.

ARBORICULTURAL MONITORING

General Requirements

Effective tree protection can only be achieved by adherence to a logical sequence of works combined with effective arboricultural monitoring. The purpose of arboricultural monitoring is to ensure that all tree protection measures are fit for purpose, are implemented in accordance with any approved details and as a means of enabling any previously unforeseen arboricultural issues to be promptly identified and suitably addressed.

The Principal Contractor will be responsible for ensuring that all site personnel are made aware of the requirements of this AMS and that any future amendments are known and understood. Copies of the approved AMS will be available onsite the requirements of which will be incorporated into all relevant site management documents and site induction procedures.

Pre-Commencement

A pre-commencement meeting will be held between the Principal Contractor, local authority tree officer and the project arboriculturist. The purpose of this meeting will be to ensure that all aspects of the tree protection measures are clear and understood and that any future sequencing and supervisory arrangements are agreed. The details of this meeting will be recorded and will be circulated to all parties in writing.

The Principal Contractor shall nominate a person to be responsible for all arboricultural matters onsite. This person must:

- Be present on site whenever work is being undertaken,
- Be aware of their arboricultural responsibilities,
- Have the authority to stop any work that is causing, or has the potential to cause harm to any retained tree,
- Be responsible for ensuring that all site operatives are aware of their responsibilities toward retained trees and the consequences of any failure to observe those responsibilities,
- Make immediate contact with the local authority and/or the project arboriculturist in the event of any tree related problems occurring, whether actual or potential.

During / Post-Construction

Once works commence the project arboriculturist will undertake a programme of monitoring. This may include phone and email contact with the site manager, regular site visits and direct monitoring of sensitive works. The frequency of any monitoring will be determined by the intensity and proximity of works to trees and will be flexible enough to accommodate changes in the scheduling of tasks as they occur on the site.

The project arboriculturist will maintain a record of all aspects of the arboricultural monitoring which has been undertaken. This will provide a record of compliance with any agreed tree protection measures and will assist in the efficient discharge of any relevant planning conditions or demonstration of compliance with any statutory requirements.

PROTECTIVE BARRIERS

TREE PROTECTION FENCING

Purpose

To protect retained trees including their stems, crowns, rooting areas and the soil within which they grow.

General Requirements

Tree protection fencing should be specified by an arboriculturist.

Tree protection fencing will be used to prevent access to the root protection areas (RPAs) of retained trees. In all instances the following specification will be strictly adhered to:

- The area to the rear of the tree protection fencing shall be considered to form a Construction Exclusion Zone. No construction activities, storage of materials or pedestrian or vehicular access shall take place within this area.
- All weather notices will be attached to the tree protection fencing at suitable intervals and shall include suitably sized informative text containing the following statement:

“TREE PROTECTION FENCING

CONSTRUCTION EXCLUSION ZONE – NO ACCESS”

- Regular daily checks will be carried out by an appointed person to ensure that all tree protection fencing is still in place and functioning; any damage will be rectified without delay.

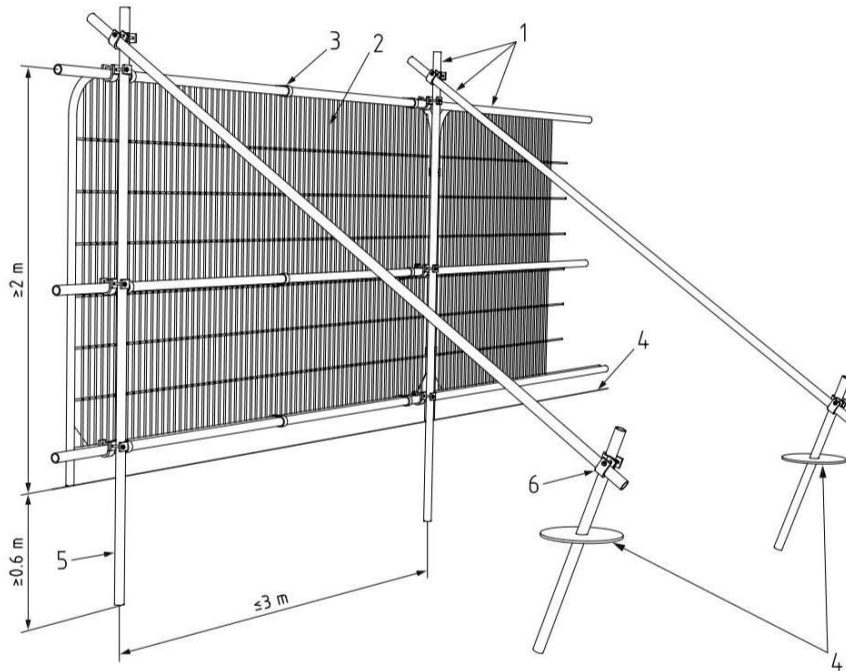
Timing

- Tree protective fencing shall be erected prior to any works onsite including site clearance, ground work or the importation of plant and materials.
- Once erected tree protection fencing shall remain in-situ until all construction activities are complete.

Specification for Fencing

- Tree protection fencing shall be fit for the purpose of excluding construction activity and appropriate for the degree and proximity of work taking place. An example of the type of tree protection fencing which may be required is included in Figure B-1.

