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BS 5837:2012 Arboricultural Survey

The Old Post Office
for:

Tesla Motors Ltd

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BS 5837:2012 Arboricultural Survey

Project:	The Old Post Office
For:	Tesla Motors Ltd
Status:	PL01
Date:	March 2023
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Contents

1.0 Non-Technical Summary

1.1 Arboricultural Survey

1.1.1 The site is an area of carpark adjacent to the restaurant 'The Old Post Office', and is located to the West of the M1 motorway to the Northwest of Barnsley, with agricultural land beyond.

1.1.2 A tree survey in accordance with BS 5837:2012 was carried out by Enzygo Ltd. in March 2023. Five trees and five tree groups as well as one hedgerow were surveyed within the site and within 15m of the site boundary, comprising a mix of native and non-native species, with the majority being semi-mature with a BS retention category B and C (moderate and low value).

1.1.3 At the time of writing this report from basic desktop searches there would not appear to be any Tree Preservation Orders or Conservation Area designation affording legal protection to trees on or adjacent to this site.

1.2 Design recommendations

1.2.1 The site layout design should take into account the constraints posed by the trees on site and should seek to retain as many trees on site as possible to minimise the effect of the development on the amenity of the site and the local landscape as well as on the ecological value of the site. The retention of trees described in this report as being of moderate value should be prioritised.

1.2.2 *BS 5837:2012 Trees in relation to design, demolition and construction* chapters 5.2 and 5.3 describe the constraints posed by existing trees and outline the potential conflict between proposed structures and retained trees and how these can be avoided or minimised.

1.2.3 New structures, hard landscape, services and construction access should be designed outside the canopy spreads and Root Protection Areas (RPA) of retained trees as far as reasonably practicable. Lowering of ground levels within the RPA of retained trees is not acceptable. Specialist solutions to manage the conflict between the proposals and retained trees are available but may have an impact on costs of the construction phase considerably. These include access facilitation pruning, no-dig construction, temporary ground protection and trenchless solutions for services.

2.0 Overview

2.1 Introduction

2.1.1 Enzygo Limited [Enzygo] have been commissioned by Tesla Motors Ltd. to prepare an Arboricultural Survey Report in accordance with BS 5837:2012 for the site The Old Post Office in support of a planning application for the development of Tesla supercharger units and associated equipment in the southern portion of the car park. Comprising of 12no. Tesla V3 Supercharger EV charging stalls, 3no. Tesla V3 Supercharger cabinets and associated substation.

2.1.2 This report should assist the preparation of the site layout, allowing the designer to consider the arboricultural constraints on site, including the retention of desirable trees (high and moderate value and/or trees which are found to be legally protected) and the protection of above and below ground parts of retained trees.

2.2 Structure of the Report

2.2.1 **Chapter 2.0** provides a brief description of the site and its location.

2.2.2 **Chapter 3.0** summarises the planning background, including national and local planning policies.

2.2.3 **Chapter 4.0** summarises the findings of the Arboricultural Survey, describing the overall species mix, age, condition and value of the trees recorded on site.

2.2.4 **Chapter 5.0** provides both general and site-specific design recommendations to assist with the development of any future site layouts which are sympathetic to the existing trees.

2.3 Site Description

2.3.1 The site is located approximately 7km northwest of Barnsley and 10km southwest of Wakefield. To the North of the site is the restaurant with a large hardstanding area and Junction 38 of the M1 beyond. To the East is the M1 motorway and slip roads to Junction 38 beyond. To the south lies open undulating countryside. To the west of the site is open countryside as far as Clayton West.

2.3.2 The site falls within the Metropolitan Borough of Barnsley in South Yorkshire.

2.3.3 The application boundary for the site is approximately 7860m² (0.8 hectares). The site is an area of carpark adjacent to the restaurant 'The Old Post Office', and is located to West of the M1 motorway with agricultural land beyond.

3.0 Planning background

3.1 National Planning Policy Framework

3.1.1 The National Planning Policy Framework (NPPF) published by the government and updated in 2021 sets out the framework objectives for development in England. These are used by Local Planning Authorities (LPA) both during the preparation of their local planning policies as well as to guide them in making individual decisions for Planning Applications.

