

Arboricultural Impact Assessment

BS5837:2012 Trees in Relation to Design, demolition and construction –
Recommendations



CLIENT:	Forge Property Consultants
SITE REFERENCE:	The Old Fire Station / Sarn Chapel, Chirk LL14 5PW
REFERENCE:	DEV103.CYM.00 GM Rev.00
CONSULTANT(S):	Giles Mercer BSc (Hons) M.Arbor.A
REPORT DATE:	25 th October 2017

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Arbor 002	Tree Constraints Plan
Arbor 003	Tree Protection Plan

1.0 Introduction

- 1.1 We are instructed by Forge Property Consultants to undertake a tree survey in accordance with British Standard 5837:2012 'Trees in relation to design, demolition and construction-Recommendations'.
- 1.2 The application relates to a proposed development on the site of the Old Fire Station & Sarn Chapel, Chirk
- 1.3 The proposed development consists of a small residential site comprising ten properties (4x1 Bed cluster, 2 x 2 bed semi pairs and 1 x 3 bed semi pair).
- 1.4 The site survey was undertaken on the 12th October 2017 and the following report is based upon the findings of that visit and the conditions found on that day.
- 1.5 We have obtained the OS Mastermap for the site and have been provided with a .pdf file showing the proposed development plan.

2.0 Scope & Objectives

- 2.1 This report has been commissioned by Forge property Consultants and the scope of the report reflects their instructions.
- 2.2 The scope of this report is limited to an appraisal of the existing trees on (and/or adjoining) the site and identification of the implications of development on retained trees.
- 2.3 The brief is to appraise the trees in relation to the proposed development of the site in accordance with British Standard 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'.
- 2.4 To prepare clear recommendations supported by relevant plans and data in order to facilitate consideration of the Arboricultural implications by the Local Planning Authority.
- 2.5 To consider the development proposals, identify areas where there are arboricultural issues and to recommend possible solutions.
- 2.6 To consider additional information supplied, to identify arboricultural issues arising from this information and to recommend possible solutions.
- 2.7 This report is not a Tree Risk Management Report or a Hazard Analysis Report and its use as such is invalid.
- 2.8 The trees have been assessed from ground level only. Assessment of condition is based on a visual tree assessment (VTA). No detailed inspection of the upper crown has been carried out.

- 2.9 No decay detection equipment (destructive or non-destructive) has been used to further assess the condition of the trees, which is beyond the scope of the survey. Any dangerous trees requiring further assessment on safety grounds will be identified.
- 2.10 Due to the changing nature of trees and other site circumstances this report and any recommendations made are limited to a 5-year period. Any alteration to the application site or any development proposals could change the current circumstances and may invalidate this report and any recommendations made. Should this be the case this report will require revision to reflect the development Proposals.
- 2.11 Trees are dynamic structures that can never be guaranteed 100% safe; even those in good condition can suffer damage under average conditions. Regular inspections can help to identify potential problems before they become acute.
- 2.12 A lack of recommended work does not imply that a tree is safe and likewise it should not be implied that a tree will be made safe following the completion of any recommended work.
- 2.13 Tree dimensions were measured using a combination of a Trupulse 200 Laser Range Finder, a Leica Disto Laser Rangefinder and a Richter Diameter tape. All instruments were used in accordance with appropriate user guides.
- 2.14 No soil samples were taken and no soils analysis was undertaken.
- 2.15 Any legal description or information given to Arbor Consultancy Limited is believed to be accurate.
- 2.16 Where solutions to arboricultural issues are specified which require the usage of a third party product or specialist design e.g. pile and beam foundations, no dig roadway construction etc. No liability is assumed for the performance or suitability of the product and specialist advice as to the suitability or installation of the product should be sought from the manufacturer or other specialist.
- 2.17 No responsibility is assumed by Arbor Consultancy Limited for legal matters that may arise from this report, and the consultant shall not be required to give testimony or to attend court unless additional contractual arrangements are made.
- 2.18 Any alteration or deletion from this report shall invalidate it as a whole.

3.0 Site Description

- 3.1 The site is an enclosed plot which was the site of the old Chirk Fire Station and the Sarn Chapel. The Site is now overgrown and the buildings semi-derelict.