Figure B-1 - Example of appropriate tree protection fencing



Key:

1. Standard scaffold poles
2. Heavy gauge 2m tall galvanized tube and welded mesh infill panels
3. Panels secured to uprights and cross-members with wire ties
4. Ground level
5. Uprights driven into the ground until secure (minimum depth 0.6m)
6. Standard scaffold clamps

Site Specific Details

- Fencing along the southern boundary has been moved further away from the calculated RPA of the groups to protect the proposed area of soft landscaping around the trees during development;
- The existing palisade fencing around the TPO woodland will act as protective fencing until such time that it is removed and replaced with a new Paladin Fence as part of the proposals. Any works being carried out within the RPA extents of the TPO woodland will be carried out under arboricultural supervision. No exceptions shall be made to this requirement. The Tree Protection Plan in **Appendix E** of this report shows the areas where this is necessary.

SPECIAL ENGINEERING AND OTHER RELEVANT CONSTRUCTION DETAILS

NEW PERMANENT HARD SURFACING WITHIN ROOT PROTECTION AREAS

Purpose

To enable permanent hard surfacing to be installed without significant damage to retained trees. To prevent sudden changes to the rooting environment of retained trees thereby giving them time to adapt.

General Requirements

The design of any new permanent hard surfacing should seek to comply with the following specification:

- Avoid the need for any excavation or lowering of soil levels other than the removal, using hand tools only, of any turf, surface vegetation or organic matter. Levels may be raised using a granular fill which will remain gas and water permeable for the duration of its design life.
- Avoid any localised compaction of the underlying soil by evenly distributing any anticipated loading over a suitably large area.
- Utilise a sub-base and wearing course that is permeable to air and water (this includes and separation membranes that may be required).
- Must not exceed 20% of any existing un-surfaced ground within the RPA.
- Should either avoid the need for the use of de-icing salt or, if undesirable, should include a system whereby contaminated run-off is directed outside of the RPA.
- Should be buildable without the need for machinery or plant to operate on areas of unprotected soil.

Timing

Permanent hard surfacing may be installed at any time during the development process provided that:

- Installation does not leave the root protection area at risk of damage (e.g. through the removal of protective fencing whilst other potentially damaging activities are taking place nearby).
- If it is to be used as temporary ground protection it is robust enough to withstand any anticipated loadings without deformation.

Specification

Design

- Hard surfacing should be designed by a structural engineer.
- Hard surfacing should utilise a sub-base formed from a three-dimensional cellular confinement system or an above ground slab supported by piles, pads or elevated beams.
- Exploratory investigations to determine suitable locations for piles and pads should be undertaken as part of the design process.
- Hard surfacing should be designed to withstand deformation by tree roots and should be sufficient distance from the tree to account for future tree growth.

- Excavations associated with the installation of kerbs and edging should be avoided. Above ground products which can be pinned in place should be used in preference to those which require foundations and haunches. Examples include pegs and boards, sleepers and gabion baskets.

Construction

- Compaction of soil surrounding and beneath any new hard surfacing shall be prevented. This may be achieved through the use of temporary ground protection or by constructing the new surface with machinery working forward from the surface as it is constructed (i.e. “rolling out”).
- Vegetation control beneath the new surface may be achieved via the use of herbicide to be applied in accordance with manufacturer’s instructions or through the installation of a permeable weed inhibiting membrane.
- Loose organic matter may be removed using hand tools only.
- The soil surface should not be lowered to remove high spots. Soil levels may be raised using granular infill which will remain permeable to air and water for the duration of its design life.
- If uncured concrete is to be used then an impermeable membrane will be required in order to prevent leachate from entering the surrounding soil.

CONSTRUCTION (EXCAVATION) WITHIN ROOT PROTECTION AREAS – PERMANENT LOSS OF ROOT PROTECTION AREA

Purpose

To minimise adverse impacts on retained trees associated with construction within the root protection area.

For the purposes of this methodology construction is defined as anything which requires excavation within the root protection area resulting in the permanent loss of roots and rooting environment.

General Requirements

The default position is that all construction occurs outside the root protection area of retained trees¹². Construction within the root protection area of retained trees should only be undertaken where there is an overriding justification to do so.

Timing

Construction within the root protection area may occur any time during the development process if it does not leave the root protection area at risk of damage (e.g. through the removal of protective fencing whilst other potentially damaging activities are taking place nearby).

Specification

Design

- The design team shall make all reasonable efforts to avoid the need for construction within the root protection area of retained trees. Justification for construction within the root protection area may be required.

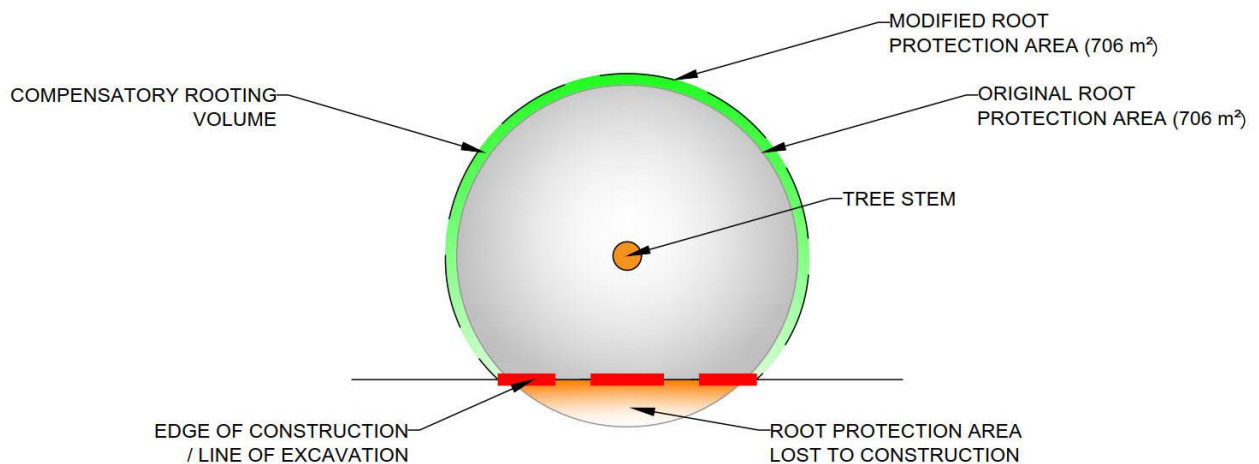
¹² British Standard BS 5837:2012 paragraph 5.3.1

