

A47/A11 Thickthorn Junction

Scheme Number: TR010037

Volume 6

6.2 Environmental Statement Appendices

Appendix 7.6 – Arboricultural Impact Assessment

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009

March 2021

Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed Forms and
Procedure) Regulations 2009**

The A47/A11 Thickthorn Junction
Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT APPENDICES
Appendix 7.6 – Arboricultural Impact Assessment

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010037
Application Document Reference	TR010037/APP/6.3
BIM Document Reference	HE551492-GTY-ELS-000-RP-LX-30009
Author:	A47/A11 Thickthorn Junction Project Team, Highways England

Version	Date	Status of Version
Rev 0	March 2021	Application Issue

Report



Arboricultural Impact Assessment A47/A11 – Thickthorn Junction

Date: February 2021

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK ADAS Ltd.

Version History

Version	Date	Amendment
A	November 2020	Initial Report
B	January 2021	Layout updated
C	February 2021	Section References in Table 2 updated

1 Executive summary

ADAS has been commissioned to assess the impact of design proposals for the A47/A11 Thickthorn Junction (Proposed Scheme), which includes a redesign of the road layout, new fencing and drainage proposals. For the purpose of this report, reference to 'the site' means land encompassed by the red site boundary line shown on the Site Location Plan contained in **Appendix 1**.

The preliminary survey was carried out by Highways England on the 01 and 02 August 2018, with additional surveys undertaken by ADAS between 13 and 17 July 2020, in line with the requirements of 'BS5837:2012 Trees in Relation to Design, Demolition and Construction: Recommendations' (BS5837:2012).

The tree surveys identified a total of 160 tree features including 67 individual trees, 89 groups of trees, two hedgerows and two woodlands which have the potential to be impacted by the proposals.

In line with the recommendations contained within Table 1 of BS5837:2012, of these tree features; 22 individual trees and two groups of trees were awarded a high quality A grade; 43 tree features, including 23 individual trees, 19 groups of trees and one woodland were awarded a moderate quality B grade; 92 tree features, including 21 individual trees, 68 tree groups, two hedgerows and one woodland were awarded a low quality C grade; and one individual tree was awarded a U grade, meaning the tree would be unsuitable for long term retention.

The location of the trees and their categories are shown on the Arboricultural Impact Assessment Plan (AIA) contained in **Appendix 2**.

Based on the current proposals, 17 individual trees and 11 groups of trees will require complete removal in order to facilitate the proposed scheme. In addition, 27 tree groups and two woodlands will require partial removal. Some special construction techniques are required to ensure other trees can be retained during the course of the works.

A search of South Norfolk Council's interactive mapping facility, My South Norfolk, on 10 September 2020 has confirmed that the footprint of the Proposed Scheme does not fall within a conservation area. One area within the boundary of the survey area is protected by a group Tree Preservation Order (TPO). These are on Cantley Lane, and the TPO affects trees at the edges of groups G80 & G81 and woodland W2. These trees will not be affected by the Scheme but should be noted due to their close proximity to the design. A copy of the results of this search has been included in **Appendix 3**.

2 Introduction

2.1 Competent expert

This document has been prepared by an arboricultural consultant (BSc (Hons) Arboriculture and Urban Forestry) with 10 years' of experience within the arboricultural industry and holds professional membership of the Arboricultural Association.

2.2 Purpose of Report

The purpose of this document is to provide an evaluation of the effects of the Proposed Scheme on the existing trees on and adjacent to the site. Where necessary it will also provide recommendations to mitigate the loss or negative impact on the vegetation that the proposals may cause.

2.3 Tree survey methodology

An initial tree survey to establish the tree constraints on the site was carried out by a previous consultant on the 01 and 02 August 2018. ADAS have not verified the accuracy of this data.

A further survey to capture trees not included in the original survey, was carried out by ADAS between 13 and 17 July 2020. The combined results of the two surveys are contained in **Appendix 4**.

The information shown in **Table 1** below, was recorded as part of the tree survey.

Table 1: Tree survey schedule heading descriptions

Column heading	Description
Tree Reference Number	All individual trees and groups of trees have been given a unique reference number. <ul style="list-style-type: none">▪ T = Individual Tree▪ G = Group of trees▪ H = Hedgerow▪ W = Woodland
Species	The English common name has been used (scientific names included in brackets for some tree features).
Height (m)	Where possible tree heights are measured using a laser. In some instances, such as in close groups of trees, one height may be measured and other nearby trees estimated from this height. Measurements are provided in metres.
Stem diameter (mm)	S _n represents the stem number. Measurements are provided in millimetres at 1.5m above ground level for single stemmed trees.
Branch spread (m)	Measured in metres to the four cardinal compass points (N, E, S, W).
Crown clearance	(1) Height in metres of the first significant branch, and the direction of growth. (2) Height in metres of lowest part of crown.
Life stage	The stage at which the tree is within its lifecycle (Y = young, SM = semi-mature, EM = early-mature, M = mature, OM = over mature, V = veteran)
General observations	Any relevant observations are recorded, with particular reference to structural and/or physiological condition.

Column heading	Description
Preliminary management recommendations	Recommendations are made where management work is required for reasons of health and safety or sound arboricultural management.
Estimated remaining contribution (years)	An estimation of how long the feature will contribute to its surroundings. This is recorded in bands of either <10 years, 10+ years, 20+ years and 40+ years.
Tree quality grading	The trees are graded to the categories prescribed within BS5837:2012 (U, A, B & C). Details of this grading system can be found in Appendix 5 .
Root protection area (RPA)	Calculated as prescribed in section 4.6 of BS5837:2012, provided as an area (m ²) and a radius from the tree's stem (m). Further guidance on RPAs is provided in Appendix 6 .

2.4 Assumptions and limitations

The AIA contained in **Appendix 2** has been developed from the tree survey and tree location plan previously produced in August 2018, along with the new data collected by ADAS in July 2020. ADAS has not verified the accuracy of the data collected during the 2018 arboricultural survey. Therefore it is recommended that tree locations are verified on site prior to any works being undertaken.

This report is not a full hazard or risk assessment of trees, and should not be used as such.

Trees are living organisms and are constantly adapting to their ever changing environment. No tree is completely safe and there is no guarantee that problems or deficiencies may not arise in the future, which have not been identified in this report. Therefore this report is only valid for a period of 1 year from the date of the initial site inspection.

2.5 Legislation

2.5.1 Tree preservation orders and conservation areas

Local planning authorities (LPAs) have the power to preserve selected trees and woodlands through the making of tree preservation orders (TPOs). Similarly, special provision is provided to trees located within conservation areas (CA) which are not the subject of a TPO. The LPAs' powers to do this are provided by the following Act of Parliament and its associated regulations:

- Town and Country Planning Act 1990
- Town and Country Planning (Determination of Appeals by Appointed Persons) (Prescribed Classes) (Amendment) (England) Regulations 2008
- Town and Country Planning (Trees) (Amendment) (England) Regulations 2012

The principal effect of a TPO is to prohibit the cutting down, uprooting, topping, lopping, wilful damage or wilful destruction of trees without first obtaining the consent of the relevant Local Authority.

Where works to trees within a CA are proposed, six weeks notification must first be given to the relevant Local Authority.

Unauthorised works to trees either protected by a TPO or those that are located within a CA, could result in an unlimited fine.

A search of South Norfolk Council's interactive mapping facility, My South Norfolk, on 10 September 2020 has confirmed that the footprint of the Proposed Scheme does not fall within a CA. One area within the boundary of the survey area is protected by a group TPO, this covers a number of trees at Cantley Lane, and affects trees at the edges of groups G80 and G81 and woodland W2. These trees will not be affected by the Proposed Scheme but should be noted due to their close proximity to the design. A copy of the results of this search has been included in **Appendix 3**.

2.5.2 Wildlife legislation

European protected species such as bats, dormice and great crested newts are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017. Other species that may be affected by tree works include breeding birds and reptiles which are protected under the Wildlife and Countryside Act 1981 (as amended). The design process should ensure protected species are considered during any redevelopment work. Tree work and the timing of tree work should be carefully considered.

2.6 Site description

The Proposed Scheme is located on the southwestern outskirts of Norwich, at the interchange between the A47 and the A11, and includes a redesign of the road layout including new fencing and drainage proposals.

Adjacent to the junction to the north-west are a park and ride facility, motel and fast food restaurants which are surrounded by trees.

The junction is approximately 0.5km west of Cringleford. However the majority of the nearby land is open arable fields with occasional woodland and residential properties.

The majority of trees surveyed were along the edges of the existing A47 and A11. These trees are generally of moderate landscape value but with moderate to low arboricultural value. Other significant groups and woodlands were identified within the survey area which also contribute to the green infrastructure of the area.

There were 24 Category A (high retention value) tree features surveyed on site, most of which were mature common oaks. These were mainly open grown trees in farmland.

3 Arboricultural impact assessment

3.1 Overview

The tree stock has been assessed under the following categories and summarised in **Table 2**:

- Trees proposed for removal. This includes trees:
 - that are under the footprint of the proposed development
 - whose RPAs are heavily affected by the development
 - that are to be removed for reasons of sound arboricultural management.
- Retained trees that are at risk of damage through disturbance of RPAs or require extra protection due to their proximity to proposed work areas
- Retained trees which are unaffected by the development proposals

Table 2: Arboricultural impact assessment

Tree ref	Species	BS5837 category	TPO	CA	Impact and Recommended Actions
T1	Pedunculate Oak	A	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T2	Common Ash	A	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T3	Pedunculate Oak	A	No	No	Fell – in centre of new carriageway
T4	Pedunculate Oak	B	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T5	Pedunculate Oak	A	No	No	Unaffected: field access track to avoid RPA - Retain and protect with temporary barrier in accordance with BS5837:2012
T6	Pedunculate Oak	A	No	No	Special construction measures needed – Services within RPA. Field access track to avoid RPA.
T7	Pedunculate Oak	A	No	No	Special construction measures needed – Services in RPA
T8	Pedunculate Oak	B	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T9	Pedunculate Oak	B	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T10	Pedunculate Oak	B	No	No	Fell – under footprint of construction
T11	Pedunculate Oak	A	No	No	Fell – under footprint of construction

Tree ref	Species	BS5837 category	TPO	CA	Impact and Recommended Actions
T12	Pedunculate Oak	A	No	No	Fell – under footprint of construction
T13	Pedunculate Oak	A	No	No	Fell – under footprint of construction
T14	Pedunculate Oak	A	No	No	Fell – under footprint of construction
T15	Pedunculate Oak	A	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T16	Pedunculate Oak	A	No	No	Special construction measures needed – compound in RPA: to be protected with temporary barrier.
T17	Pedunculate Oak	B	No	No	Special construction measures needed – compound in RPA: to be protected with temporary barrier.
T18	Pedunculate Oak	A	No	No	Special construction measures needed – compound in RPA: to be protected with temporary barrier.
T19	Pedunculate Oak	A	No	No	Special construction measures needed – compound in RPA: to be protected with temporary barrier.
T20	Pedunculate Oak	A	No	No	Special construction measures needed – compound in RPA: to be protected with temporary barrier.
T21	Pedunculate Oak	A	No	No	Special construction measures needed – compound in RPA: to be protected with temporary barrier.
T22	Sycamore	B	No	No	Fell – under footprint of construction
T23	Pedunculate Oak	A	No	No	Special construction measures needed – compound in RPA: to be protected with temporary barrier.
T24	Pedunculate Oak	B	No	No	Special construction measures needed – compound in RPA: to be protected with temporary barrier.
T25	Pedunculate Oak	A	No	No	Special construction measures needed – compound in RPA: to be protected with temporary barrier.
T26	Pedunculate Oak	A	No	No	Unaffected – outside works area.
T27	Pedunculate Oak	A	No	No	Unaffected – outside works area.
T28	Pedunculate Oak	A	No	No	Unaffected – outside works area.
T29	Pedunculate Oak	A	No	No	Unaffected – outside works area.
T30	Pedunculate Oak	B	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012