3.1.2 The NPPF sets out several objectives concerning the natural environment, including trees, woodland and hedgerows. In addition to broad objectives addressing biodiversity and the challenges posed by climate change (e.g. flood resilience, species selection) it encourages the enhancement of the natural and local environment by "*recognising […] the wider benefits from natural capital and ecosystem services including […] of trees and woodland*".

3.1.3 Paragraph 131 states that "Trees make an important contribution to the character and quality of urban environments, and can also help mitigate and adapt to climate change. Planning policies and decisions should ensure (…) that existing trees are retained wherever possible."

3.1.4 In paragraph 175 the NPPF requests that "Planning policies and decisions should contribute to and enhance the natural and local environment by (…) recognising (…) benefits (…) of trees and woodland".

3.2 The Hedgerows Regulations 1997 *(if applicable)*

3.2.1 As some of the hedgerows recorded in this survey are more than 20m long and located next to land used for agriculture, it needs to be investigated whether they fulfil one or more of the criteria set for "important hedgerows" in order to establish whether they are protected under the above regulations. Importance is defined by several both archaeological and ecological factors listed in Schedule 1, Part II of the regulations and should be confirmed by the relevant consultants.

3.3 Local Planning Policy

3.3.1 Supplementary Planning Guidance: Trees and Hedgerows produced by Barnsley Metropolitan Borough Council supports Planning Policy *BIO1 Biodiversity and Geodiversity* of their 2019 Local Plan and requests:

"Where trees and hedgerows are situated in close proximity to a proposed development a full Tree Survey to British Standard BS5837: 2012 Trees in relation to design, demolition and construction – Recommendations will be required. The Tree Survey should include as a

minimum the species, height, crown spread, stem diameter, crown height and general condition of the trees and hedgerows. The trees and hedgerows must also be given a retention category in accordance with the guidance laid out in BS5837: 2012. The Tree Survey also needs to specify any works or pruning that is needed so that they can be satisfactorily and safely accommodated in the development.

The tree constraints plan submitted with the survey must show the position and crown spread of all trees and hedgerows on and adjoining the site and the Root Protection Area (RPA) of each tree. The site plan submitted with the application must also clearly indicate which trees it is proposed to retain and which to remove. The site plan must also show the proposed layout of the site with the existing contour of the ground and any proposed alterations in ground level.

Where there are impacts on trees you may be requested to provide an Arboricultural Impact Assessment (AIA) in addition to the above information detailing all the potential impacts on the trees and how they can be dealt with in a manner which means that the tree can be safely retained. "

4.0 Arboricultural Survey

4.1 Overview

4.1.1 The arboricultural survey in accordance with BS 5837:2012 was carried out by James Rowland, in March 2023. At the time of the survey the trees were not in leaf. Five groups, five individual trees as well as one hedgerow were recorded during the walk-over survey. They scattered across the site.

4.1.2 A full schedule of all trees and tree groups recorded can be found in Appendix 1 – Arboricultural Survey Schedule. A selection of photographs showing both the site and notable individual trees and tree groups is included in Appendix 3 – Site photographs.

4.2 Tree species, age and overall condition

4.2.1 Species are a mixture of native and non-native. The features are generally semi-mature and in good condition. Almost all the trees are at a semi-mature life stage. The condition and health of the trees is generally good or fair.

4.3 Tree quality, value and significance on site and local landscape

4.3.1 The majority of the trees on-site are of moderate to low quality (Category B & C). Whilst the higher value groups and trees provide significant screening between the iste and the adjacent major roads, all features on site are considered of landscape importance due to their location within Barnely's Green Belt. One Category U tree was identified adjacent to the restaurant's beer garden and should be removed urgently for the safety of the site.

4.4 Root Protection Areas (RPA)

4.4.1 The Root Protection Areas for each Category A to C tree and tree group has been calculated based on measured stem diameters. Both the radius and the area of each RPA are listed in Appendix 1 – Arboricultural Survey Schedule and shown on the plan included in Appendix 2 – Tree Survey and Constraints Plan.