- A realistic assessment regarding the probable impact on the tree(s) should be made and opportunities for the provision of compensatory rooting area identified.
- A modified root protection area (to account for any compensatory rooting volume) shall be specified and suitable tree protection measures identified.

Construction

- The modified root protection area shall be protected throughout construction and any during any post-development soft landscaping activities.
- Construction immediately adjacent to the modified root protection area shall be proceeded by the careful severance of roots along the edge of the root protection area. This shall occur in the following manner:
 - A narrow trench shall be excavated using hand tools only. The trench shall extend to a minimum depth of 0.6 metres the purpose of which is to carefully expose any tree roots which may be present. The ultimate depth of the trench should be determined onsite and will depend on the likely depth of significant tree roots. Trench depth should be advised by an arboriculturist but may be limited for health and safety reasons.
 - Tree roots shall be cut back to the edge of the root protection area using either a sharp saw or pair of secateurs. Roots shall be cut to leave as smaller cut as possible without ragged edges or damage to bark.
 - Exposed roots shall be protected from extremes of temperature or desiccation by covering them in damp hessian until construction occurs.
 - Where uncured concrete is to be used immediately adjacent to the root protection area then an impermeable membrane shall be utilised to prevent leachate from entering adjacent soil.

Figure B-1 - Illustration showing modified root protection area and line of root severance



EXCAVATION WITHIN ROOT PROTECTION AREAS

Areas to be excavated but which are within root protection areas are identified on the TRPP included in Appendix E of this report. In all instances excavatory work will be undertaken in accordance with the following methodology:

Pre-Commencement

- All staff involved will be made aware of this working methodology.
- Prior to undertaking any work, the location of any root protection areas and excavations must be determined and shall be marked out using non-toxic marker paint.

Mechanical Excavation

- Soil shall be carefully removed using a non-toothed excavator bucket. The leading edge of the bucket shall be angled parallel to the soil surface and the soil removed in thin layers of approximately 25mm depth. An observer/banksman shall be present at all times and shall keep watch for the presence of roots. If roots are identified then the excavator shall stop work and soil surrounding the root shall be excavated by hand.
- Spoil shall be deposited outside of the root protection area.
- On no account shall plant or machinery operate from within the root protection area unless positioned on suitable ground protection¹³.
- The soil surface shall be inspected in between each use of the bucket. Should evidence of tree roots be found then the area shall be carefully excavated by hand as a means of exposing any underlying roots without risk of damage.

If tree roots are uncovered then they shall be treated in the following manner:

- Roots <25mm Ø shall be cleanly cut back to the edge of the excavation using a sharp saw or pair of secateurs.
- Roots >25mm Ø shall only be severed following technical approval from an arboriculturist and the acting local authority Tree Officer. If approval is given then roots shall be cleanly cut back to the edge of the excavation using a sharp saw.
- Once excavation reached the desired depth the final soil surface shall be inspected for the presence of roots which could become damaged during construction. The advice of an arboriculturist shall be sought regarding the most suitable means of protecting any roots which may have been identified.

Hand Excavation

- Soil shall be carefully removed using hand tools only. Spoil shall be deposited outside the root protection area. A trowel shall be used to loosen and remove soil in proximity to roots whilst a brush or compressed air shall be used to remove any soil which may adhere to the outside of any root.

-
- ¹³ For plant up to 2 tons in weight proprietary interlinked ground protection boards will be used and placed on top of 150mm depth of compression resistant material (e.g. woodchip) laid onto a geotextile membrane.
 - For wheeled or tracked equipment exceeding 2 tons in weight a structural engineer will design an alternative system. This may include the use of temporary cellular confinement systems, reinforced concrete slabs or track board systems details of which are to be approved before construction commences.

- Those excavations closest to the tree(s) shall be carried out first. These shall be undertaken under the direct supervision of the project arboriculturist. Hand excavations shall be carried out to a minimum depth of 0.6m beyond which mechanical means may be employed should the project arboriculturist deem it acceptable.

If tree roots are uncovered then they shall be treated in the following manner:

- Roots <25mm Ø shall be cleanly cut back to the edge of the excavation using a sharp saw or pair of secateurs.
- Roots >25mm Ø shall only be severed following technical approval from an arboriculturist and the acting local authority Tree Officer. If approval is given then roots shall be cleanly cut back to the edge of the excavation using a sharp saw.

Once excavation reached the desired depth the final soil surface shall be inspected for the presence of roots which could become damaged during construction. The advice of an arboriculturist shall be sought regarding the most suitable means of protecting any roots which may have been identified.

Post-Excavation

- Exposed roots and soil closest to the tree shall be covered at the earliest opportunity to protect them from extremes of temperature and desiccation.
- Where uncured concrete is to be used then an impermeable membrane shall be installed to prevent leachate from contacting roots or entering the soil that surrounds them.
- Where excavations render soil at risk of collapse then bracing or other support measures shall be employed. These shall be sufficient to prevent any loosening or further loss of soil from within the rooting area of any nearby tree.