Tree ref	Species	BS5837 category	TPO	CA	Impact and Recommended Actions
T31	Elm	C	No	No	Fell – under footprint of construction
T32	Pedunculate Oak	B	No	No	Fell – under footprint of construction
T33	Pedunculate Oak	B	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T34	Pedunculate Oak	B	No	No	Fell – under footprint of construction
T35	Pedunculate Oak	B	No	No	Fell – under footprint of construction
T36	Pedunculate Oak	C	No	No	Fell – under footprint of construction
T37	Sycamore	C	No	No	Fell – under footprint of construction
T38	Ash	C	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T39	Pedunculate Oak	B	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T40	Pedunculate Oak	C	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T41	Pedunculate Oak	B	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T42	Pedunculate Oak	C	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T43	Pedunculate Oak	C	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T44	Pedunculate Oak	B	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T45	Ash	C	No	No	Special construction measures needed – Fencing in RPA
T46	Hawthorn	C	No	No	Special construction measures needed – Fencing in RPA
T47	Hawthorn	C	No	No	Special construction measures needed – Fencing in RPA
T48	Pedunculate Oak	C	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T49	Pedunculate Oak	U	No	No	Fell – remove for good arboricultural management

Tree ref	Species	BS5837 category	TPO	CA	Impact and Recommended Actions
T50	Pedunculate Oak	C	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T51	Pedunculate Oak	C	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T52	Pedunculate Oak	C	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T53	Pedunculate Oak	B	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T54	Pedunculate Oak	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
T55	Pedunculate Oak	B	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T56	Prunus	C	No	No	Unaffected - Retain and protect with temporary barrier in accordance with BS5837:2012
T57	Pedunculate Oak	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
T58	Pedunculate Oak	B	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
T59	Pedunculate Oak	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
T60	Pedunculate Oak	B	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
T61	Pedunculate Oak	C	No	No	Fell – beneath footprint of construction
T62	Pedunculate Oak	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
T63	Ash	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
T64	Pedunculate Oak	C	No	No	Fell – under footprint of construction
T65	Pedunculate Oak	B	No	No	Fell – under footprint of construction

Tree ref	Species	BS5837 category	TPO	CA	Impact and Recommended Actions
T66	Pedunculate Oak	B	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
T67	Pedunculate Oak	B	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G1	Mixed highways planting	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012. Special construction measures needed – Services in RPA
G2	Mixed highways planting	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G3	Mixed highways planting	C	No	No	Fell – under footprint of construction
G4	Mixed highways planting	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G5	Mixed highways planting	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G6	Oak & Hawthorn	C	No	No	Fell – under footprint of construction
G7	Mixed native	C	No	No	Fell – under footprint of construction
G8	Mixed native	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G9	Mixed native	B	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G10	Mixed native and naturalised	B	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012. Special construction measures needed – Fencing in RPA
G11	Mixed native and naturalised	B	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012. Special construction measures needed – Services in RPA

Tree ref	Species	BS5837 category	TPO	CA	Impact and Recommended Actions
G12	Scots Pine, Oak, Elder	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G13	Mixed native	B	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012. Special construction measures needed – Services in RPA
G14	Mixed native	B	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012. Special construction measures needed – Fencing in RPA
G15	Mixed native and naturalised	B	No	No	Special construction measures needed – Fencing in RPA
G16	Mixed native and naturalised	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012. Special construction measures needed – services close to RPA
G17	Mixed native and naturalised	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G18	Mixed native	A	No	No	Unaffected – outside works area.
G19	Mixed native	C	No	No	Unaffected – outside works area.
G20	Mixed native and ornamental	A	No	No	Special construction measures needed – Compound in RPA
G21	Mixed native and naturalised	B	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G22	Mixed native and naturalised	B	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G23	Mixed native and exotic	B	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G24	Mixed native and naturalised	B	No	No	Fell – under footprint of construction

Tree ref	Species	BS5837 category	TPO	CA	Impact and Recommended Actions
G25	Mixed native	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G26	Mixed native and naturalised	B	No	No	Special construction measures needed – Compound in RPA
G27	Mixed native	B	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G28	Mixed native and naturalised	C	No	No	Unaffected – outside works area.
G29	Field Maple	B	No	No	Unaffected – outside works area.
G30	Goat Willow	C	No	No	Unaffected – outside works area.
G31	Field Maple	C	No	No	Unaffected – outside works area.
G32	Field Maple	C	No	No	Unaffected – outside works area.
G33	Hawthorn	C	No	No	Fell – under footprint of construction
G34	Hawthorn	C	No	No	Fell – under footprint of construction
G35	Hawthorn	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G36	Ash	C	No	No	Fell – under footprint of construction
G37	Hawthorn	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G38	Ash	B	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G39	Hawthorn	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012. Special construction measures needed – Services in RPA
G40	Cherry	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G41	Hawthorn	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G42	Hawthorn	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.

Tree ref	Species	BS5837 category	TPO	CA	Impact and Recommended Actions
G43	Pedunculate Oak	B	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G44	Hawthorn	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G45	Pedunculate Oak	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G46	Hawthorn	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G47	Pedunculate Oak	C	No	No	Fell – under footprint of construction
G48	Ash	C	No	No	Fell – under footprint of construction
G49	Alder	C	No	No	Special construction measures needed – Fencing and Services within RPA
G50	Ash	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G51	Ash	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G52	Hawthorn	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G53	Pedunculate Oak	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G54	Hawthorn	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G55	Hazel	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G56	Pedunculate Oak	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G57	Silver Birch	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G58	Hawthorn	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012

Tree ref	Species	BS5837 category	TPO	CA	Impact and Recommended Actions
G59	Pedunculate Oak	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G60	Pedunculate Oak	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G61	Hawthorn	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G62	Sycamore	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G63	Sycamore	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G64	Pedunculate Oak	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G65	Pedunculate Oak	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G66	Mixed native	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G67	Ash	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G68	Beech	B	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G69	Field Maple	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G70	Goat Willow	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G71	Field Maple	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G72	Field Maple	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012

Tree ref	Species	BS5837 category	TPO	CA	Impact and Recommended Actions
G73	Field Maple	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G74	Hawthorn	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012. Special construction measures needed – Services in RPA
G75	Hazel	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G76	Hawthorn	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G77	Wych Elm	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G78	Pedunculate Oak	C	No	No	Fell – under footprint of construction
G79	Pedunculate Oak	C	No	No	Fell – under footprint of construction
G80	Scots Pine	C	Yes – see section 2.5.1	No	Special construction measures needed – Services in RPA
G81	Mixed broadleaf group	B	Yes – see section 2.5.1	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G82	Mixed native	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G83	Mixed broadleaf group	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G84	Mixed native	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G85	Mixed native	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G86	Mixed native	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012

Tree ref	Species	BS5837 category	TPO	CA	Impact and Recommended Actions
G87	Mixed native	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
G88	Mixed broadleaves	B	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
G89	Mixed broadleaves	B	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
H1	Hawthorn	C	No	No	Unaffected – Retain and protect with temporary barrier in accordance with BS837:2012
H2	Leylandii	C	No	No	Special construction measures needed – Services in RPA
W1	Mixed native and naturalised	C	No	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.
W2	Mixed native and naturalised	B	Yes – see section 2.5.1	No	Fell section in conflict with scheme and protect remainder with temporary barriers in accordance with BS5837:2012.

3.2 Tree removal

Based on the current proposals, 17 individual trees and 11 groups of trees will require complete removal in order to facilitate the scheme – see **Table 3**. One tree is a very low quality U grade tree and will be removed for reasons of sound arboricultural management.

In addition, 27 tree groups and two woodlands will require partial removal. These include B grade tree groups G9, G10, G11, G13, G14, G21, G22, G23, G27, G38, G88, G89; B grade woodland W2; C grade tree groups G1, G2, G4, G5, G8, G16, G17, G25, G39, G42, G50, G66, G71, G74, G82, and C grade woodland W1

Some special construction techniques are required to ensure other trees can be retained during the course of the works (see Section 4).

Table 3: Tree features requiring complete removal

Tree type	Tree Quality Assessment Category Grading				Totals
	A	B	C	U	
Individual trees	T3, T11, T12, T13, T14	T10, T22, T32, T34, T35, T65	T31, T36, T37, T61 T64	T49	17
Groups of trees	None	G24	G3, G6, G7, G33, G34, G36, G47, G48, G78, G79	None	11
	Total = 5	Total = 7	Total = 16	Total = 1	28

3.3 Compounds and Material Storage Areas within RPAs

A site compound is shown within the RPA of A grade trees T16, T18, T19, T20, G20, T21, T23, T25; and B grade trees T17, T24 and G26.

Where possible, the compounds and storage areas should be positioned outside the RPA of these trees. If this is not possible; where new temporary hard-surfacing is proposed within RPAs, certain precautions must be followed in order to maintain a growing environment which is able to support the long term growth of the retained trees.

Of key importance is the need to avoid severing roots and also to avoid compacting the soil to such a degree that the tree roots are no longer able to penetrate the soil and that air and moisture are no longer able to enter and move through the soil. In addition, it is important that the new hard surface does not block the movement of air and moisture into and out of the soil.

The new hard surfaces will therefore be built on top of existing ground levels and their construction should be engineer designed. Providing surface water is not liable to be contaminated by salt or toxic run-off from oil or petrol, a permeable surface and sub-base will be employed. In order to avoid compaction of the existing soil it may be necessary to incorporate a load suspension system such as a 3D cellular confinement system similar to the one shown in **Appendix 7**.

The Site Supervisor shall ensure the prepared surface meets the necessary strength requirements prior to installation.

The Site Supervisor shall provide the setting out of any edging requirements.

The soil surface will not be skimmed to establish new hard surfaces at the former ground level, as this has the potential to cause root damage. Therefore, loose organic matter and/or turf will be removed carefully using either hand tools or pedestrian operated machinery (such as a turf stripper), and the new surface established above the former ground level, using a granular fill where required.

If ground levels are to be raised within the RPA such as to accommodate dips and level changes in the existing ground levels, or to create the sub-base for the hard-surface, this should be achieved by the use of a granular material which does not inhibit vertical gaseous diffusion. Examples of suitable granular materials include, no-fines gravel, washed aggregate, or cobbles.

Excess water in the RPA should be avoided, particularly on clay soils where water logging can occur. In these cases, the hard surface should slope away from the tree to avoid ponding.

The excavation needed for the placement of kerbs, edgings and their associated foundations and haunching can damage tree roots. This should be avoided within the RPA, either by the use of alternative methods of edge support. Suitable edge supports may consist of but are not limited to:

- Peg and board edging
- Sleepers pinned to the ground
- Gabions
- Other proprietary structures

Consideration will be given to the placing of drainage gullies and these will be located outside of the RPAs of the retained trees.

3.1 Fence lines constructed within RPA of retained trees

New permanent fencing is proposed within the RPAs of B grade trees G10, G11, G14, G15; and C grade trees T45, T46, T47. There is potential for causing damage to the roots of these trees during installation of fencing and supporting posts. In order to avoid damage to the roots, or crown of these trees, it is important that the installation is carefully planned.

Where possible, the fence line should be adjusted to avoid the RPA of retained trees. Where this is not possible, the following recommendations must be followed:

- Supporting posts will be designed to require minimal excavations.
- Any posts to be positioned below ground will be kept as small as possible and will be positioned to avoid significant roots.
- Where possible hand-dug trial excavations will be carried out in the locations of the proposed posts. These excavations will be to a depth of 500mm or to the proposed depth of the post and footing if this is shallower. The excavations should be undertaken under the supervision of the retained Arboricultural Consultant.
- If significant roots are exposed the position of the post should be altered to avoid these roots.
- If concrete or any other phyto-toxic material is to be used for the foundations a sheath / protective barrier will be used to prevent leaching into the soil.