4.5 Tree Preservation Orders (TPO) and Conservation Areas

4.5.1 The online tool provided on the Barnsley Metropolitan Borough Council website has confirmed that none of the trees included in this survey are protected by Tree Preservation Order, and the site is not located within a Conservation Area.

4.6 Non-statutory Designations

4.6.1 There are no non-statutory designations affecting the site.

5.0 Design recommendations

5.1 General recommendations

5.1.1 Design decisions should be based on the recommendations in chapters 5.2 and 5.3 of *BS 5837:2012 Trees in relation to design, demolition and construction* which describe the constraints posed by existing trees and outline the potential conflict between proposed structures and retained trees and how these can be avoided or minimised.

5.2 Maximise tree retention

5.2.1 It is recommended that the site layout design considers the safe retention of any trees which have been assigned the retention categories A, B and C as far as practicable to retain the ecological value and the mature character of the site and to minimise the potential visual impact the development may have on the surrounding landscape. The retention of legally protected trees should be a priority.

5.3 Minimise residual effect of development on retained trees

Proposed buildings, structures and hard surfacing

5.3.1 The site layout design should allow generous distances between vertical structures and tree canopies and allow for the expected future expansion of crowns.

5.3.2 The location of new structures and hard surfacing within the canopy spread of existing trees and tree groups should be considered carefully. Excessive management of these trees to facilitate any such elements may cause an imbalance of stem/crown ratio, unbalanced crowns or unnatural shape of specific tree species. The future requirement for continuous tree management to limit any conflicts should remain minimal.

5.3.3 Where built structures and hard landscape elements are proposed within the Root Protection Areas of existing trees, specialist methodologies may have to be adopted to manage the conflict. These solutions may have an impact on costs of the construction phase and it may be desirable to keep this to a minimum by developing a layout which is sensitive to the existing trees. Any vertical elements such as fences should be proposed at such a distance from tree stems as to allow for the future increase of the stem diameter and root buttresses.

Earthworks

5.3.4 Underground services and any proposed design elements requiring foundations (e.g. boundary treatments, street furniture, hard surfaces) should be placed outside of Root Protection Areas where possible.

5.3.5 Excavations for underground services may have an impact where they are proposed within the RPA of retained trees. Proposed above ground services may further conflict with parts of tree canopies.

5.3.6 The reduction of ground levels within the Root Protection Areas of retained trees are not acceptable. Where this can't be avoided, the removal of the tree may have to be considered.

Construction operations

5.3.7 Construction operations near retained trees are likely to cause accidental damage of tree trunks and low hanging branches. Where possible, the design should allow for reasonable distances between new structures and above ground parts of retained trees, including sufficient clear working areas around those structures.

5.3.8 Vehicle and plant movement during construction may further cause ground compaction which could lead to irreversible damage of tree roots and the rooting environment within the RPA of retained trees. The construction phase plans should ensure that site access routes, site compounds and internal routes are proposed outside the Root Protection Areas (RPA) of retained trees.