INSTALLATION OF NEW FOUNDATIONS ADJACENT TO ROOT PROTECTION AREAS

Aim

The prevent encroachment into, and disturbance of, root protection areas adjacent to new foundations.

Design

- Foundations shall be designed to avoid encroachment into root protection areas.
- Designers shall consider the method of construction as part of the overall design. The below ground working area must not encroach into the root protection area although above ground construction access may be available subject to the use of appropriate tree protection measures and avoidance of any tree stems and crowns.
- Measures must be put in place which remove the risk of soil loosening or collapse within the root protection area.

Timing

At no point shall work be undertaken without appropriate tree protection measures having been agreed and implemented.

Specification

- Where piled foundations are to be employed then due regard must be given to formation of any below ground capping beams including the space required for any shuttering.
- Strip foundations may be utilised but may require the use of sheet piles or bracing in order to ensure soil stability within the root protection area.
- Where safe to do so all roots >25mm Ø must be cut back to the edge of the excavation using a sharp saw or a pair of secateurs.
- Where uncured concrete is to be used an impermeable membrane shall be installed to prevent leachate from entering the root protection area.

INSTALLATION OF UNDERGROUND APPARATUS AND SERVICE RUNS

Purpose

To ensure underground services can be installed, operated and maintained without detriment to retained trees. To prevent services becoming damaged by trees.

Design

- Wherever possible any underground services (cabling and pipes) shall be located outside the root protection area of any retained tree. Soakaways must not be located within root protection areas.
- Wherever possible services will be grouped together, will utilise common ducts and have all inspection chambers located outside of the RPA.

Timing

At no point shall work be undertaken without appropriate tree protection measures having been agreed and implemented.

Specification

- Any new services installed within the zone of influence (not just the root protection area) of any proposed, or retained, tree will incorporate sealed and flexible joints and be sufficiently robust to avoid damage due to differential soil movement.
- In situations where services must pass through the root protection area of a retained tree then trenchless techniques will be used wherever possible. Receptor pits will be located outside the root protection area and potentially toxic external lubricants will not be used.
- In situations where trenchless techniques are impractical then the use of open trenches will only be considered if they can be excavated without the need for shoring of the sides. The method of excavation will be using an 'air-spade' or similar to ensure that soil can be removed from around the tree roots whilst causing only minimal damage.

SOFT-LANDSCAPING OPERATIONS

Purpose

To avoid damage to trees during the implementation of soft landscaping activities.

Design

The root protection areas of retained trees are identified on the TRPP included in Appendix E of this report. All soft landscaping activities within these areas will conform to the following specification:

Timing

- No works will be carried out if the soil moisture is of a level likely to allow compaction to occur (i.e. soil shall not be waterlogged but shall be firm and friable).

Specification

General requirements

- Only pedestrian operated machinery shall be used.
- All pedestrian operated machinery shall utilise low ground pressure tyres.

Soil preparation

- Herbicide applications shall be restricted to the use of translocated products such as glyphosate. These will be applied according to the manufacturer's instructions and drift onto non-target plants avoided.
- Existing vegetation will be removed by hand. Turf may be removed using a mechanical turf stripper where necessary.
- Compacted areas of soil will be broken up by using hand tools only.
- There shall be no excavation or lowering of soil levels.
- Depressions may be levelled through infilling with a maximum depth of 150mm of loosely compressed good quality topsoil or other porous material.

Grass seeding, wildflower seeding and turfing

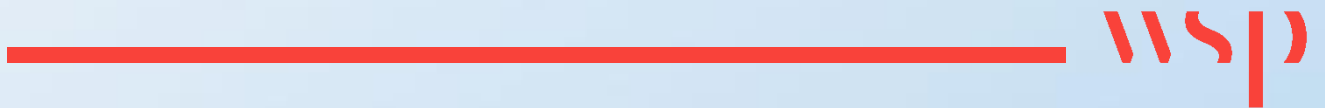
- Soil shall be cultivated to a depth of no more than 25mm.

Planting

- Bare root seedlings, transplants, whips and feathered trees shall be notch planted
- Container grown shrubs, feathered trees, and standard trees shall be planted into individual pits.
- In no circumstances shall planting take place into cultivated beds or trenches.
- All planting pits shall be excavated with due care for underlying tree roots and using hand tools only.
- In instances where tree roots are found within the planting pit then roots less than 25mm in diameter may be severed using a sharp tool such as a saw or pair of secateurs. The cut should be as small as possible and must avoid leaving a ragged end. Roots over 25mm diameter may only be cut on the advice of an arboriculturist. If roots over 50mm are encountered, or groups of roots over 25mm, then the planting pit will be backfilled and moved to an alternative location.

Appendix C

ARBORICULTURAL SURVEY METHODOLOGY



SURVEY METHODOLOGY

The survey was undertaken by a suitably qualified and experienced arboriculturist.