4.0 Development Proposal

- 4.1 The proposed development consists of a small residential site comprising ten properties (4x1 Bed cluster, 2 x 2 bed semi pairs and 1 x 3 bed semi pair).

5.0 Tree Survey

- 5.1 The survey of the trees was carried out on the 12th October 2017. Tree data is recorded in Table 1 with locations indicated on plans Arbor 001 (Tree Survey), Arbor 002 (Tree Constraints Plan) and Arbor 003 (Tree Protection Plan). Nine trees and four hedgerows were assessed as part of the Survey.

TREE SURVEY SCHEDULE FOR ARBORICULTURAL IMPACT ASSESSMENT						
Site:	The Old Fire Station / Sarn Chapel – Chirk, LL14 5PW					
Client:	Forge Property Consultants					

Surveyor:	Giles Mercer
Assessment Date:	12 th October 2017
Job Reference:	DEV103.CYM.00 GM REV.00

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No.	Species	Height (m)	Stem Diam. (mm)	Branch Spread (m)	Crown height (m)	Age	Comments on Structural Condition, etc.	Management Recommendations	ERC	Cat	RPA Radius (m)	RPA Area (m ²)
T1	Ash	12	280	N 4.5 E 2.5 S 4.5 W 4.5	N/A	EM	▪ Self-set Ash very close to the existing building	▪ Remove in order to facilitate the development	20-40	C	3.4	35
T2	Ash	14	490	N 4.5 E 4.5 S 4.5 W 4.5	N/A	EM	▪ Twin stemmed from 1.67m ▪ Self-set Ash very close to the existing building ▪ Co-dominant stems ▪ Partial inclusion	▪ Remove for a combination of Arboricultural reasons and in order to facilitate the development	20-40	C	5.9	109
T3	Ash	14	290	N 4.5 E 4.5 S 2.5 W 4.5	N/A	EM	▪ Self-set Ash very close to the existing building	▪ Remove in order to facilitate the development	20-40	C	3.5	38
T4	Ash	15	350 190 310	N 5.0 E 5.0 S 5.0 W 5.0	N/A	EM-M	▪ Tri stemmed from 1.1m ▪ Co-dominant stems ▪ Included union	▪ Remove in order to facilitate the development	20-40	C	6.1	115
T5	Ash	16.5	370 440 190	N 4.25 E 4.2 S 4.25 W 4.25	N/A	EM	▪ Ivy covered ▪ Included from base ▪ Tri-stemmed ▪ Significant damage and decay to stem from 0-2m	▪ Remove in order to facilitate the development	0-20	U	7.3	166
T6	Sycamore	16	400* X3	N 4.0 E 4.0 S 4.0 W 4.0	4	EM-M	▪ Multi-stemmed Sycamore on third-party property	▪ None	20-40	C	8.3	217
T7	Ash	17.5	720	N 6.5 E 6.5 S 6.5 W 6.5	3+	M	▪ Mature Ash located on property boundary	▪ Remove in order to facilitate the development	40+	B	8.6	235

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No.	Species	Height (m)	Stem Diam. (mm)	Branch Spread (m)	Crown height (m)	Age	Comments on Structural Condition, etc.	Management Recommendations	ERC	Cat	RPA Radius (m)	RPA Area (m ²)
T8	Ash	9	280	N 3.8 E 3.8 S 3.8 W 3.8	N/A	EM	- Multi stemmed from base with several stems removed historically - Very poor form - Self-set Ash	Remove to facilitate development	0-20	C/U	3.4	35
T9	Holly	4.5	490	N 2.0 E 2.0 S 2.0 W 2.0	N/A	EM	Third party tree	None	20+	C	5.9	109
H1	Cypress	3	290	N 2.0 E 2.0 S 2.0 W 2.0	N/A	EM	- Topped at circa 3m - Located circa 30cm back from the boundary - X 6 stems - Third party hedge providing screening value	None	20+	C	3.5	38
H2	Hawthorn	4.2	150 ms	N 2.5 E 2.5 S 2.5 W 2.5	N/A	EM	Boundary screen	None	20-40	C	1.8	10
H3	Privet	1.85	25 ms	N 1.0 E 1.0 S 1.0 W 1.0	N/A	EM	Boundary hedge – well maintained	None	0-20	C	N/A	N/A
H4	Privet	3*	30 ms*	N 1.5 E 1.5 S 1.5 W 1.5	N/A	EM	Overgrown boundary hedge	Reduce and bring back into management	0-20	C	N/A	N/A
H5	Privet	5*	≤ 50* ms	N 1.5 E 1.5 S 1.5 W 1.5	N/A	EM	Overgrown boundary hedge	Reduce and bring back into management	0-20	C	N/A	N/A