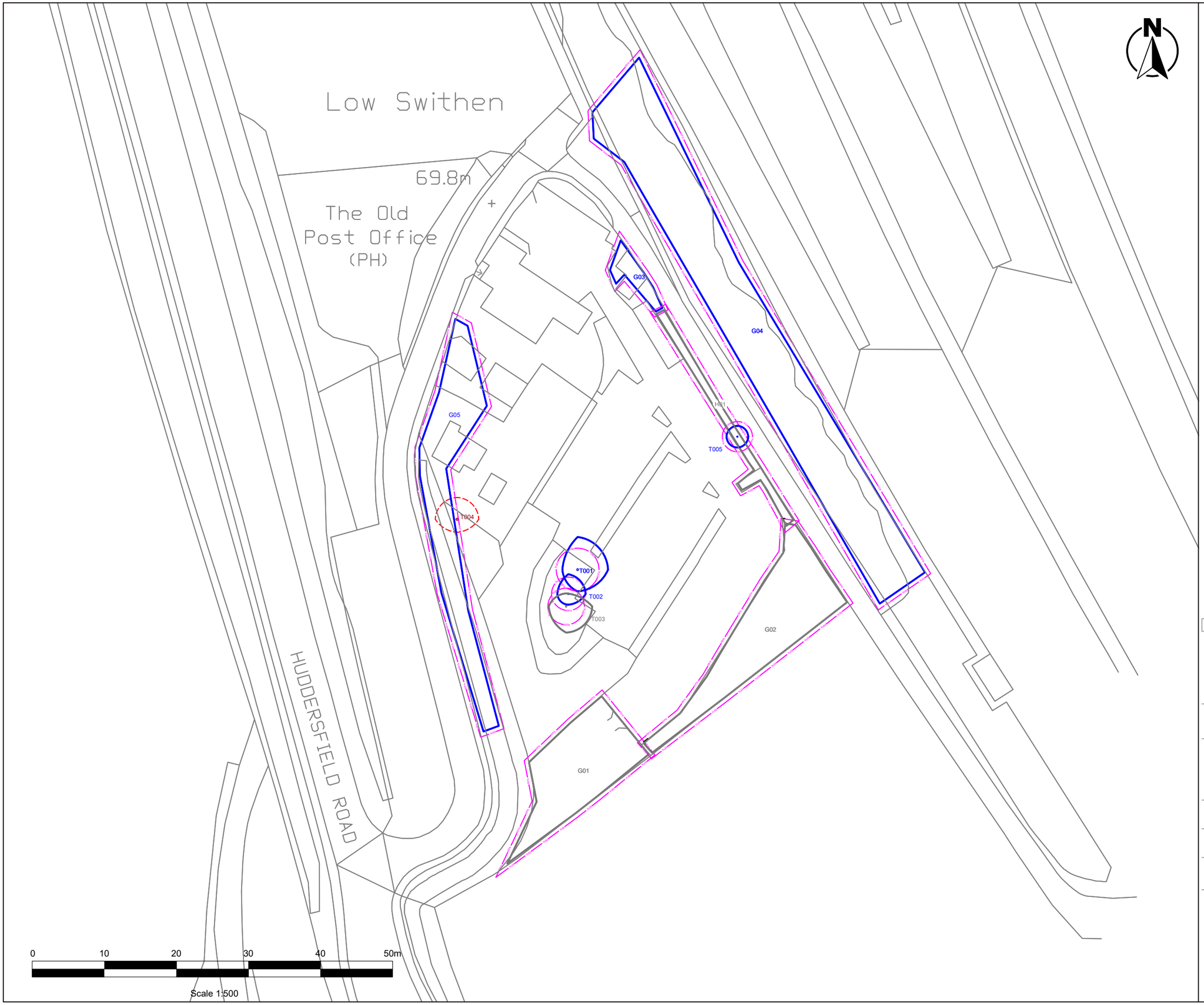
5.4 Trees to be removed

5.4.1 It is recommended that Category U tree T004 is removed to improve the safety of the site. T004 is not within Tesla's leased area.