The survey was undertaken with topographical survey data forming the base mapping. The arboricultural survey was undertaken in accordance with the following criteria:

- Arboricultural features have been recorded as tree groups or wooded areas where this has been deemed appropriate. Tree groups have been recorded on the basis that they form distinct arboricultural features either aerodynamically, visually or because they contain trees of similar cultural and biodiversity value. Wooded areas are recorded where larger expanses of trees exist and included features which may otherwise be referred to as copses, spinneys or shelterbelts.
- Hedges have been recorded where they form substantial internal or boundary features or where they contribute meaningfully to the landscape character of the local area.
- The trees have been inspected using the Visual Tree Assessment methodology as purported by Mattheck and Breoler¹⁴.
- The tree survey was carried out from ground level only.
- No tissue samples were taken nor was any internal investigation of the subject trees undertaken.
- Tree heights and crown spreads have been estimated to the nearest 1m.

Stem diameters have been measured in accordance with Annex C of BS 5837. Diameters of single stem trees on level ground have been measured at 1.5m above ground level. The diameters of other commonly encountered stems have been measured where most appropriate and this is recorded within the schedule. The combined stem diameters for multi-stemmed trees have been calculated in accordance with BS 5837 paragraph 4.6.1.

By default, Root Protection Areas (RPAs) are calculated as an area equivalent to a circle with a radius 12 times the stem diameter. However, for ancient and veteran trees a root protection area with a radius of 15 times the stem diameter is used¹⁵

QUALITY ASSESSMENT

The quality of arboricultural features has been determined in accordance with BS 5837 Table 1 a summary of which is provided in Tables C-1, C-2, C-3 and C-4. The purpose of the quality assessment is to enable informed decisions to be made regarding the removal and retention of arboricultural features in the context of development.

The quality of each arboricultural feature is defined based on its sub-category. Sub-categories carry equal weight, do not influence retention priority and are simply included to indicate the primary value(s) associated with each surveyed item. The quality and sub-category assigned to each arboricultural feature are identified within the Arboricultural Survey Schedule included in Appendix D of this report.

¹⁴ Mattheck, C., Breoler, H., 2006. *The body language of trees*. Norwich: The Stationary Office

¹⁵ Ancient Tree Forum, 2007. *Ancient Tree Guides No.3: Trees and development* [online] Available at <http://www.ancienttreeforum.co.uk/wp-content/uploads/2015/02/ancient-tree-guide-3-development.pdf> [Accessed 25 January 2019].

Table C-1 - Sub-categories associated with high quality category A arboricultural features

Sub-category	Area of value	Estimated remaining life expectancy (years)	Description
1	Arboricultural	>40	Trees that are of particularly good examples of their species (e.g. notable specimens), especially if rare or unusual; or those that are essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principle trees within an avenue).
2	Landscape	>40	Trees, groups, or woodlands of particular visual importance as arboricultural and/or landscape features.
3	Cultural	>40	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. ancient trees, veteran trees and ancient woodland).

Table C-2 - Sub-categories associated with moderate quality category B arboricultural features

Sub-category	Area of value	Estimated remaining life expectancy (years)	Description
1	Arboricultural	>20	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. the presence of significant though remediable defects including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention beyond 40 years; or trees lacking the special quality necessary to merit category A designation.
2	Landscape	>20	Trees present in numbers, usually as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality.
3	Cultural	>20	Trees with material conservation or other cultural value.

Table C-3 - Sub-categories associated with low quality C category arboricultural features

Sub-category	Area of value	Estimated remaining life expectancy (years)	Description
1	Arboricultural	>10	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.
2	Landscape	>10	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits.
3	Cultural	>10	Trees with no material conservation or other cultural value.

Table C-4 - Very-Low Quality U Category Arboricultural Features

Sub-category	Estimated remaining life expectancy (years)	Description ¹⁶
None	<10	■ Trees that have serious irremediable structural defects; ■ Trees that are dead or are showing signs of immediate and irreversible physiological decline, and; ■ Trees infected with significant pathogens or very-low quality trees suppressing specimens of better quality.

NOTES AND LIMITATIONS

Arboricultural survey data is of a preliminary nature and has been collected based on a walkover survey. Only defects visible from the ground have been noted and each individual feature may not have been inspected closely due to access difficulties, the presence of dense ivy or vegetation or safety constraints. Safety related features have recorded on the basis that the arboricultural features will be subject to a normal programme of tree hazard assessment and only those features which materially affect the quality of the feature or pose a real and immediate safety concern have been recorded.

Arboricultural survey data is typically valid for a period of two years unless otherwise stated. Significant environmental events (such as extreme weather conditions) or changes to the Site may render it invalid within a shorter timescale.

Records held on the Ancient Tree Inventory¹⁷ are collected on a voluntary basis, therefore the absence of records does not demonstrate the absence of ancient, veteran or notable trees but may simply indicate a gap in recording coverage.

¹⁶ These features do not apply in the instance that a tree is defined as ancient or veteran

¹⁷ Ancient Tree Inventory, 2018. *Ancient Tree Inventory* [online] Available at: < <https://ati.woodlandtrust.org.uk> >



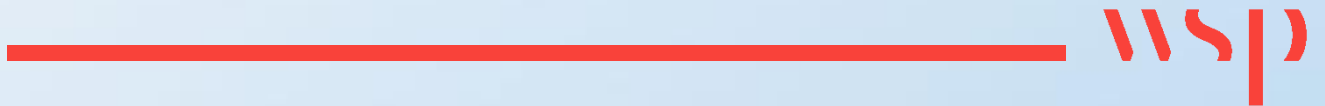
Whilst arboricultural surveys are not seasonally limited it is the case that certain pests and diseases may be more or less evident at different times of the year. This is especially true of certain wood decaying fungi such as the Giant Polypore (*Meripilus giganteus*) where fruiting bodies are short-lived and the early stages of root decay may not result in other identifiable symptoms. Walkover survey data is therefore based upon observations made at the time of the site visit and may be subject to change should further or more detailed inspections be undertaken.