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Headings and Abbreviations:

No.	Allocated sequential reference number - Tree ('T'), Group ('G'), Woodland ('W') or Hedge ('H') reference number - refer to plan and to numbered tags where applicable
Species:	Common name
Height:	In metres, to half nearest metre – where possible approximately 80% are measured using an electronic clinometer and the remainder estimated against the measured trees. In the case of Groups and Woodlands the measurement listed is that of the highest tree
Stem Diam.:	Stem diameter in millimetres, to nearest 10mm - measured and calculated as per Annex C of BS5837:2012. MS = multi-stemmed, TS = twin-stemmed
Branch Spread:	Crown radius measured (or estimated where considered appropriate) from the four cardinal points (north, east, south and west) to give an accurate visual representation of the crown
Branch & Canopy Clearances:	Existing height above ground level, in metres, of first significant branch and direction of growth (e.g. 2.5-N) and of canopy at lowest point – to inform on crown to height ratio, potential for shading, etc.
Life Stage:	Estimated age class - Y = young, SM = semi-mature, EM = early-mature, M = mature, PM = post-mature
PC:	Physiological Condition - a measure of the tree's overall vitality, i.e. D = Dead, MD = Moribund, P = Poor, M = Moderate, G = Good
General Observations and Comments:	Comments relating to the tree's overall condition and any other pertinent factors including structural defects, current and potential direct structural damage, physiological decline, poor form, etc.
Management Recommendations:	Either Preliminary or In Consideration of the Proposal - In the case of Arboricultural Constraints Surveys the recommended management works only take existing site and tree circumstances and conditions into account and not proposed developments. Arboricultural Impact Assessment and Method
ERC:	Statement related Surveys take the proposed development into consideration with recommendations made accordingly. More than one option may be given if considered appropriate
Cat. Grade:	Estimated Remaining Contribution - in years as per BS5837:2012 (i.e. <10, 10+, 20+, 40+)
RPA m²:	Category Grading - tree retention value listed as U, A, B or C - in accordance with BS5837:2012 Table 1
RPA Radius (m):	Root Protection Area in m ² - calculated area around the tree that must be appropriately protected throughout the development process in order avoid root damage
* (Estimated Dimensions):	Root Protection Area Radius - in metres measured from the centre of the stem to the line of tree protection
	Where trees are located off-site, or are inaccessible for any other reason, and accurate measurements or other information cannot be taken then the information provided is estimated and is duly suffixed with a “#” symbol

6.0 Arboricultural Impact Assessment

6.1 BS5837 (2012) requires that the root protection area is calculated for each of the retained trees on the development. The root protection area is the minimum area in m² which should be left undisturbed around each retained tree. The standard calculated RPA's and the protection zone radii are detailed in the Tree Survey Schedule (Table 1) above.

6.2 For single stem trees, the RPA has been calculated as an area equivalent to a circle with a radius 12 times the stem diameter. For trees with more than one stem, one of the two calculation methods below has been used.

6.3 For trees with multiple stems the following rules apply.

a) For trees with two to five stems, the combined stem diameter has been calculated as follows:

$$\sqrt{(\text{stem diameter } 1)^2 + (\text{stem diameter } 2)^2 \dots + (\text{stem diameter } 5)^2}$$

b) For trees with more than five stems, the combined stem diameter is calculated as follows:

$$\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$$

6.4 The RPA for each tree is plotted as a circle centred on the base of the stem.

6.5 The calculated RPA for each tree has been capped to 707 m².

6.6 Where pre-existing site conditions or other factors suggest that rooting has occurred asymmetrically, a polygon of equivalent area has been produced.