6.0 Appendix 1 – Arboricultural Survey Schedule

Ref	Species		Ht (m)	Stem dia (mm)	Canopy Spread (m)				Clear Crown	Life Stage	RULE	Physiological Condition	Structural Condition	Notes (Including preliminary management recommendations)	Recommendations	BS Cat.	RPA (m)	RPA (m^2)
					N	E	S	W										
G01	Blackthorn Beech Elder Dog rose Hawthorn Laurel Cherry	*Prunus spinosa* *Fagus sp.* *Sambucus nigra* *Rosa canina* *Crataegus sp.* *Prunus laurocerasus*	15	390	See plan				0	Semi Mature	40+ Years	Fair	Fair	Mixed species group. Multi-stemmed. Predominantly Aspen. Low crown.	Crown lift to 3 metres over carpark.	C2		612
G02	Hawthorn Aspen Blackthorn Dog rose	*Crataegus sp.* *Populus tremula* *Prunus spinosa* *Rosa canina*	8	130	See plan				0	Semi Mature	40+ Years	Fair	Fair	Provides buffer from adjacent agricultural field to carpark. Predominantly multi-stemmed Hawthorn and Blackthorn, with a larger element of young to semi-mature Aspen scattered throughout group. Crowns encroaching onto carpark. To the North East is a group of Aspen in close proximity to overhead power cables.	Crown lift to 3 metres over carpark, cut back to clear parking area. Remove approx x15 self-set Aspen encroaching onto overhead powerlines.	C2		445
G03	Hazel x2 Goat Willow Pine x2 Sycamore x2	*Corylus avellana x2* *Salix caprea* *Pinus sp. x2* *Acer pseudoplatanus x2*	15	350	See plan				2.5	Semi Mature	40+ Years	Fair	Fair			B2		76
G04	Ash Hazel Sycamore Dog rose Mixed Species Group Hawthorn Pedunculate Oak	*Fraxinus sp.* *Corylus avellana* *Acer pseudoplatanus* *Rosa canina* *Group, mixed species* *Crataegus sp.* *Quercus robur*	18	400	See plan				5	Semi Mature	40+ Years	Fair	Fair	Third Party land, buffer between motorway and carpark area.		B2		1588
G05	Oak x6 Sycamore X1	*Quercus sp. x6* *Acer pseudoplatanus*	12	800	See plan				3.5	Mature	40+ Years	Fair	Fair	Semi-mature Oak besides entrance road to site, with x2 mature Oaks adjacent pub. Outside of boundary line.		B1,2		470
H01	Hawthorn Elder Elm Blackthorn Dog rose	*Crataegus sp.* *Sambucus nigra* *Ulmus sp.* *Prunus spinosa* *Rosa canina*	1	90	See plan				0	Semi Mature	40+ Years	Fair	Fair	Managed hedgerow. 1m width. Recently reduced. Multi-stemmed.		C2		68
T001	Aspen	*Populus tremula*	14	410	7.5	7	5	3.5	2	Early Mature	40+ Years	Good	Good	Low crown over carpark.	Crown lift to 3 metres over carpark.	B1	4.9	75
T002	Aspen	*Populus tremula*	12	320	4.5	4	2.5	2.5	4	Semi Mature	40+ Years	Good	Good	Minor deadwood.		B1	3.8	45
T003	Norway Maple	*Acer platanoides*	9	350	3	6	6	4	4	Semi Mature	20+ Years	Fair	Fair	Bark damage. Root decay extending into lower stem. Deadwood/bark necrosis in upper crown.		C1	4.2	55
T004	Poplar	*Populus sp.*	16	470	5	5	3	5	5	Early Mature	<10 years	Poor	Poor	Significant crown dieback. Bark necrosis. Sounding mallet used, indicating significant stem decay. Adjacent to pub garden, recommended removal (close to boundary line, client to confirm ownership).	Remove. Within 1-3 months.	U	0.0	0
T005	Pedunculate Oak	*Quercus robur*	10	289	2.5	2.5	2.5	2.5	2.5	Semi Mature	40+ Years	Fair	Fair	Bifurcated at 0.5m, x3 stems, tight unions.		B1	3.5	38

7.0 Appendix 2 – Tree Survey and Constraints Plan



NOTES

- Do not scale from this drawing for construction purposes
- This drawing is to be read in conjunction with all relevant drawings and documents associated with this project.
- All surveyed information including levels and layout is provided by others
- All existing and proposed dimensions, levels and locations to be checked and verified by the main contractor on site prior to the commencement of the works and any anomalies reported to the engineer.

KEY - Tree Survey and Tree Constraints Plan

Tree Categories BS 5837 (2012)

- Tree Category A
- Tree Category B
- Tree Category C
- Tree Category U

Root Protection Area (RPA)

Rev	Date	Description			
PL01	02/05/23	For Planning	JR	VM	TB

Project
The Old Post Office

Client
Tesla Motors Ltd.