The survey has only been undertaken from land within the client's ownership, from public land or from areas where formal access has been arranged.

The position of arboricultural features not recorded on a topographical survey has been estimated using aerial photography. The position and extent of these features should be regarded as approximate only.

Appendix D

ARBORICULTURAL SURVEY SCHEDULE



Measurements		Life Stages		Quality Assessment of BS Category		ULE (relates to BS Category)
Height	Overall height (m) – maximum and minimum heights may be recorded for tree groups, wooded areas and hedges where these vary considerably.	Estimated	Young trees; Establishing and typically with good vigour and fast growth rates and strong apical dominance; < 1/3rd estimated life expectancy	Category A	Trees of high quality with an estimated remaining life expectancy of at least 40 years.	40+ years
Stem Dia.	Diameter measured (mm) in accordance with BS 5837 paragraph 4.6.1, Annex C. Average stem diameter is provided for tree groups, woodlands and hedges.	Semi-mature	Semi-mature trees; 1/3rd to 2/3rd estimated life expectancy	Category B	Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.	20-40 years
Crown Radius	Estimated on site or measured using a digital distometer radially from the stem (m). Cardinal points north (N), east (E), south (S) and west (W) provided.	Mature	Mature; > 2/3rd estimated life expectancy, generally good vigour and achieving full height potential with crown still spreading	Category C	Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.	10-20 years
LCH	Lowest crown height (m)* Lowest branch height (m)*	Veteran	Biological, cultural or aesthetic value comprising niche saproxylic habitat. Individuals of large proportions (stem girth) in comparison to trees of the same species/ exists significantly beyond its normal life expectancy.	Category U	Trees 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.	<10 years
FSB	Height of lowest significant branch (m)*			Sub-categories: 1 - Mainly arboricultural value 2 - Mainly landscape value 3 - Mainly cultural or conservation value		
		Abbreviations and Notes				
* In some instances, where an arboricultural feature abuts the edge of the Study Area then only the portion of the crown within/overhanging the Study Area will be surveyed and recorded.		est - Estimated stem diameter avg - Average stem diameter for multiple stems upto - Maximum stem diameter of a group erc - Estimated remaining contribution		The BS category particular consideration has been given to the following: • The presence of any structural defects in each tree/group and its future life expectancy • The size and form of each tree/group and its suitability within the context of a proposed development • The location of each tree relative to existing site features e.g. its screening value or landscape features • Age class and life expectancy		

Structural Condition		Physiological Condition	
Good	No significant structural defects.	Good	No significant health problems.
Fair	Structural defects that can be remediated.	Fair	Symptoms of ill-health that can be remediated.
Poor	Significant defects beyond remediation, presents a risk of failure in the foreseeable future.	Poor	Significant ill-health. Unlikely the tree will recover in the long term.
Dead	Dead tree with structural integrity of tree severely compromised.	Dead	Advanced state of decline and unlikely to recover or dead.

Root Protection Area (RPA)
• The RPA Radius column provides the extent of an equivalent circle from the centre of the stem (m). • The RPA is calculated using the formulae described in paragraph 4.6.1 of British Standard 5837: 2012 and is indicative of the rooting area required. Tree roots extend beyond the calculated RPA in many cases and where possible a greater distance should be protected. An average stem diameter is provided for tree groups, wooded areas and hedges • Where veteran trees have been identified the RPA has been calculated in accordance with Natural England guidance i.e. 15x the stem diameter or 5m beyond the crown whichever is greater

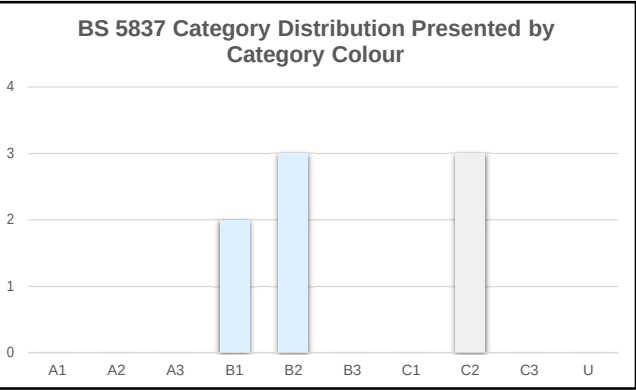
Evidence of

Arboricultural Survey Summary

Table 1 - Summary of Individual Tree, Groups of Trees, Woodlands and Hedgerows by BS5837:2012 Category

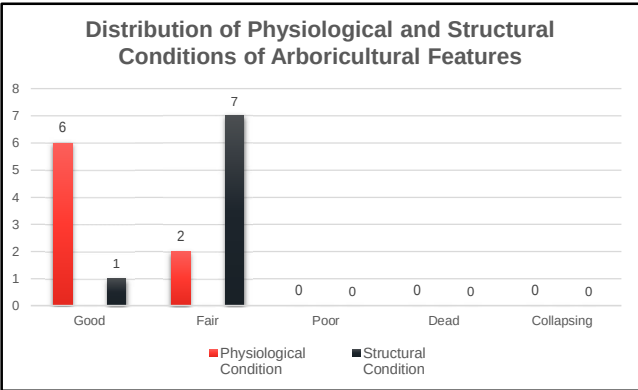
Category	Individual Trees, Groups, Woodlands, Hedgerows	Total
Category A		0
Category B	T2, G3, W5, T7, W8	5
Category C	G1, G4, G6	3
Category U		0
Total		8