- Any machinery used, including piling rigs, will be as small as possible and will work from existing hard surfacing or suitable ground protection as specified in Section 3.4 above.
- Where the work is below the crowns of retained trees, consideration will also be given to required working space for any machine.

3.1 Utility connections

ADAS have been made aware of proposals for underground services, and these have been duly considered within the arboricultural impact assessment and associated recommendations.

Underground services will be located within the RPA of A grade trees T6 and T7; B grade trees G11 and G13; and C grade trees G1, H2, G39, G49, G74 and G80.

Where possible the works will be carried out using trenchless techniques such as moling, laser guided boring and in accordance with advice contained within National Joint Utilities Group (NJUG) document Volume 4 Issue 2.

Machinery must not be used to excavate utility trenches within the RPA of retained trees. Where trenchless techniques cannot be used, excavations must be hand-dug and supervised by the retained Arboricultural Consultant.

Any hand digging within the RPA of retained trees must be undertaken with great care requiring closer supervision than normal operations to protect the epidermis of structural roots (roots greater than 25mm diameter). These roots must not be severed at any time without first consulting the retained Arboricultural Consultant.

3.2 Facilitation pruning

It is not anticipated that any facilitation pruning will be required.

4 Tree Protection Recommendations

4.1 Ground protection

Where access will be required for machinery or pedestrians within the RPAs of any retained trees, ground protection will be installed.

This ground protection will be required to avoid direct damage to the roots of the trees as well as preventing compaction of the soil. In accordance with section 6.2.3 of BS5837:2012 this ground protection will need to be fit for the purpose of supporting any traffic entering the RPA without causing compaction of the soil below.

For pedestrian traffic, a single layer of scaffold or 19mm ply boards laid on top of driven scaffold framework or laid onto a compressible layer of sharp sand or woodchip on a geotextile membrane should be adequate.

In those instances where access is required within the RPAs of retained trees for plant and machinery, the level of ground protection will need to be increased to proprietary inter-locking boards on a compressible layer, or a cellular confinement system (an example is provided in **Appendix 7**) capable of withstanding the expected weight loads.

4.2 Tree protection fencing

Tree protection fencing should be installed around the perimeter of the RPAs or tree canopy extents, whichever is greater, of all retained individual and groups of trees.

In line with Section 6.2.2 of BS 5837:2012, which requires that the tree protection barriers be fit for the purpose of excluding construction activity and that they provide adequate protection to the trees and hedge, it is proposed that they will consist of 2m tall welded mesh panels supported by upright poles driven into the ground. Each panel will be secured to its neighbour with a minimum of two anti-tamper couplers secured so that they can only be undone from inside the construction exclusion zone (CEZ). The panels will be further supported by stabilizer struts which will be pinned to the ground. Examples of suitable fencing configurations are included in **Appendix 8**. Inside the CEZ the following prohibitions will be complied with:

- No excavations, including by hand
- No storage of machinery
- No storage or handling of building materials, fuel, chemicals or spoil
- No fires
- No vehicular access
- No pedestrian access

- No alteration, increase or decrease, to existing ground levels
- No excavation or installation of services

4.3 Arboricultural monitoring

An Arboricultural Consultant should be appointed to monitor the tree protection measures on site. The purpose of this is to ensure the protection measures remain in situ and continue to provide sufficient protection to the trees.

This role will initially entail the Arboricultural Consultant liaising with the build contractor to ensure the recommended protection measures are correctly installed. Once the tree protection measures have been installed, and construction activity commences, the Arboricultural Consultant should monitor any works taking place within the RPAs of retained trees.

A formal record of these supervisory visits should be recorded and kept on file; a copy should also be circulated to all relevant parties.

5 Conclusions

The tree survey undertaken by Highways England on 01 and 02 August 2018, and the additional survey undertaken by ADAS on 13 July 2020, identified a total of 160 tree features including 67 individual trees, 89 groups of trees, two hedgerows and two woodlands which have the potential to be impacted by the proposals.

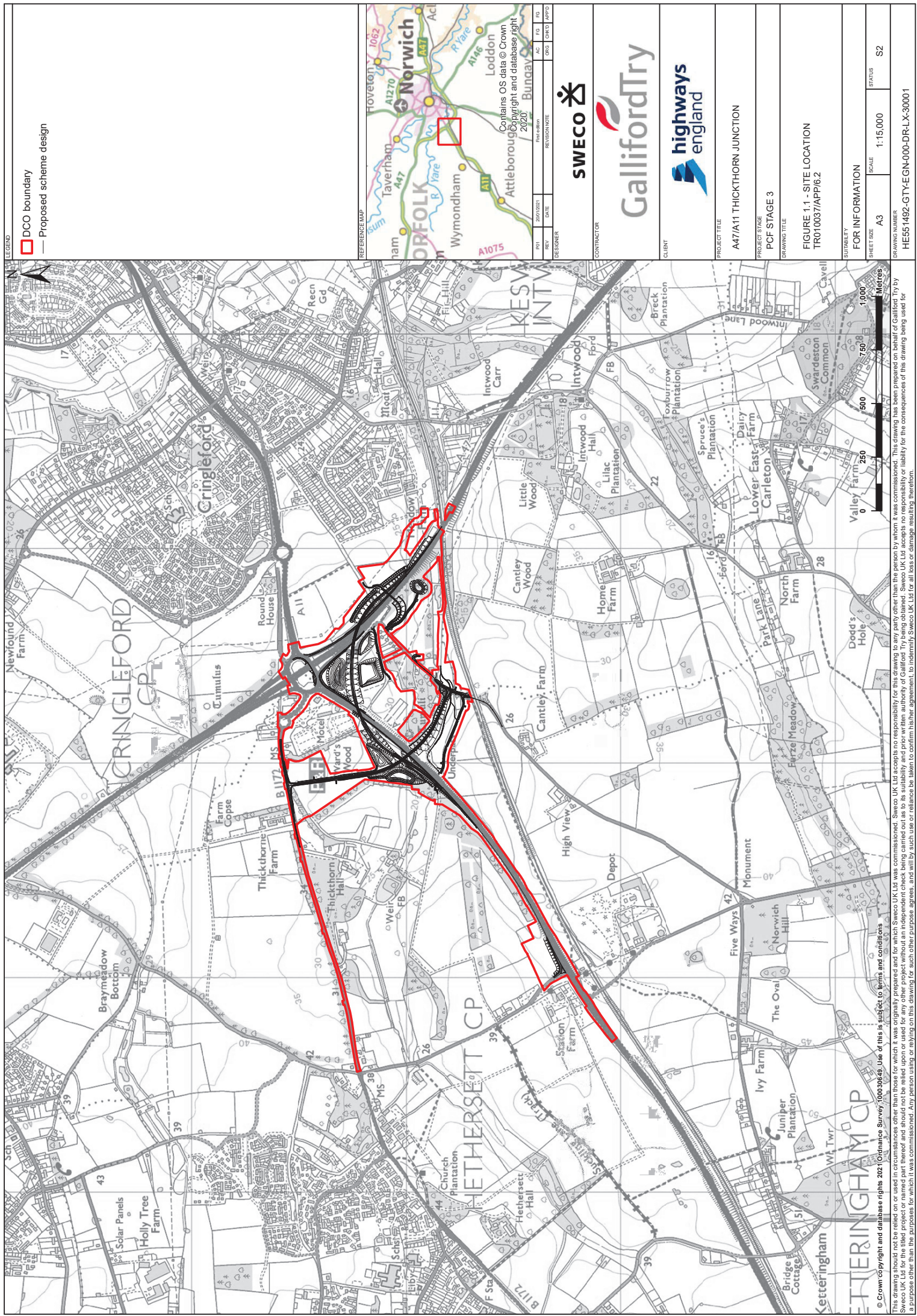
In line with the recommendations contained within Table 1 of BS5837:2012, of these tree features, 22 individual trees and two groups of trees were awarded a high quality A grade. Forty one tree features, including 23 individual trees, 17 groups of trees and one woodland were awarded a moderate quality B grade. Ninety two tree features, including 21 individual trees, 68 tree groups, two hedgerows and one woodland were awarded a low quality C grade. One individual tree was awarded a U grade, meaning the tree would be unsuitable for long term retention.

Based on the current proposals, 17 individual trees and 11 groups of trees will require complete removal in order to facilitate the proposed scheme. In addition, 27 tree groups and two woodlands will require partial removal. Some special construction techniques are required to ensure other trees can be retained during the course of the works.

ADAS believes that, if the recommended tree protection measures are correctly installed and maintained, the trees identified for retention will not be at risk of damage.

Appendix 1: Proposed Site Layout

See following page.



Appendix 2: Arboricultural Impact Assessment Plan

See following page.

Appendix 3: TPO and Conservation Area Search Results

See following page.

Current location: Thickthorn Food Services, Thickthorn Services, Norwich Road, Hethersett, Norfolk, NR9 3AU Setup Alerts for this location

Change

Hide side panel

Reset page

Find Nearest

Map Categories

Council and Democracy

1/5

☒

Leisure

0/2

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Highways

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Planning

0/3

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Property

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Conservation Areas

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Listed Buildings

☐

Tree Preservation Orders

☒

Property Assets

☐

NHS Choices

0

POWERED BY iShare

100 m

500 ft

616867, 305539

Thickthorn Farm

Thickthorn

East Lodge

Hotel

Wychwood Lodge

The Clock House

Woodlands

Lodge

South Norfolk

Thickthorn Farm

Wychwood House

Racecourse Copse

Hethersett Racecourse

Meadow Farm Cottage

Cottage

Cantley Wood

INTWOOD ROAD

Crossing

MEADOW FARM

BRETtingham AVENUE

ASPEN WAY

NEWMARKET ROAD

NEWMARKET ROAD

A47

2) Astun Data Services- data derived from Ordnance Survey Premium data

Tree Preservation Orders

TPO Reference: SN0539
TPO Location: 126 Cantley Lane
 Ketteringham Norfolk NR4 6TD
Category: Area
Category Number: 1
Species: Various
Situation: Area of trees surrounding 126 Cantley Lane, Ketteringham

The representation of Tree Preservation Orders (TPOs) is intended as a guide only. Due to the nature of some TPOs, and methods used for their plotting, it may be that the trees or woodland may

Appendix 4: Tree Survey Schedule

See following page.



Column Heading	Description
Colour Coding	Data from previous Highways England Survey
Tree Ref No.	Data from ADAS survey: All individual trees and groups of trees have been given a unique reference number. Each number is prefixed by a letter. ▪ T = Individual tree ▪ G = Group of trees ▪ H = Hedgerow ▪ W = Woodland
Species	The English common name has been used.
Single or Multiple stem (S or M)	* 'S' represents a tree which has a single clear stem to at least 1.5m above ground level. * 'M(a)' represents a tree where the main stem divides into two to five stems below 1.5m above ground level, and * 'M(b)' represents a tree where the main stem divides into 6 or more stems below a height of 1.5m.
Height (m)	Where possible tree heights are measured using a laser. In some instances such as in close groups of trees, one height may be measured and other nearby trees estimated from this height. Measurements are provided in metres.
Stem Diameter (mm)	S ₁ represents the stem number. Measurements are provided in millimetres at 1.5m above ground level for single stemmed trees.
Branch Spread (m)	Measured in metres to the four cardinal compass points (N, E, S, W).
Crown Clearance	(1) Height in metres of the first significant branch, and the direction of growth. (2) Height in metres of lowest part of crown.
Life Stage	The stage at which the tree is within its lifecycle (Y = young, SM = semi-mature, EM = early-mature, M = mature, OM = over-mature, V = veteran)
General Observations	Any relevant observations are recorded, with particular reference to structural and/or physiological condition.
Preliminary Management Recommendations	Recommendations are made where management work is required for reasons of health and safety or sound arboricultural management.
Estimated Remaining Contribution (years)	An estimation of how long the feature will contribute to its surroundings. This is recorded in bands of either <10 years, 10+ years, 20+ years and 40+ years.
Tree Quality Grading	The trees are graded to the categories prescribed within BS5837:2012 (U, A, B & C).
Root Protection Area	Calculated as prescribed in section 4.6 of BS5837:2012, provided as an area (m ²) and a radius from the tree's stem (m).
Note: Those measurements shown in <i>italics</i> have been estimated, usually where access has restricted it being taken.	