Drawing Title
Tree Constraints Plan

Status	Date	Scale
For Planning	02/05/23	1:500 @ A3

Drawn	Designed	Checked	Approved
JR	--	JR	TB

DWG No. 3030.014.ENZ.XX.00.DR.AR.45.101

Revision PL01

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8.0 Appendix 3 – Site photographs

Plate 1: T001,T002,T003 Looking east

Plate 2: G02 Looking Northeast across site

Plate 3: East end of G02 (overhead powerlines)

Plate 4: G01

Plate 5: Tree 004 (Recommend removal)

9.0 Appendix 4 – Methodology

9.1 Introduction

9.1.2 This report and the methodology adopted to carry out the Arboricultural Survey is based on recommendations outlined in *British Standard (BS) 5837:2012 Trees in relation to design, demolition and construction- Recommendations*. This was published by BSI Standards Limited and came into effect on 30th April 2012. It supersedes BS 5837:2005 which is withdrawn.

9.2 Arboricultural Survey

9.2.1 A tree survey or arboricultural survey is a ground-based visual assessment of existing trees and tree groups on a site. It records the location of trees, the species, the estimated height and canopy spread, the stem diameter, and the tree's life stage, remaining useful life expectancy (RULE) and overall condition. Any distinctive features and abnormalities such as structural defects and physiological condition which may or may not have an adverse effect on the health or stability of the tree are also recorded, together with any signs of nesting birds and bat roost potential. Where ground conditions may influence the tree's growth, health and stability, such as water logging, ground compaction and severe level changes, this would also be recorded.

9.2.2 The site walkover includes an assessment of the overall value and quality of the trees on site by assigning a retention category to each tree and tree group. This assists stakeholders in deciding which trees should be removed or retained in the event of development occurring. There are four categories: A (high quality), B (moderate quality), C (low quality) and U (unsuitable for retention). For trees in categories A to C, these should qualify under one or more subcategories: 1 (mainly arboricultural qualities), 2 (mainly landscape qualities) and 3 (mainly cultural values).

9.2.3 The findings of the tree survey are recorded in an Arboricultural Survey Schedule supported by a Tree Survey and Tree Constraints Plan, both appended to the report.

9.2.4 The survey includes all trees which have a stem diameter of at least 75mm at 1.5m height or measured in accordance with BS 5837:2012 Annex C.

9.2.5 The tree survey usually records individual trees (labelled "T" on the Tree Survey and Tree Constraints Plan and in the Tree Survey Schedule), but may also group trees of similar age, species and condition into Groups (labelled "G"). Trees may also be grouped where they form a homogeneous unit (e.g. tree belts and woodland groups) which is unlikely to be directly

affected by the development (labelled “G” for small groups or “W” for Woodland Groups, as appropriate). Hedgerows are also recorded where present (labelled “H”).

9.2.6 To determine the location of trees, groups and hedgerows on site, Enzygo Ltd. use the OTISS tree survey app and a Samsung Android Tablet. It enables the surveyor to plot trees onto a base plan, usually a digital copy of a topographic survey or an OS map tile, and to simultaneously record all tree survey information required for a full tree survey schedule to BS 5837:2012.

9.2.7 Following the completion of the site survey this is then uploaded into a Computer Aided Design (CAD) programme in order to produce the Tree Survey and Tree Constraints Plan, with the tree survey information converted into a corresponding Tree Survey Schedule.

9.2.8 The survey includes any trees outside the site boundary which may be affected by any development proposals by overhanging canopies or by Root Protection Areas which are likely to extend into the site. These trees are normally found within 15m from the site boundary.

9.2.9 In addition to a site walk-over survey, a desk-study is carried out which includes the calculation of Root Protection Areas (RPA) in accordance with BS 5837:2012 clause 4.6 as the minimum area of land around the stem of a tree which should be protected during construction.

9.2.10 In line with standing advice by the Forestry Commission and Natural England for any veteran trees on site, the Root Protection Area will be a “*buffer zone around an ancient or veteran tree*” which “*should be at least 15 times larger than the diameter of the tree* [and] *5m from the edge of the tree’s canopy if that area is larger than 15 times the tree’s diameter*”.

9.2.11 The desk study includes liaison with the relevant local authority to establish whether any of the trees on site are protected by Tree Preservation Order (TPO) or whether Conservation Areas affect the legal status of any trees. Some local authorities provide online mapping tools on their website which identify any legal tree protection.

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