Chart 1



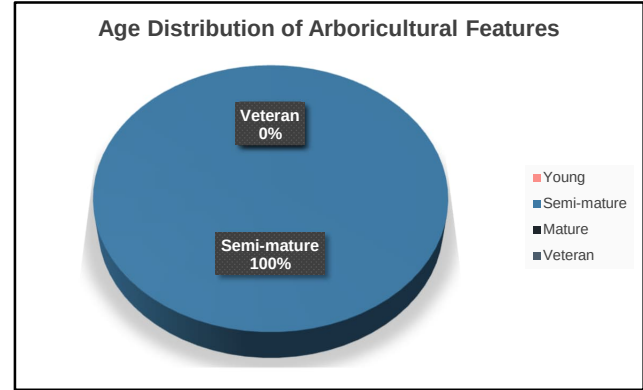
BS 5837 Category Distribution displays the proportion of trees assessed in each category type to enable a better understanding of the category distribution across the population. Trees have been divided into one of four categories based on Table 1 of BS5837 Cascade chart for tree quality assessment.

Chart 2



One of the key factors in assessing the long-term value and vulnerability of the resilience of the tree population to pests and diseases is the overall condition of that population. Physiological condition provides an indication of the physiological vitality of the tree whilst tree structural condition is related to the presence of defects (e.g. large cavity or codominant branches with included bark) that can lead to tree failure. An assessment of the condition allows for an assessment of the overall health of the tree population

Chart 3



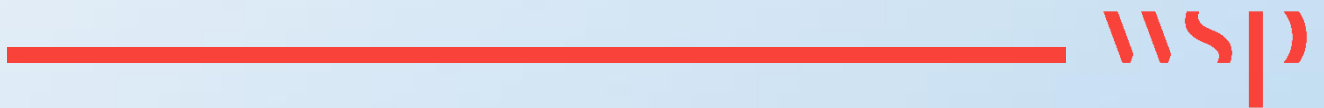
Age Distribution of Arboricultural features shows the percentage of the tree population in each age category. The distribution of age category across the population is useful for understanding the expected longevity of the existing tree cover which can be used for determining mitigation, management and replacement. A population requires sufficient large, mature trees and to deliver the widest range of environmental benefits in urban areas and enough trees of a younger age classes to replace these mature trees as they eventually die.

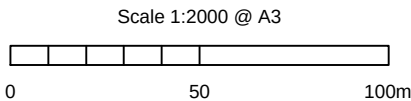
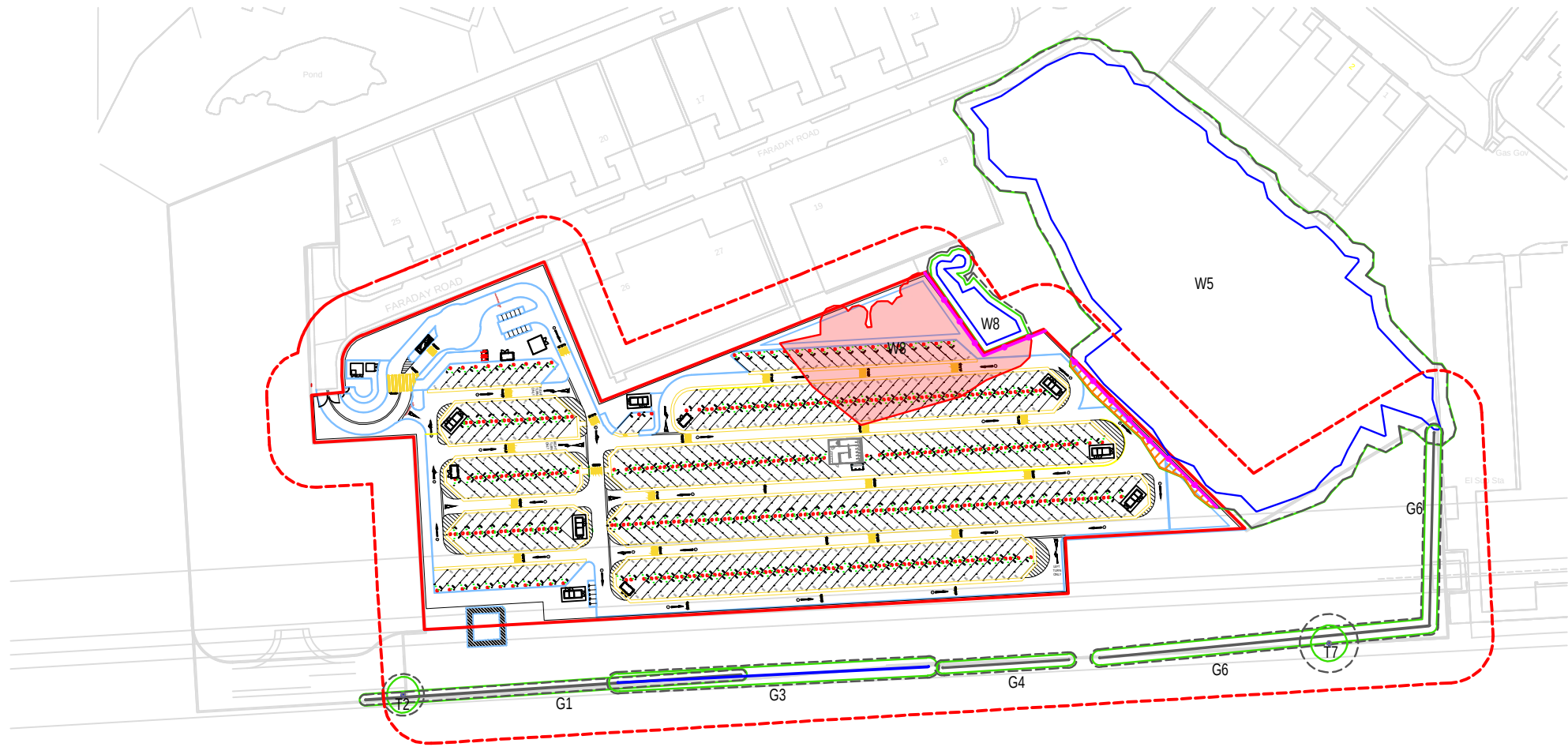
Arboricultural Survey Schedule