Table 1: Tree Survey Schedule heading descriptions

Tree Ref No.	Species	Single or Multiple Stem (S or M)	Height (m)	Stem Diameter (mm)								Branch Spread (m)				Crown Clearance (m)		Life Stage	General Observations (structural / Physiological condition)	Preliminary Management Recommendations	Estimated Remaining Contribution (years)	Tree Quality Grading	Root Protection Area							
				S1	S2	S3	S4	S5	S6	S7	N				W								(1)	(2)	(m²)	(radius in m)				
											N	E	S	W	N	E	S										W			
T1	Pedunculata oak	S	21	1960														9	7	12	10	2.0-S	N/A	V	Very large old oak, verging on veteran age ~200 years old. Prominent in landscape, high arb, ecological and cultural value due to size and age. Pouching damage.	None.	40+	A13	707.0	15.0
T2	Common ash	M(e)	17	460	420	370	370	250									7	8	9	8	4.0-N	N/A	V	Old multi-stemmed ash with very old central root plate and basal trunk upward of 150 years old. Main stems are younger regrowth around 40-60 years old. High arb value but moderate landscape value as not particularly large or prominent. Pouching damage.	None.	40+	A13	327.7	10.2	
T3	Pedunculata oak	S	14	1320													5	4	5	7	2.0-S	N/A	M	Old mature oak, large trunk but reduced crown size due to natural die back. High arb value but not especially prominent in landscape	None.	40+	A1	707.0	15.0	
T4	Pedunculata oak	S	16	1330													6	4	5	5	2.0-S	N/A	OM	Old oak with one side missing due to historic lightning strike. Still has many decades of life but natural dieback is reducing the crown gradually. good arb and ecological value	None.	40+	B1	707.0	15.0	
T5	Pedunculata oak	S	20	1400													8	7	10	9	2.0-S	N/A	V	Very large old oak, stem has split in half in past otherwise diameter would be over 2m. Very high arb and ecological value however not especially prominent in landscape.	None.	40+	A13	707.0	15.0	
T6	Pedunculata oak	S	24	1720													10	9	8	11	2.0-E	N/A	V	Very old and mature oak, stem beginning to hollow out but still vigorous. Excellent arb and ecological value.	None.	40+	A13	707.0	15.0	
T7	Pedunculata oak	S	17	1410													6	6	5	7	2.0-N	N/A	M	Old mature oak with boundary group, some due back in crown, normal for age. Good arb and ecological value	None.	40+	A1	707.0	15.0	
T8	Pedunculata oak	S	18	850													6	7	5	5	2	N/A	EM	Good early mature oak, stem covered in ivy, stem diameter estimated. Some deadwood in crown and pouching damage otherwise healthy.	None.	40+	B1	326.9	10.2	
T9	Pedunculata oak	S	19	900													9	8	8	7	5	N/A	EM	Very good form and structure. Some deadwood in crown and pouching damage due to position on field boundary otherwise healthy.	None.	40+	B2	366.5	10.8	
T10	Pedunculata oak	S	14	1640													5	5	3	6	2.0-W	N/A	OM	Over mature oak, one main stem missing, ivy covered, stem diameter estimated, good arb and ecological value.	None.	40+	B1	707.0	15.0	
T11	Pedunculata oak	S	20	1670													8	10	11	8	2.0-S	N/A	M	Very large oak verging on veteran status. Some ivy in crown, occasional deadwood typical of age. Excellent arb value.	None.	40+	A1	707.0	15.0	
T12	Pedunculata oak	S	15	1520													4	4	6	4	2.0-S	N/A	M	Very old oak verging on veteran status. Crown reduced due to natural die back. Good arb value.	None.	40+	A1	707.0	15.0	
T13	Pedunculata oak	S	11	1720													7	3	2	6	3.0-W	N/A	V	Veteran oak tree, hollow with majority of crown reduced by die-back, excellent arb and ecological value. Not very prominent due to location in woodland.	None.	40+	A13	707.0	15.0	
T14	Pedunculata oak	S	9	2210													6	4	6	6	2	N/A	V	Open grown veteran oak, hollow trunk- extremely large diameter, advanced die back and stag heading. Excellent arb and ecological value.	None.	40+	A13	707.0	15.0	
T15	Pedunculata oak	S	12	1510													7	7	9	6	2	N/A	OM	Verging on veteran status still in very good health considering size and age, roots will have ploughing damage due to position in field but tree remains extremely vigorous despite this.	None.	40+	A13	707.0	15.0	

Tree Ref No.	Species	Single or Multiple Stem (S or M)	Height (m)	Stem Diameter (mm)							Branch Spread (m)				Crown Clearance (m)		Life Stage	General Observations (structural / Physiological condition)	Preliminary Management Recommendations	Estimated Service Life Contribution (years)	Tree Health Grading	Root Protection Area (radius in m)
				S1	S2	S3	S4	S5	S6	S7	N	E	S	W	(1)	(2)						
T16	Pedunculate oak	S	16	1140							6	9	7	12	3.0-W	N/A	M	Mature open grown oak, good arb and landscape value, die-back and stag heading prominent. Roots will have ploughing damage due to position in field but tree remains extremely vigorous despite this.	None.	40+	A1	588.0 13.7
T17	Pedunculate oak	S	12	990							6	7	3	3	5.0-N	N/A	M	Mature oak. Large snap out of main stem, trunk hollow, approaching veteran status but still in very good health considering size and age. Roots will have ploughing damage due to position in field.	None.	40+	B1	443.4 11.9
T18	Pedunculate oak	S	18	970							8	9	7	8	3.0-E	N/A	M	Mature open grown oak, good form and structure, some snapped limbs in crown and verging on veteran status still in very good health considering size and age. roots will have ploughing damage due to position in field but tree remains vigorous despite this.	None.	40+	A1	425.7 11.6
T19	Pedunculate oak	S	19	1100							10	7	12	9	4.0-N	N/A	M	Mature open grown oak. Good form and structure. Some snapped out limbs in crown and verging on veteran status still in very good health considering size and age. roots will have ploughing damage due to position in field but tree remains vigorous despite this.	None.	40+	A1	547.5 13.2
T20	Pedunculate oak	S	15	940							7	7	8	8	2.0-E	N/A	M	Mature open grown oak, minor die-back only. Good form, arb and landscape value. Roots will have ploughing damage due to position in field but tree remains vigorous despite this.	None.	40+	A12	398.8 11.3
T21	Pedunculate oak	S	15	1350							4	7	6	5	3.0-E	N/A	OM	Verging on veteran status, some large die back, beginnings of hollow trunk. Some ploughing damage.	None.	40+	A13	707.0 15.0
T22	Syamore	S	19	1040							9	8	8	9	2	N/A	M	Open grown sycamore, good form and structure. Some ploughing damage - prominent in landscape.	None.	40+	B2	489.4 12.5
T23	Pedunculate oak	S	19	1330							10	9	8	12	3.0-W	N/A	M	Mature oak, excellent form and structure. Good arb and landscape value.	None.	40+	A12	707.0 15.0
T24	Pedunculate oak	S	15	800							9	7	5	8	3.0-W	N/A	EM	Good form and structure, prominent in landscape, ploughing damage to roots and some dead wood in crown.	None.	40+	B2	289.6 9.6
T25	Pedunculate oak	S	15	1430							3	3	4	6	2.0-W	N/A	OM	Verging on veteran status, large amounts of natural die back and a hollow trunk. Good arb and ecology value. Some ploughing damage.	None.	40+	A1	707.0 15.0
T26	Pedunculate oak	S	17	980							5	7	4	7	3.0-N	N/A	M	Open grown oak, as a pair with tree 27 forms prominent feature in landscape.	None.	40+	A12	434.5 11.8
T27	Pedunculate oak	S	20	890							3	8	6	5	4.0-S	N/A	M	Open grown oak, as a pair with tree 27 forms prominent feature in landscape.	None.	40+	A12	358.4 10.7
T28	Pedunculate oak	S	18	1350							10	9	7	9	2.0-S	N/A	M	Large, mature, open grown oak. Good arb and landscape value.	None.	40+	A12	707.0 15.0
T29	Pedunculate oak	S	18	1150							10	9	11	8	4.0-S	N/A	M	Large, mature, open grown oak. Good arb and landscape value. Some natural die back and stag heading has begun.	None.	40+	A12	598.4 13.8
T30	Pedunculate/common oak (Quercus robur)	S	23	1150							9	10	10	9.5	3.5-W	2.5	M	Minor deadwood throughout but otherwise exhibiting good form. Some minor damage to buttresses.	None.	40+	B1	598.4 13.8

Tree Ref No.	Species	Single or Multiple Stem (S or M)	Height (m)	Stem Diameter (mm)								Branch Spread (m)			Crown Clearance (m)		Life Stage	General Observations (structural / Physiological condition)	Preliminary Management Recommendations	Estimated Remaining Contribution (years)	Tree Health Grading	Root Protection Area (radius in m)
				S1	S2	S3	S4	S5	S6	S7	N	E	S	W	(1)	(2)						
T31	Elm (Ulmus spp)	S	6.5	120							2	2	2	2	1.5-E	1.5	Y	Poor form, within 0.5M of overhead conductor.	None.	10+	C2	6.5 1.4
T32	Pedunculate/common oak (Quercus robur)	S	20	180							9	9	8	7.5	2.5-N	2.5	SM	Ivy clad, minor deadwood throughout. Looks to have good physiology and structure.	None.	20+	B2	14.7 2.2
T33	Pedunculate/common oak (Quercus robur)	S	15	650							4.5	6.5	8.5	9	3.0-S	3	M	Ivy obscuring main stem. Asymmetric crown. Good health and vigour.	None.	20+	B2	191.2 7.8
T34	Pedunculate/common oak (Quercus robur)	S	17	1540							9.5	9.5	10	8.5	2.0-W	0.5	M	Main stem forks at 4m with split to Southerly main stem which has partially occluded. Moderate deadwood throughout. Dieback in upper crown on Eastern aspect and split to main stem on north aspect. Valuable habitat tree. Good vigour.	None.	20+	B2	707.0 15.0
T35	Pedunculate/common oak (Quercus robur)	S	11	690							5	8.5	8.5	7.5	3.0-E	1.5	M	Dieback in upper crown with significant deadwood.	None.	20+	B2	215.4 8.3
T36	Pedunculate/common oak (Quercus robur)	S	11	940							6	8.5	6.5	5	2.0-E	1	M	Significant ivy cover restricted more thorough visual tree assessment. Dieback in upper crown with moderate deadwood. Overhead cable running through centre of crown.	None.	10+	C2	399.8 11.3
T37	Sycamore (Acer pseudoplatanus)	M(a)	7	250	75	120	120	80			4	3	4	4	1.0-S	1	Y	Good physiology and structure.	None.	10+	C2	46.7 3.9
T38	Ash (Fraxinus excelsior)	S	15	80							6	6	5	6	3.0-E	2	M	Large breakout cavity in main stem with advanced decay. 1 primary limb split and hanging vertically out continues to grow. Valuable habitat tree.	None.	10+	C1	2.9 1.0
T39	Pedunculate/common oak (Quercus robur)	S	13	1120							8	7.5	8.5	8	3.0-W	1	M	Significant ivy cover on main stem. Moderate deadwood in upper crown. Main stem decay within buttresses at ground level.	None.	20+	B2	567.6 13.4
T40	Pedunculate/common oak (Quercus robur)	S	14	940							10	7	6	0	4.5-E	4.5	OM	In advanced decline, with significant ivy cover throughout. Suppressed on Western side.	None.	10+	C1	399.8 11.3
T41	Pedunculate/common oak (Quercus robur)	S	15	940							8	6.5	9	9	4.5-E	4	M	Large tear out to Eastern aspect, partially occluded. Good physiology and structure.	None.	20+	B2	399.8 11.3
T42	Pedunculate/common oak (Quercus robur)	S	12	600							2	7	6	2.5	4.5-W	6.5	M	Asymmetric crown. Tree is in decline with reduced vigour.	None.	10+	C1	162.9 7.2
T43	Pedunculate/common oak (Quercus robur)	S	24	1260							9	11	10	9	4.0-W	4.5	M	Large breakout on western side. Asymmetric crown. Bird nest in upper crown. Moderate deadwood in places.	None.	10+	C2	707.0 15.0
T44	Pedunculate/common oak (Quercus robur)	S	17	1130							8	10	9	10	2.0-W	3.5	M	Minor deadwood throughout. Good physiology and structure.	None.	20+	B2	577.7 13.6
T45	Ash (Fraxinus excelsior)	S	6	150							3	2	2	1.5	1.0-N	2.5	Y	Of low vigour.	None.	10+	C2	10.2 1.8