6.7 Where modifications to the shape of the RPA have been specified they reflect a soundly based arboricultural assessment of likely root distribution. Any deviation in the RPA from the original circular plot takes account of the following factors whilst still providing adequate protection for the root system:

- a) the morphology and disposition of the roots, when influenced by past or existing site conditions (e.g. the presence of roads, structures and underground apparatus);
- b) topography and drainage;
- c) the soil type and structure;
- d) the likely tolerance of the tree to root disturbance or damage, based on factors such as species, age, condition and past management.'

7.0 Incursions in to the RPA (Root Protection Area)

- 7.1 The proposed development, specifically the block to the north east is in conflict with trees on site.
- 7.1 The conflicting trees are all Ash trees (believed to be self-set). The trees are generally of low quality however, the Ash tree (T7) is considered to be of higher quality.
- 7.2 Modifying the foundation type (for example to piles) would enable the retention of the Ash tree (T7) however, the proposed building is three storeys high and the crown of T7 extends significantly over the footprint of the proposed building.
- 7.3 The extent of crown reduction required (in combination with the proximity of the tree T7) is not considered sustainable either in the short or the long term and I consider that there would be continuing pressure for removal of the tree if it were retained at the initial stage.
- 7.4 In order to facilitate the development the removal of trees T1, T2, T4, T4, T7 and T8 has been identified. The Ash tree (T5) has been recommended for removal for Arboricultural reasons.
- 7.5 Following the initial tree removal no incursions into the RPA of retained trees is envisaged however, RPA's of retained trees do extend into the site and accordingly protection methods have been specified.
- 7.6 BS 5837 2012 describes the extent and form of the root system as highly branched within a short distance of the stem, forming a network of small-diameter woody roots, which can extend radially for a distance much greater than the height of the tree, except where impeded by unfavourable conditions.
- 7.7 All parts of this system bear a mass of fine, non-woody absorptive roots, typically concentrated within the uppermost 600 mm of the soil.
- 7.8 The development of all roots is influenced by the availability of water, nutrients, oxygen and soil penetrability. As far as these conditions allow, the root system tends to develop sufficient volume and area to provide physical stability.
- 7.9 The uptake of water and mineral nutrients by the root system takes place via the fine non-woody roots (typically less than 0.5 mm diameter) and associated beneficial fungi (mycorrhizae). Their survival and functioning, which are essential for the health of the tree as a whole, depend on the maintenance of favourable soil conditions. The fine roots are short-lived, with the majority dying each winter and new ones developing in response to the needs of the tree.
- 7.10 All parts of the root system, but especially the fine roots, are vulnerable to damage. Once roots are damaged, water and nutrient uptake is restricted until new ones have grown. Mature trees recover slowly, if at all, from damage to their woody roots.

8.0 Arboricultural Method Statement – Construction / Demolition / Removal of existing surfaces

8.1 Demolition of the existing buildings on site will require that precautions be taken to maintain the condition and health of the root system and in particular to:

- a) prevent physical damage to the roots during demolition or construction (such as by soil compaction or severing);
- b) make provision for water and oxygen to reach the roots;
- c) allow for the future growth of the root system;
- d) preserve the soil structure at a suitable bulk density for root growth and function (in particular for soils of a high fines content).

8.2 Throughout the process of demolition or construction, including piling, the soil structure within the root protection area should be protected. The methods of protecting trees from damage during all phases of demolition and construction work will be specified in section 9.0 and conform to the specifications laid down in the Standard.

8.3 All plant and vehicles engaged in demolition works will either operate outside the RPA, or will run on a temporary surface designed to protect the underlying soil structure. Where such ground protection is required, it will be installed prior to commencement of operations.

8.4 Should the level of dust build-up on trees become significant, the advice of an arboriculturist will be sought. If considered appropriate by the attending arboriculturist the affected trees will be hosed down immediately.

8.5 Where an existing surface is scheduled for removal, care will be taken not to disturb tree roots that may be present beneath it. Hand held tools or appropriate machinery will be used (under arboricultural supervision) to remove the existing surface. Tree roots exposed by such operations will be treated in accordance with details in 8.6.