Ref.	Species	Height (m)	Stem measurement	Stem Dia. (mm)	N	E	S	W	LCH	LBH	Life Stage	Physiological Condition	Structural Condition	Tree Condition Notes & Observations	RPA (m²)	RPA Rad. (m)	BS5837 Category	Estimated Remaining Contribution
G1	Hawthorn, Oak, Silver Birch, Sycamore, Goat Willow, Elder	6	Estimated	150	2	2	2	2	1	1	Semi-Mature	Good	Fair	Some multi stemmed specimens, understory for larger trees in G3	10.18	1.80	C2	10+
T2	Oak	9	Estimated	500 300	5	6	5	6	1.5	2	Semi-Mature	Good	Fair	Stem estimated, pruning wounds, one piece of major deadwood in lower crown, epicormic growth on branches,	153.83	7.00	B1	20+
G3	Oak, Poplar, Goat Willow, Silver Birch	12	Estimated	300	3	3	3	3	4	4	Semi-Mature	Good	Fair	Excellent screening value, stems estimated average, pruning wounds to north, minor deadwood, some suspended major deadwood, Poplar up to 18m tall, concrete post and wire fence behind oak specimens trench already been dug in RPA, roots exposed severed and dried	40.72	3.60	B2	20+
G4	Oak, Silver Birch, Goat Willow, Sycamore, Whitebeam	10	Estimated	200	2	2	2	2	2	3	Semi-Mature	Fair	Fair	Some collapsed specimens, major deadwood, bark wounds, pruning wounds, trees generally of poor form, dead trees noted, situated on embankment, offering some screening value, unable to gain access, trench already been dug at group base in RPA	18.10	2.40	C2	10+
W5	Oak, Sycamore, Goat Willow, White willow, Blackthorn, Cherry	12	Estimated	400	5	5	5	5	2	2	Mature (Late)	Good	Good	Unable to gain access, situated behind palisade fencing, dense understory, bark wounds, minor deadwood	72.39	4.80	B2	20+
G6	Sycamore, Oak, Silver Birch, Ash, Goat Willow	8	Estimated	250	2.5	2.5	2.5	2.5	1	1	Semi-Mature	Fair	Fair	Likely self seeded, stem average, some multi stemmed specimens, gaps present, along boundary fence	28.28	3.00	C2	10+
T7	Sycamore	11	Estimated	550 330 280 350 200 100	6	6	6	6	1	1	Mature (Late)	Good	Fair	Multi stemmed from base, straddling wire fence, minor deadwood, epicormic growth, dieback of outer lower leaves	299.66	9.77	B1	20+
W8	Rowan, Hawthorn, Sycamore, Oak, Goat Willow, Ash, Swedish Whitebeam, Yew, Blackthorn	7	Estimated	250	2	2	2	2	1	2	Semi-Mature	Good	Fair	Evidence of windthrow and fallen dead wood throughout	28.28	3.00	B2	20+

Appendix E

TREE RETENTION AND PROTECTION PLAN





LEGEND:

- T TREE
G TREE GROUP
W WOODLAND
- BS 5837 CATEGORY GRADING / QUALITY
- B CATEGORY / MODERATE
● C CATEGORY / LOW
- ROOT PROTECTION AREA ○ TREE CANOPY
- TREES TO BE REMOVED □ TREE PROTECTION FENCING
- ▨ AREA OF SUPERVISION REQUIRED DURING EXCAVATION
- PROPOSED DEVELOPMENT BOUNDARY
- 15M BUFFER ARBORICULTURAL STUDY AREA

P05	30/05/2023	JG	FIFTH ISSUE: PROTECTION FENCING FOR W5	JG	JG
P04	28/02/2023	JG	FOURTH ISSUE: UPDATED GENERAL ARRANGEMENT	MW	MW
P03	26/01/2023	JG	THIRD ISSUE: UPDATED GENERAL ARRANGEMENT, ARBORICULTUALL IMPACTS AND PROTECTION	MW	HB
P02	29/10/2020	EKP	SECOND ISSUE	CTT	CTT
P01	17/07/2020	EKP	FIRST ISSUE	CTT	CTT
REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS: S2 - SUITABLE FOR INFORMATION



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CLIENT: NETWORK SPACE

ARCHITECT: NOT APPLICABLE

PROJECT: FARADAY ROAD, KNOWSLEY

TITLE: TREE REMOVAL AND PROTECTION PLAN

SCALE @ A3: 1:2000	CHECKED: CTT	APPROVED: CTT
PROJECT No: 70073657	DESIGNED: EKP	DRAWN: EKP
DRAWING No: 70073657-TRPP-EV-005	DATE: 17/07/2020	REV: P04

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