Tree Ref No.	Species	Single or Multiple Stem (S or M)	Height (m)	Stem Diameter (mm)								Branch Spread (m)				Crown Clearance (m)		Life Stage	General Observations (structural / Physiological condition)	Preliminary Management Recommendations	Estimated Remaining Contribution (years)	Tree Quality Grading	Root Protection Area (radius in m)		
				S1	S2	S3	S4	S5	S6	S7	N				W										
											N	E	S	W	(1)	(2)									
T46	Hawthorn species (Crataegus spp)	S	7	250									2.5	4	3.5	3	0.5-W	1.5	M	Good physiology and structure.	None.	10+	C1	28.3	3.0
T47	Hawthorn species (Crataegus spp)	S	6	250									3	3	3	3	0.5-E	0	M	Good physiology and structure.	None.	10+	C1	28.3	3.0
T48	Pedunculate/common oak (Quercus robur)	S	8	900									4	6	6	4	3.0-S	2	OM	Significant ivy cover restricted more thorough visual tree assessment. Poor form with advanced dieback in upper crown.	None.	10+	C1	366.5	10.8
T49	Pedunculate/common oak (Quercus robur)	S	7	1000									3.5	3.5	3	4	3.0-S	3	M	Significant ivy cover restricted more thorough visual tree assessment. Advanced decay in base of main stem extending vertically for at least 1.5M.	Monitor.	<10	U	452.4	12.0
T50	Pedunculate/common oak (Quercus robur)	S	15	900									6.5	6	6.5	6	3.5-W	3.5	M	Significant ivy cover restricted more thorough visual tree assessment. Minor deadwood throughout upper crown.	None.	10+	C2	366.5	10.8
T51	Pedunculate/common oak (Quercus robur)	S	11	1100									6	5	5	6.5	3.5-E	3.5	M	Significant ivy cover restricted more thorough visual tree assessment. Basal decay in buttresses. Minor deadwood throughout.	None.	10+	C2	547.5	13.2
T52	Pedunculate/common oak (Quercus robur)	S	13	1100									6	5	6.5	5.5	3.5-S	3.5	M	Significant ivy cover restricted more thorough visual tree assessment. Moderate deadwood noted, but otherwise tree looks to be in fair physiological condition.	None.	10+	C2	547.5	13.2
T53	Pedunculate/common oak (Quercus robur)	S	18	1100									6	8	7.5	8	1.0-S	2	M	Minor deadwood throughout. Tree has been struck by lightning, forming a crack from top of crown to base, partially occluded.	None.	20+	B2	547.5	13.2
T54	Pedunculate/common oak (Quercus robur)	S	14	1200									5.5	8	10	4.5	3.5-S	3.5	M	Significant ivy cover restricted more thorough visual tree assessment. Eliculated at 2.5m, with basal decay on northern side between buttresses. Minor deadwood throughout.	None.	10+	C2	651.5	14.4
T55	Pedunculate/common oak (Quercus robur)	S	15	1220									7	9.5	7.5	7	2.0-S	3	M	Minor deadwood throughout. Good physiology and structure.	None.	20+	B2	673.4	14.6
T56	other species (not in list)	S	7	300									5	5.5	4	4	0.5-N	0	M	Prunus spp. Historic partial windthrow, so tree leaning south. Bark damage to lower stem.	None.	10+	C2	40.7	3.6
T57	Pedunculate/common oak (Quercus robur)	S	3.5	200									3	3	2	2	0.5-N	0	SM	Tree with good vigour, but poor form.	None.	10+	C2	18.1	2.4
T58	Pedunculate/common oak (Quercus robur)	S	7	340									4	4	4	4	1.0-S	1	SM	Good physiology and structure.	None.	20+	B2	52.3	4.1
T59	Pedunculate/common oak (Quercus robur)	S	7	490									6	6	5.5	5	1.0-E	0.5	SM	Good physiology. Asymmetric crown.	None.	10+	C2	108.6	5.9
T60	Pedunculate/common oak (Quercus robur)	S	11	340									3.5	4	4.5	4	1.5-W	0.5	SM	Good physiology and structure.	None.	20+	B2	52.3	4.1

Tree Ref No.	Species	Single or Multiple Stem (S or M)	Height (m)	Stem Diameter (mm)							Branch Spread (m)				Crown Clearance (m)		Life Stage	General Observations (structural / Physiological condition)	Preliminary Management Recommendations	Estimated Remaining Contribution (years)	Tree Quality Grading	Root Protection Area (radius in m)			
				S1	S2	S3	S4	S5	S6	S7	N E S W				(1)	(2)									
											N	E	S	W											
T61	Pedunculate/common oak (Quercus robur)	M(a)	7.5	500	360	410							5.5	5.5	5	5.5	1.0-N	1	M	Extensive decay in one stem. Lapsed pollard.	None.	10+	C2	247.8	8.9
T62	Pedunculate/common oak (Quercus robur)	S	11	1060									6.5	6.5	7	6	1.0-W	1	M	Shear crack and bark damage on central main stem. Decay pockets resulting from tear outs in lower main stem. Minor deadwood throughout. Good vigour.	None.	20+	B2	508.4	12.7
T63	Ash (Fraxinus excelsior)	M(b)	11	280	200	270	280	280	310				7	6.5	5.5	5.5	0.5-W	1	M	Lapsed coppice. Ganoedema at base, with basal decay in each main stem. Chalara present, but tree still has good vigour.	None.	10+	C2	228.4	8.5
T64	Pedunculate/common oak (Quercus robur)	S	4	75									1.5	3.5	2.5	2.5	0.5-W	0.5	Y	Good physiology and structure.	None.	10+	C2	2.5	0.9
T65	Pedunculate/common oak (Quercus robur)	S	5	310									4	4	4	4	4.0-S	0	SM	Good vitality. Tree growing close to overhead power cables.	Crown reduce to maintain clearance between tree and overhead cables.	20+	B2	43.5	3.7
T66	Pedunculate/common oak (Quercus robur)	S	15	1000									8	6	7	8	3.0-E	3	M	Significant Ivy cover throughout restricted more thorough visual tree assessment. No access to base of tree as on adjacent land.	None.	20+	B3	452.4	12.0
T67	Pedunculate/common oak (Quercus robur)	S	16	1050									8	7	7	8	5.0-W	5	M	Significant Ivy cover throughout restricted more thorough visual tree assessment. No access to base of tree as on adjacent land.	None.	20+	B3	488.8	12.6
G1	Mixed highways planting	S	4	150									2	2	2	2	0.5	N/A	Y	Self-set trees on highway boundary, easily replaceable. Oak, elder, ash, plum, elm. Sporadic in between nettles and brambles.	None.	20+	C2	10.2	1.8
G2	Mixed highways planting	S	8	240									4	4	4	4	0.5	N/A	SM	Group on roundabout boundary, screens junction from fields. Fairly dense, mix of ash, wild cherry, hazel, hawthorn, elm.	None.	20+	C2	26.1	2.9
G3	Mixed highways planting	S	8	200									4	4	4	4	0.3	N/A	SM	Highways boundary planting, fairly dense, good screening value and physical condition. Oak, field maple, hazel, goat willow, wild cherry, sweet chestnut.	None.	40+	C2	18.1	2.4
G4	Mixed highways planting	S	15	320									4	4	4	4	0.5	N/A	SM	Highways boundary planting, dense tall, crack willow, aspen, hybrid black poplar canopy, hazel, Hawthorne, goat willow, cherry, field maple.	None.	20+	C2	46.3	3.8
G5	Mixed highways planting	S	12	280									3	3	3	3	0.3	N/A	SM	Well established highways boundary planting, good screening value, diverse species mix. Oak, field maple, Hawthorne, ash, dogwood, alder-buckthorn, hazel, sweet chestnut, wild cherry, aspen, goat willow, holly, honey suckle, guelder rose. However, relatively easy to replace with mitigation planting.	None.	40+	C2	35.5	3.4
G6	Oak and hawthorn	S	6	200									3	3	3	3	0.5	N/A	Y	Sporadically spaced oak and hawthorn set amongst brambles and shrubs. Majority self-set.	None.	40+	C2	18.1	2.4
G7	Mixed native	S	7	240									3	3	3	3	0.1	N/A	SM	Thin boundary of highways planting on edge of G6. Some screening value, oak, ash, guelder rose, wild cherry, hazel, field maple, hawthorn.	None.	40+	C2	26.1	2.9
G8	Mixed native	S	5	180									3	3	3	3	0.3	N/A	Y	Sporadically spaced field boundary group, mix of self-set and hedge. Oak, hazel, hawthorn, elder, blackthorn.	None.	40+	C2	14.7	2.2

Tree Ref No.	Species	Single or Multiple Stem (S or M)	Height (m)	Stem Diameter (mm)							Branch Spread (m)				Crown Clearance (m)		Life Stage	General Observations (structural / Physiological condition)	Preliminary Management Recommendations	Estimated Remaining Contribution (years)	Tree Health Grading	Root Protection Area (radius in m)
				S1	S2	S3	S4	S5	S6	S7	N	E	S	W	(1)	(2)						
G9	Mixed native	S	6	460							2	2	2	2	0.3	N/A	M	Group of mixed age species, predominantly hawthorn, some mature and others younger. Also, oak, plum, elder. Forms long established and old field boundary.	None.	40+	B2	95.7
G10	Mixed native and naturalised	S	8	210							4	4	4	4	0.3	N/A	SM	Well established highways boundary planting, good screening value. Ash, lime, horse chestnut, field maple, downy birch, sycamore	None.	40+	B2	20.0
G11	Mixed native and naturalised	S	11	940							5	5	5	5	1	N/A	M	Old historic field boundary group. Ash and cultural value. Contains mature oak, hornbeam and field maple on a raised bank. Understory of mature hawthorn. Occasional younger goat willow, elder, holly, sycamore	None.	40+	B13	399.8
G12	Scots pine, oak, elder	S	20	270							3	3	3	3	7	N/A	SM	Fairly modern Scots pine plantation. Some screening value. Understory of elder, occasional oak, only edge if group surveyed due to access	None.	20+	C2	33.0
G13	Mixed native	S	18	500							5	5	5	5	1	N/A	EM	Boundary group of early mature trees, large ash with under story of field maple, hawthorn, plum, hazel	None.	40+	B1	113.1
G14	Mixed native	S	19	540							6	6	6	6	2	N/A	EM	Group bordering riparian corridor, early mature oak and ash. Occasional younger sycamore. Understory of elder, elm.	None.	40+	B1	131.9
G15	Mixed native and naturalised	S	9	350							3	3	3	3	1	N/A	SM	Boundary group between field and highway, located adjacent to road. Ash, sycamore, hornbeam, tolerant species, alder, goat willow, crack willow, also, sycamore, ash, cherry, lime, oak hawthorn	None.	20+	B2	55.4
G16	Mixed native and naturalised	S	4	150							2	2	2	2	0.3	N/A	SM	Boundary group, predominately hawthorn, occasional elder, blackthorn, ash, sycamore	None.	20+	C2	10.2
G17	Mixed native and naturalised	S	8	200							3	3	3	3	1.5	N/A	SM	Young to semi mature mitigation planting appears to have been installed to screen A11 from adjacent land. Contains: field maple, wild cherry, oak, service tree, Scots pine, hawthorn, sweet chestnut, elder	None.	40+	C2	18.1
G18	Mixed native	S	20	1250							8	8	8	8	2	N/A	M	Mature to veteran row of large oaks, interspersed with early mature ash, holly.	None.	40+	A13	707.0
G19	Mixed native	S	5	220							2	2	2	2	2	N/A	Y	Fairly young block of planting containing wild cherry, field maple, ash, oak, hornbeam.	None.	40+	C2	21.9
G20	Mixed native and ornamental	S	22	1250							7	7	7	7	2	N/A	M	Area bordering site, not surveyed in detail but contains mature ash, aspen, London plane, sweet chestnut plantations. Landscaped features in open parkland that are mature to semi mature to veteran oak with ash, elder, hawthorn, holly, sycamore	None.	40+	A12	707.0
G21	Mixed native and naturalised	S	16	460							5	5	5	5	2	N/A	EM	Boundary hedge/grow and tree group. Hawthorn hedge with early mature lime, oak, interspersed within.	None.	40+	B2	95.7
G22	Mixed native and naturalised	S	10	320							4	4	4	4	1	N/A	SM	Boundary group, younger than surrounding old woodland groups. Screens site from B1172, predominantly sweet chestnut, occasional young sycamore, understory of holly, elm.	None.	40+	B2	46.3
G23	Mixed native and exotic	S	17	360							5	5	5	5	0.5	N/A	EM	Early mature group likely planted for screening park and ride/A47-A11 junction. Contains lime, oak, ash, occasional robinia, hybrid black poplar and understory of hawthorn and field maple	None.	40+	B2	59.6