8.6 Installation of Services (Underground and above ground services)

8.7 At the time of writing this report we were unaware of the exact location / routing of services although we consider it likely that they will run along the route of the proposed driveway and accordingly they will not impact on the RPA of retained trees.

8.8 Additional precautions outside the exclusion zone

8.9 Once the exclusion zone has been protected by barriers and/or ground protection, construction work can commence. All weather notices should be erected on the barrier with words such as: "Construction exclusion zone — Keep out".

- 8.10 Planning of site operations should take sufficient account of wide loads, tall loads and plant with booms, jibs and counterweights (including drilling rigs), in order that they can operate without coming into contact with retained trees.

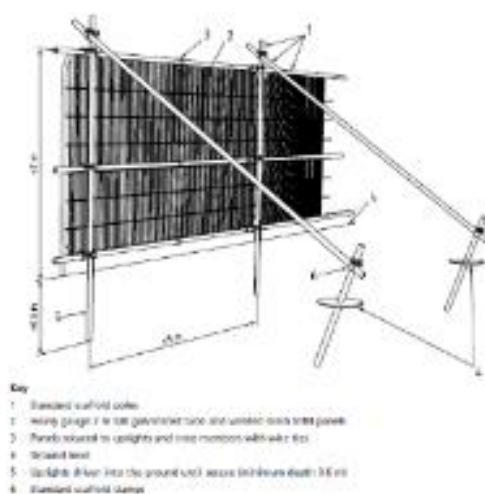
- 8.11 Such contact can result in serious damage to the trees and might make their safe retention impossible. Consequently, any transit or traverse of plant in proximity to trees should be conducted under the supervision of a banksman, to ensure that adequate clearance from trees is maintained at all times. Access facilitation pruning should be undertaken where necessary to maintain this clearance. NOTE In some instances, local planning authority consent for pruning might be required.

- 8.12 Fires on sites should be avoided if possible. Where they are unavoidable, they should not be lit in a position where heat could affect foliage or branches. The potential size of a fire and the wind direction should be taken into account when determining its location, and it should be attended at all times until safe enough to leave. NOTE Local environmental health authorities might have specific restrictions.

- 8.13 Any materials whose accidental spillage would cause damage to a tree should be stored and handled well away from the outer edge of its RPA. It is essential that allowance should be made for the slope of the ground so that damaging materials such as concrete washings, mortar or diesel oil cannot run towards trees.