Tree Ref No.	Species	Single or Multiple Stem (S or M)	Height (m)	Stem Diameter (mm)							Branch Spread (m)				Life Stage	General Observations (structural / Physiological condition)	Preliminary Management Recommendations	Estimated Canopy Contribution (years)	Tree Health Grading	Root Protection Area (radius in m)
				S1	S2	S3	S4	S5	S6	S7	N	E	S	W						
G24	Mixed native and naturalised	S	24	600							6	6	6	6	EM	Boundary group containing large early mature grey poplar, oak, sycamore, occasional walnut, understory of holly and hawthorn	None.	40+	B2	162.9 7.2
G25	Mixed native	S	5	180							2	2	2	2	N/A	Young group of trees between A11 and open field area some minor screening value. Silver birch, ash, hawthorn, elm, cherry, oak.	None.	40+	C2	14.7 2.2
G26	Mixed native and naturalised	S	9	250							3	3	3	3	N/A	Central belt of trees planted approx. 30 years ago. Contains wild cherry, field maple, hawthorn, occasional poplar, oak, larch Scots pine, sweet chestnut, birch	None.	40+	B2	28.3 3.0
G27	Mixed Native	S	9	450							4	4	4	4	N/A	Trees and hedgerow species flanking road. Oak, ash and hawthorn predominant. Occasional blackthorn, hawthorn, sycamore and sycamore. Some older oaks and hawthorn present	None.	40+	B12	91.6 5.4
G28	Mixed Native and naturalised	S	12	350							4	4	4	4	N/A	Highways boundary planting, good screening value, surveyed from roadside. Oak, field maple, hawthorn, ash, sycamore, hazel, goat willow, sycamore. Relatively easy to replace with mitigation planting	None.	40+	C2	55.4 4.2
G29	Field maple (Acer campestre)	S	15	200							2.5	2.5	2.5	2.5	SM	Even aged, group of Oak, Ash, Hazel, Hawthorn, Poplar, Sycamore and Goat Willow	None.	20+	B2	18.1 2.4
G30	Goat willow (Salix caprea)	S	10	160							2	1.5	3	2	SM	Even aged highway plantation comprising Field Maple, Hazel, White Willow, Sycamore and Hawthorn. Good physiology and structure.	None.	10+	C2	11.6 1.9
G31	Field maple (Acer campestre)	S	10	140							2	3	2.5	2.5	SM	Group consisting of Cherry, Goat Willow, Hawthorn and Hazel. Good physiology and structure.	None.	10+	C2	8.9 1.7
G32	Field maple (Acer campestre)	S	12	140							2	3	2	2.5	Y	Hedgerow comprising Oak, Field Maple and Hawthorn. Good physiology and structure.	None.	10+	C2	8.9 1.7
G33	Hawthorn species (Crataegus spp)	S	8	120							2	2	2	2	M	Unmanaged hedgerow	None.	10+	C2	6.5 1.4
G34	Hawthorn species (Crataegus spp)	S	5	250							2	1	2	1	M	Section of unmanaged boundary hedgerow.	None.	10+	C2	28.3 3.0
G35	Hawthorn species (Crataegus spp)	S	5.5	150							2	2	2	2	M	Section of unmanaged boundary hedgerow.	None.	10+	C2	10.2 1.8
G36	Ash (Fraxinus excelsior)	S	15	250							4.5	6	4	4.5	Y	Roadside group of Ash and Oak. Some Main stems ivy clad. Ash dieback present. Poor form, low vigour.	None.	10+	C2	28.3 3.0
G37	Hawthorn species (Crataegus spp)	S	5	160							2	2	2.5	2	SM	Small group on top of embankment. Elder and Hawthorn.	None.	10+	C2	11.6 1.9
G38	Ash (Fraxinus excelsior)	S	15	500							7	7	7	7	M	Mixed species group of Oak and Ash with Hawthorn and Elder present. Some ivy clad main stems. No major defects were noted.	None.	20+	B2	113.1 6.0

Tree Ref No.	Species	Single or Multiple Stem (S or M)	Height (m)	Stem Diameter (mm)							Branch Spread (m)				Crown Clearance (m)		Life Stage	General Observations (structural / Physiological condition)	Preliminary Management Recommendations	Estimated Remaining Contribution (years)	Tree Health Grading	Root Protection Area (radius in m)
				S1	S2	S3	S4	S5	S6	S7	N	E	S	W	(1)	(2)						
G39	Hawthorn species (Crataegus spp)	S	3.5	120							2	2	2	2	0.5-E	0.5	M	Group of low quality scrub comprising Hawthorn, Elder and Blackthorn.	None.	10+	C1	6.5 1.4
G40	Other cherry spp (Prunus spp)	S	1.4	300							3.5	3.5	3.5	3.5	1.5-E	2	M	Garden group, Cherry and Cypress. Measurements estimated as unable to gain access to private garden. No major defects were noted.	None.	10+	C2	40.7 3.6
G41	Hawthorn species (Crataegus spp)	S	3.5	160							3	3	3	3	0-N	0	M	Unmanaged Hawthorn and Blackthorn hedgerow.	None.	10+	C2	11.6 1.9
G42	Hawthorn species (Crataegus spp)	S	3.5	170							1.5	1.5	1.5	1.5	0-S	0	M	Unmanaged hedgerow comprising Hawthorn and Elder. Continues within tree group at Western end but becomes more sporadic.	None.	10+	C2	13.1 2.0
G43	Pedunculate/common oak (Quercus robur)	S	19	1100							10	10	11	9	5.0-S	4	M	Linear group of mature Oak on boundary, some with significant ivy cover. Good physiology and structure.	None.	20+	B2	547.5 13.2
G44	Hawthorn species (Crataegus spp)	S	2.5	150							0.5	1.5	0.5	1.5	0-N	0	M	Maintained hedgerow comprising Elder and Hawthorn.	None.	10+	C2	10.2 1.8
G45	Pedunculate/common oak (Quercus robur)	S	20	1110							8.5	9	7.5	8	2.0-S	3.5	M	Group of 2 Mature Oak. Northern most tree has shear crack in Western main stem, exudates, several breakout cavities, minor deadwood. Southerly tree exhibiting good physiology and structure.	None.	10+	C2	557.5 13.3
G46	Hawthorn species (Crataegus spp)	S	2.5	75							1.5	1.5	1.5	1.5	0-N	0	M	Fragmented boundary hedge group alongside railway comprising Hawthorn and Elder.	None.	10+	C2	2.5 0.9
G47	Pedunculate/common oak (Quercus robur)	S	5	140							2	2	2	2	0.5-S	1	Y	No significant defects, on edge of riparian zone.	None.	10+	C1	8.9 1.7
G48	Ash (Fraxinus excelsior)	S	8	500							8	6	7	5	5.0-S	3.5	M	Group of Ash with Hawthorn understorey. Poor physiological condition, on edge of riparian zone.	None.	10+	C1	113.1 6.0
G49	Alder (Alnus spp)	S	6.5	160							2.5	2.5	2.5	2.5	1.0-S	2	SM	Good physiology and structure.	None.	10+	C2	11.6 1.9
G50	Ash (Fraxinus excelsior)	S	8	190							3	3	4	3.5	1.0-S	0.5	SM	Even aged roadside group of Ash, Cherry, Field Maple, Oak and Bird Cherry. Good physiology and structure.	None.	10+	C2	16.3 2.3
G51	Ash (Fraxinus excelsior)	S	7.5	170							3	3	3	3	0.5-S	0.5	SM	Even aged roadside group of Ash, Oak, Hawthorn, Sycamore and Cherry. Good physiology and structure.	None.	10+	C2	13.1 2.0
G52	Hawthorn species (Crataegus spp)	S	2.5	75							1	1	1	1	0-N	0	M	Maintained hedgerow.	None.	10+	C2	2.5 0.9
G53	Pedunculate/common oak (Quercus robur)	S	15	1200							7	5.5	6	7	4.0-S	3.5	M	Pair of mature Oak, both with significant ivy cover obscuring main stems. Minor deadwood throughout.	None.	10+	C2	651.5 14.4

Tree Ref No.	Species	Single or Multiple Stem (S or M)	Height (m)	Stem Diameter (mm)								Branch Spread (m)				Crown Clearance (m)	Life Stage	General Observations (structural / physiological condition)	Preliminary Management Recommendations	Estimated Remaining Contribution (years)	Tree Quality Grading	Root Protection Area (radius in m)			
				Stem Diameter (mm)								Branch Spread (m)													
				S1	S2	S3	S4	S5	S6	S7	N	E	S	W											
G54	Hawthorn species (Crataegus spp)	S	2.5	75									1	1	1	1	0.5-S	0.5	SM	Maintained hedgerow	None.	10+	C2	2.5	0.9
G55	Hazel (Corylus avellana)	M(b)	5.5	90									4	4	4	4	1.0-S	1	M	Hazel group. No major defects were noted.	None.	10+	C2	17.7	2.4
G56	Pedunculate/common oak (Quercus robur)	S	5	150									2	2	2	2	1.0-S	1	Y	Mixed species group of Oak and 1 Hornbeam, generally good physiological condition, although some bark damage to base of the Hornbeam was noted.	None.	10+	C2	10.2	1.8
G57	Silver birch (Betula pendula)	S	9	220									3.5	3.5	3.5	3.5	1.5-S	0.5	Y	Mixed species group comprising Oak and Silver Birch, Ash and Hornbeam. Good physiology and structure. Ash debark present in varying degrees of severity.	None.	10+	C2	21.9	2.6
G58	Hawthorn species (Crataegus spp)	S	2	75									0.5	0.5	0.5	0.5	0.5-W	0.5	Y	Recently planted around plantation, stems under 75mm dbh.	None.	10+	C2	2.5	0.9
G59	Pedunculate/common oak (Quercus robur)	S	9.5	250									3	3	3	3	1.0-S	4	SM	Even aged mixed species plantation comprising Oak, Field Maple, Cherry, Beech and Scots Pine. Generally exhibiting good physiology and structure.	None.	10+	C2	28.3	3.0
G60	Pedunculate/common oak (Quercus robur)	S	12	220									3	3	3	3	2.0-S	5	SM	Mixed species even aged plantation comprising Oak, Scots Pine, Beech, Field Maple, Sweet Chestnut and Goat Willow. Good physiology and structure.	None.	10+	C2	21.9	2.6
G61	Hawthorn species (Crataegus spp)	S	3.5	80									1.5	1.5	1.5	1.5	0-E	0	M	Semi managed hedgerow.	None.	10+	C2	2.9	1.0
G62	Sycamore (Acer pseudoplatanus)	S	8.5	170									3.5	3	4	4	2.0-S	3.5	Y	Mixed species group growing within and adjacent to hedgerow. Comprises Sycamore, Oak and Goat Willow.	None.	10+	C2	13.1	2.0
G63	Sycamore (Acer pseudoplatanus)	S	7.5	220									4	4	4	4	0.5-N	1	SM	Mixed species roadside group comprising Ash, Sycamore, Cherry, Willow, Elder, Scots Pine and Field Maple. Good physiological condition.	None.	10+	C2	21.9	2.6
G64	Pedunculate/common oak (Quercus robur)	S	6.5	370									4	4	5	4	1.0-S	0	SM	Good physiology and structure.	None.	10+	C2	61.9	4.4
G65	Pedunculate/common oak (Quercus robur)	S	6	200									4	2.5	4	2.5	1.0-S	0.5	SM	Mixed species group alongside layby. Comprises Oak, Field Maple, Ash, Lime and Cherry. Good physiology and structure.	None.	10+	C2	18.1	2.4
G66	hedgerow (mixed)	S	5.5	80									3	1.5	3.5	1.5	0-S	2.5	M	Semi managed hedgerow comprising Hawthorn, Field Maple and Plum.	Crown lift above footpath to 2.5m to allow unrestricted access.	10+	C2	2.9	1.0
G67	Ash (Fraxinus excelsior)	S	12	250									4	4	4	4	4.0-S	4	SM	Predominantly Ash, Field Maple and Cherry. Planted at circa 1m spacings on land which is slightly lower than highway. Growing such distance from pavement that RPA unlikely to be affected during works to footpath and crown overhang is negligible due to outgrown hedgerow growing directly south of group.	None.	10+	C2	28.3	3.0
G68	Beech (Fagus sylvatica)	S	21	700									6	6	6	6	3.5-S	6	M	Edge of woodland group comprising Beech, Yew, Cherry and Sweet Chestnut, with a Yew and Holly understorey. Overall good physiological condition, but no access within group.	None.	20+	B2	221.7	8.4

Tree Ref No.	Species	Single or Multiple Stem (S or M)	Height (m)	Stem Diameter (mm)							Branch Spread (m)				Crown Clearance (m)	Life Stage	General Observations (structural / Physiological condition)	Preliminary Management Recommendations	Estimated Remaining Contribution (years)	Tree Quality Grading	Root Protection Area (radius in m)			
				S1	S2	S3	S4	S5	S6	S7	N E S W													
											N	E	S	W										
G69	Field maple (Acer campestre)	S	5.5	180								1.5	1.5	3	1.5	0-S	2.5	M	Semi managed hedgerow comprising Hawthorn and Field Maple. Highway facing side failed.	None.	10+	C2	14.7	2.2
G70	Goat willow (Salix caprea)	S	11	360								3.5	3.5	3.5	3.5	4.0-S	4.5	M	Good physiology and structure.	None.	10+	C2	58.6	4.3
G71	Field maple (Acer campestre)	S	11	180								3.5	3.5	3.5	3.5	1.5-N	3.5	SM	Roadside semi managed hedgerow, failed to sides with Field Maple with Hawthorn understorey.	None.	10+	C2	14.7	2.2
G72	Field maple (Acer campestre)	S	5	160								3	1.5	3	1.5	1.0-S	3	M	Semi managed hedgerow, failed to sides. Comprising Blackthorn, Hawthorn, Field Maple and Sycamore. Good physiology and structure.	None.	10+	C2	11.6	1.9
G73	Field maple (Acer campestre)	S	7	150								3	1.5	3	1.5	1.0-W	3	M	Semi managed hedgerow, failed to sides.	None.	10+	C2	10.2	1.8
G74	Hawthorn species (Crataegus spp)	S	3	250								0.5	0.5	0.5	0.5	0.5-W	0.5	M	Sporadic, managed boundary hedgerow. Of low quality and sides have been failed. Comprises Hawthorn, Hazel, Elm and Blackthorn.	None.	10+	C2	28.3	3.0
G75	Hazel (Corylus avellana)	M(a)	3.5	75	75							0.5	0.5	0.5	0.5	0.5-S	0.5	M	Section of managed hedgerow comprising Hazel and Elder.	None.	10+	C2	5.1	1.3
G76	Hawthorn species (Crataegus spp)	S	3.5	250								0.5	0.5	0.5	0.5	0.5-N	0.5	M	Section of managed hedgerow comprising Hazel, Hawthorn and Field Maple. No major defects noted.	None.	10+	C2	28.3	3.0
G77	Wych elm (Ulmus glabra)	S	4.5	160								2	2	2	2	1.0-S	1	M	Unmanaged hedgerow comprising Elm and Hawthorn. Good physiology and structure.	None.	10+	C2	11.6	1.9
G78	Pedunculate/common oak (Quercus robur)	S	3.5	75								2	2	2	2	0.5-N	0.5	Y	No major defects noted. Small group of 1 Oak and 1 Greengage.	None.	10+	C2	2.5	0.9
G79	Pedunculate/common oak (Quercus robur)	S	3	160								2	2	2	2	0.5-W	1	Y	Good physiology and structure.	None.	10+	C2	11.6	1.9
G80	Scots pine (Pinus sylvestris)	S	15	290								1	1	1	1	8.0-N	8	SM	Scots Pine woodland with young understorey regeneration growth of Sycamore.	None.	10+	C2	38.1	3.5
G81	Mixed broadleaves	M(a)	19	360	200	200	240	360				5	5	5	5	7.0-E	7	M	Mixed woodland with single and multi stemmed specimens. Semi managed. Limited regeneration.	None.	20+	B2	189.7	7.8
G82	hedgerow (mixed)	S	8	120								1	0.5	4	0.5	2.5-S	3	EM	Outgrown hedgerow. Branches in most places overhanging entire footpath (circa 2.5m) as suppressed on all other aspects. Southern side maintained as hedgerow to 3m.	None.	10+	C3	6.5	1.4
G83	Mixed broadleaves	S	9	290								3.5	3.5	3.5	3.5	1.0-W	0.5	SM	No access to base of group. Predominantly Oak and Cherry. Significant Ivy cover throughout.	None.	10+	C3	38.1	3.5

Tree Ref No.	Species	Single or Multiple Stem (S or M)	Height (m)	Stem Diameter (mm)							Branch Spread (m)				Crown Clearance (m)		Life Stage	General Observations (structural / Physiological condition)	Preliminary Management Recommendations	Estimated Remaining Contribution (years)	Tree Health Grading	Root Protection Area (radius in m)	
				S1	S2	S3	S4	S5	S6	S7	N	E	S	W	(1)	(2)							
G84	hedgerow (mixed)	S	2	75							1	1	1	1	0-N	0	SM	Sporadic backside hedgerow.	None.	10+	C3	2.5	0.9
G85	Mixed broadleaves	M(s)	9	140	170						2.5	2.5	2.5	2.5	2.5-S	6	SM	Unmanaged group between petrol station and car park. No obvious defects observed.	None.	10+	C3	21.9	2.6
G86	hedgerow (mixed)	S	2	75							1	1	1	1	0-N	0	SM	Unmanaged hedgerow.	None.	10+	C3	2.5	0.9
G87	Mixed broadleaves	S	8	220							3	3	4	5	5.0-S	1.5	SM	Buffer planting on bank with natural regeneration. Predominantly Oak, Field Maple and Birch. No access to group.	None.	10+	C3	21.9	2.6
G88	Mixed broadleaves	S	9	250							3	3	3	3	0.5-E	0	SM	Trees growing on roundabout north of A47. No access to base. Predominantly Pine, Birch and Ash. No major defects observed. Regeneration noted within group.	None.	20+	B2	28.3	3.0
G89	Mixed broadleaves	S	13	230							2	2	2	2	1.0-N	0.5	SM	Trees growing on roundabout south of A47. Predominantly Poplar spp. Some birch and other broadleaves. Relatively dense group with some foliage dieback, likely due to trees failing to fully establish. No access to base due to roundabout location.	None.	20+	B2	23.9	2.8
H1	Common hawthorn	S	2	150							2	2	2	2	0	N/A	SM	Predominantly hawthorn field boundary.	None.	20+	C2	10.2	1.8
H2	Leylandii	S	2	100							1	1	1	1	0	N/A	SM	Ornamental leylandii hedge	None.	20+	C2	4.5	1.2
W1	Mixed native and naturalised	S	10	350							5	5	5	5	1	N/A	SM	Contaminated land mitigation planting. Scots pine, goat willow, crack willow, oak.	None.	20+	C2	55.4	4.2
W2	Mixed native and naturalised	S	20	450							5	5	5	5	1	N/A	EM	Mixed native woodland. Oak and ash dominant, occasional sycamore, cherry plum, alder, hawthorn	None.	40+	B2	91.6	5.4

Appendix 5: Cascade Chart for Tree Quality Assessment

See following page.

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	<ul style="list-style-type: none"> 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 <p><i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i></p>	See Table 2
<div> <div>1 Mainly arboricultural qualities</div> <div>2 Mainly landscape qualities</div> <div>3 Mainly cultural values, including conservation</div> </div>		
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 particular visual importance as arboricultural and/or landscape features
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 present in numbers, usually growing 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
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 material conservation or other cultural value
	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	Trees with no material conservation or other cultural value

Appendix 6: Root Protection Area Guidance

The Root Protection Area (RPA) is calculated from the stem diameter of the tree, in accordance with the guidance contained in section 4.6 of BS 5837:2012.

These areas are normally sacrosanct and should not be entered by traffic or foot, during construction, or used to store materials, fuel or chemicals.

Protective fencing should be erected along the edge of the RPA, before construction begins, and should not be moved until after all construction has finished and vacated the site. The type of fencing used should be fit for purpose, and ordinarily conform to the recommendations given in section 6.2.2 of BS 5837:2012 and be erected similar to the example shown in Figure 2 of the same standard.

Where underground services cannot be routed outside the RPA, these should be installed by trenchless technology, such as a directional drill. Where this technology is used the underground channel created should be no less than 600mm below normal ground level, or the base of the tree. Also, the starting and receiving excavations should not be within the RPA. Drill channel lubricant should be avoided, other than water, unless precautions are taken to prevent contamination of soil and possibly water. Hand digging may be an alternative to trenchless excavation, but this is less desirable, and not always practical.

When determining the workable space around the RPA of a tree or trees, it is also important to maintain a working zone of one metre (which is usually sufficient) between the edge of construction and the protective fencing.

Appendix 7: Cellular Confinement System Examples

See following page.

CI/SfB

Common Arrangement R12

Uniclass
L81208/L81210

CellWeb™



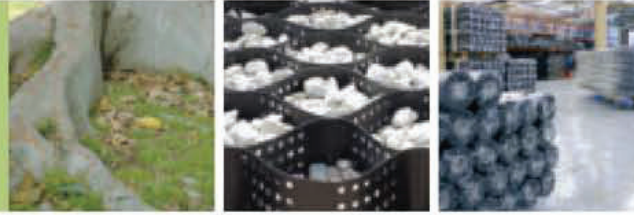
Tree Root Protection System



Geosynthetics

CellWeb™

Tree Root Protection System



The CellWeb™ TRP cellular confinement system protects tree roots from the damaging effects of compaction and desiccation, while creating a stable, load-bearing surface for vehicular traffic.

CellWeb™ offers an alternative to the traditional methods of constructing roadways and building foundations that involve excavation, which can result in tree root severance and soil compaction from the passage of vehicles. Such damage can severely influence tree health, and in extreme cases leads to death. CellWeb™ can be sensitively installed close to and under the canopies of trees without negative effects.

Trees are valuable landscape features and a vital environmental resource. Increasingly, contractors are being required to ensure the health and survival of trees during and beyond the construction period. Although this is enshrined in BS 5837: Trees in Relation to Construction: Recommendations (2005) and Tree Preservation Order legislation, it presents several issues when implementing construction projects near to trees:

- Root severance caused by excavation, leaving trees open to decay, less stable and with a diminished capacity to utilise soil water and nutrients.
- Destruction of soil structure and compaction due to the passage of heavy vehicles, restricting the flow of water and air to tree roots.
- Need for construction access, new roadways and hard surfaces that require engineering-standard load-bearing foundations that meet building regulations.
- Need for high-performance, cost-effective driveways and roadways in the vicinity of tree roots.



Potential loss of existing tree due to poor construction techniques.

The CellWeb™ system overcomes these issues and helps contractors to comply with tree health guidelines by creating a load-bearing base that is water-permeable, stable and durable.

With no need for excavation, the system is quick and easy to install, reducing construction time and saving costs and making it suitable for temporary and permanent solutions.



Glynebourne Wood.

Pedestrian path to recreational woodland built using a CellWeb™ foundation which was covered with DuoBlock and then filled with woodchip to create a porous surface.

Product features



CellWeb™ comprises an expandable cellular mattress that is then filled with a clean stone sub-base and above a Treetex T300 Geotextile.

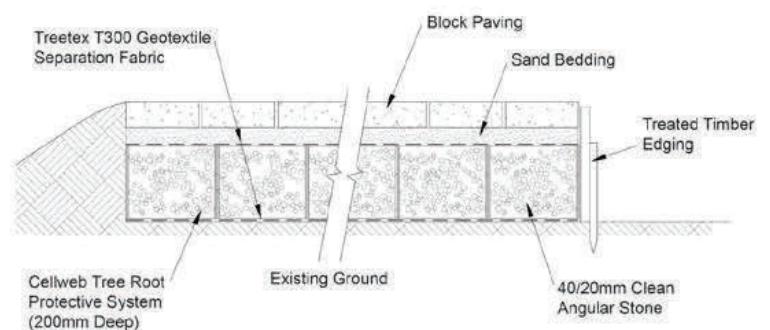
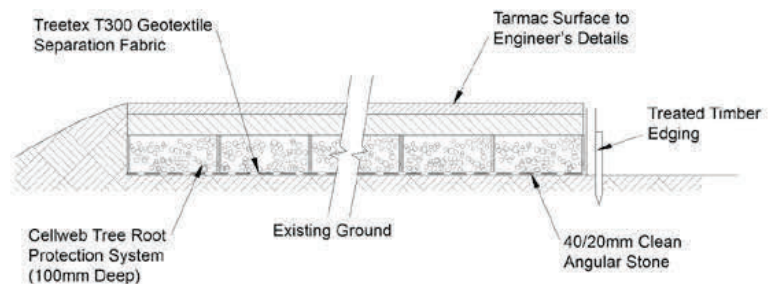
The honeycomb-like structure is made of robust high-density polyethylene (HDPE) that is simply stretched out and filled with clean angular material. Just like traditional roadways, the strength of the structure comes from the binding together of the infill, but with CellWeb™ this is achieved without compaction and without reduction in permeability.

Perforated cell walls allow the angular infill to bind with the contents of the adjacent cell, but with sufficient space for the movement of water and air to nearby tree roots. As the infill contains no fines and the geotextile layers prevent clogging from particles washing into the system, the structure remains permeable to water over time and protects the roots for the lifetime of the tree.

As well as being quick and easy to install, CellWeb™ also dramatically cuts down the depth of sub-base required, in most cases by as much as 50%, further reducing costs. CellWeb™ significantly reduces surface rutting, increasing the long-term performance of the finished surface and ensuring that tree roots remain protected from vertical loads.

CellWeb can be used as a permanent solution or alternatively the system can be used in a temporary situation. In a temporary application the system can be used for the required period of time, then removed for use on another site or recycled, thereby adding to CellWeb's green credentials.

- No excavation – Soil structure remains undisturbed; risk of root damage minimised.
- Porous infill – Allows tree roots to conduct moisture and gas exchange.
- No compaction – No need to compact the infill to achieve a load-bearing structure.
- Lateral stability – Structure remains rigid to vertical loads.



Please call

or email sales@geosyn.co.uk
for further information.

Wide
product
range

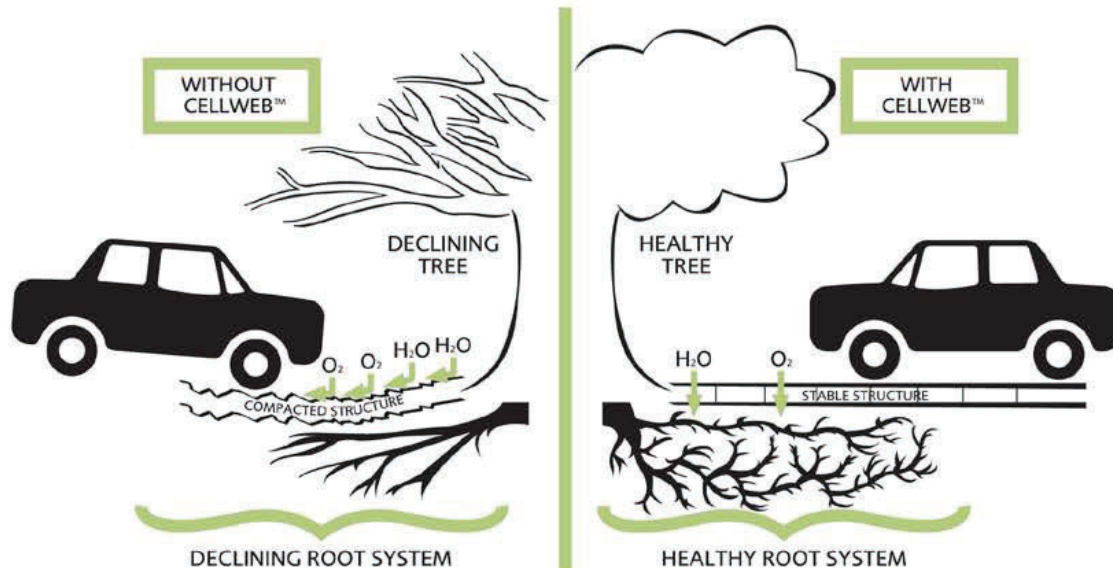
Large
stock
holding

Next day
delivery

Hydrological benefits

Water is a shrinking resource in the urban environment. As the extent of the built environment increases, more and more ground is being covered by impermeable hard surfaces that repel rainwater runoff, preventing it from reaching the roots of vegetation, and in particular trees. Rapid water runoff stretches the capacity of stormwater drains and frequently results in drainage management issues that are rarely resolved in favour of adjacent trees.

Using CellWeb™ mitigates these issues by promoting both the vertical and the lateral movement of water, whether the system is installed above or below ground. The 'pores' that are created by the spaces between the infill stones and the cell perforations even allow water to flow to adjacent tree roots that are effectively 'trapped' under areas of impermeable hard standing. CellWeb™ therefore helps to promote root growth and allows roots to continue to grow within areas of hard surfacing.



Design
service

Onsite
support



Geosynthetics



Design & installation

Final surfacing

The benefits of the CellWeb™ system to trees can only be maintained if a suitably porous final surface is selected. An ideal surfacing is the DuoBlocks grass reinforcement and gravel retention system, a visually attractive surface that has the advantage of being fully porous. Alternatives include block paviers, porous asphalts and loose or bonded gravel.

Call the Geosynthetics sales team on 01455 617 139 for more advice on surfacing options and other products and systems.

Advice and product selection

Geosynthetics Limited has been supplying the CellWeb™ system for many years and has acquired solid experience in its application. No two contracts are the same, and we understand the factors that need to be taken into account to specify the right CellWeb™ product.

We provide a FREE consultation, design and advisory service to find the solution that is most cost-effective and beneficial for your site. Our service includes product selection, CAD drawings and full instructions to help you from project conception to completion.

Call our sales office on 01455 617 139 for specification details and project-specific design assistance.

CellWeb™ in action:

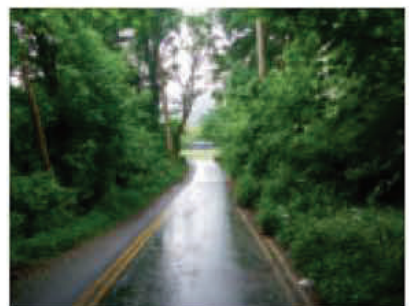
Access road for the Lake District National Parks Authority.



Site before construction pictured above.



Installation of the CellWeb™ system.



Four years later.

Technical specification

Product Specifications

Properties	Standard Cell
Material	Virgin HDPE
Wall thickness	1.25mm
Seam welding	Ultrasonic to 100% of seam length
Cell depth	75, 100, 150, 200 and 300mm
Width of expanded panel	2.56m
Length of expanded panel	8.1m
Cell diameter (expanded)	259 x 224mm

Certified Quality

CellWeb™ is manufactured in accordance with the ISO 9001 Quality Management System in a comprehensive range of cell diameters and depths.



Geosynthetics Ltd



Geosynthetics

Geosynthetics Limited

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Hinckley, Leicestershire LE10 3DU

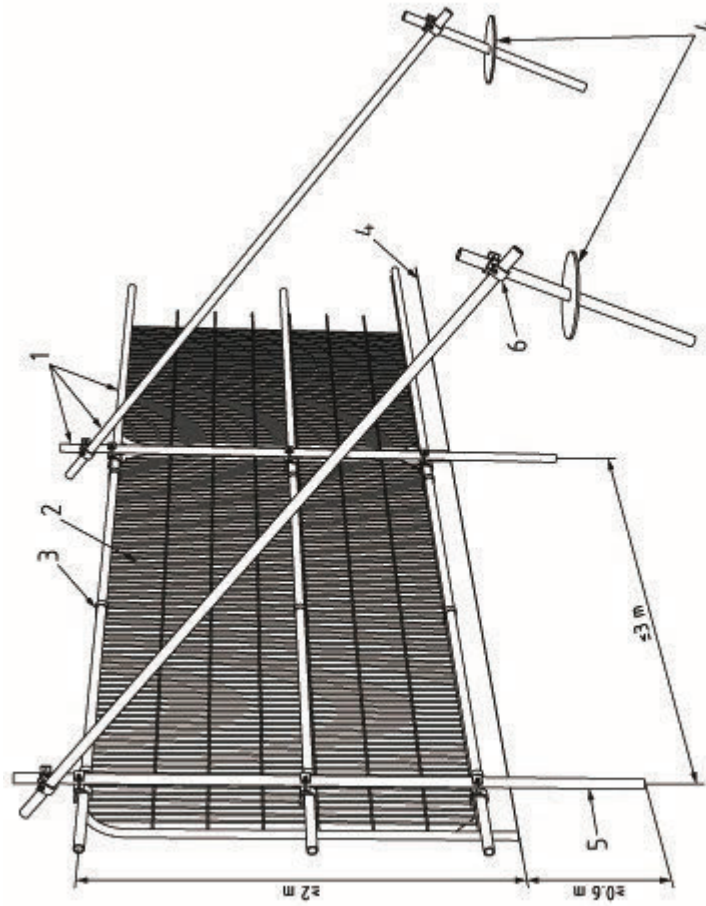
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Appendix 8: Tree Protection Fencing Examples

See following page.



Key

- 1 Standard scaffold poles
- 2 Heavy gauge 2 m 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 0.6 m)
- 6 Standard scaffold clamps