9.0 Tree Protection Plan (TPP)

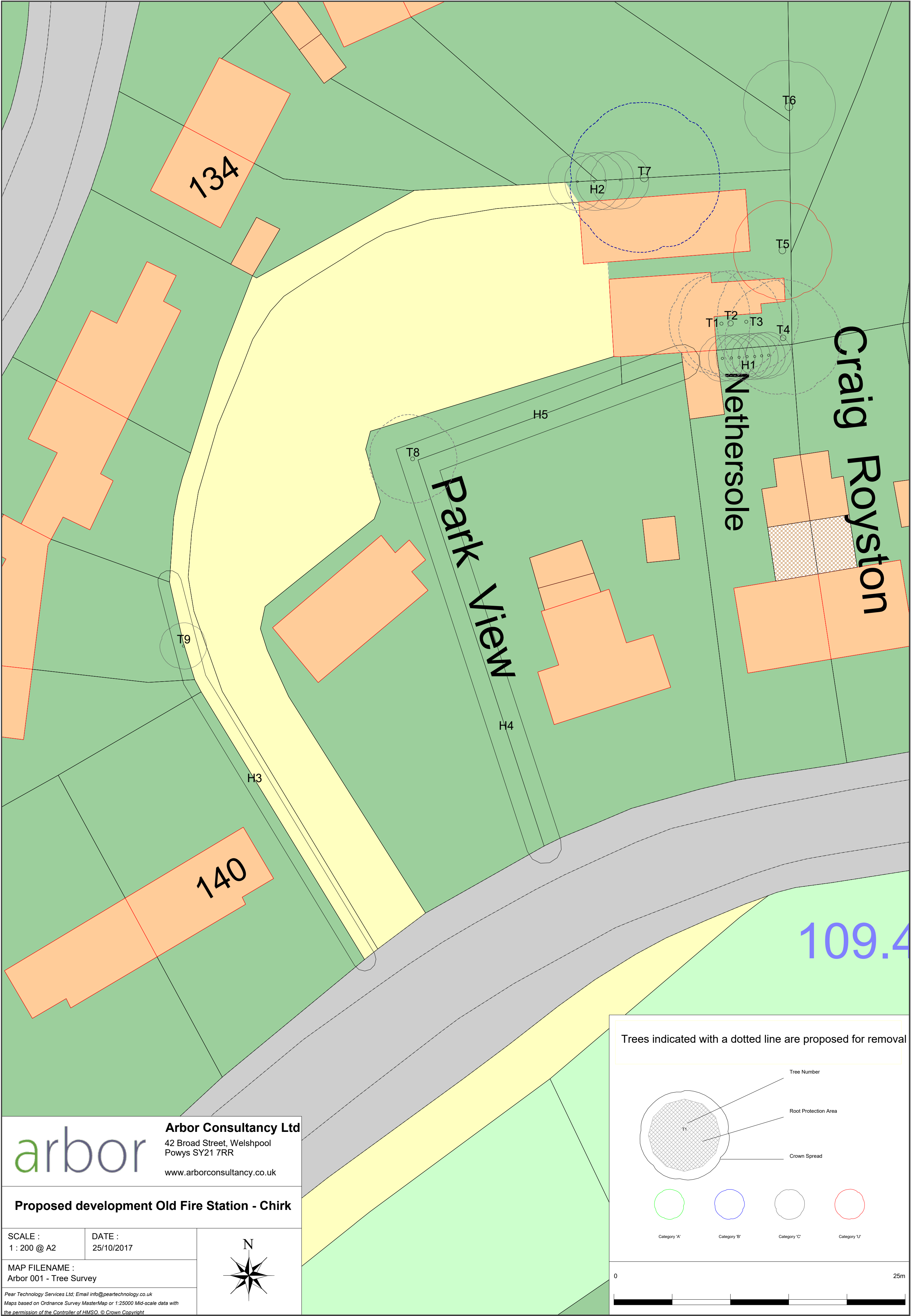
- 9.1 The exclusion zones as defined in this report will be protected with fencing. We have indicated on the Tree Protection plan (Arbor 003 - Tree Protection Plan) where we believe additional precautions should be installed. The fencing is to be strong enough to resist impacts and suitable to the degree of construction activity on the site and to be in accordance with that specified within BS5837:2012.
- 9.2 Where hard surfacing exists within the RPA and where it is to remain, protective barriers will be erected at the edge of the hard surface and the space may be utilised for operational purposes.
- 9.3 All fencing will be in place prior to any other development work (with the exception of necessary tree works) commencing on site. Such fencing will therefore be erected before any materials or machinery is brought onto site. Once erected the fences will not be moved or altered in any way without prior consultation with the Local Planning Authority other than for operations detailed in this report. If the fencing is damaged in any way it will be re-instated to its original condition before construction work can re-commence.
- 9.4 Notices will be erected on the fencing stating 'Protected Area – No Operations within Fenced Area'.
- 9.5 Protective fences shall be maintained *in-situ* until all equipment, machinery and surplus materials have been removed from the site. Nothing will be stored or placed in any area fenced in accordance with this condition and the ground levels within those areas shall not be altered, nor shall any excavation be made other than those detailed in this report, without the written consent of the Local Planning Authority.
- 9.6 All protective fencing (except where specified above) is to be constructed in accordance with BS:5837 (2012) – specification reproduced below.



- 9.7 Notices will be erected on the fencing stating 'Tree Protection Area - Keep Out'.

10.0 Conclusion and recommendations

- 10.1 Nine trees and four hedgerows were in response to a proposed development. The removal of six trees has been proposed in order to facilitate the proposed development. The Ash tree (T5) has been recommended for removal for a combination of Arboricultural reasons (poor form, significant damage and structural defects) as well as facilitating the development. We believe that there is sufficient available space on site to compensate for the loss of the trees through replacement landscape planting.
- 10.2 The impact of the proposed development has been assessed and in our professional opinion it is concluded that provided that the works take place in accordance with the method statements specified in this report the works will not be detrimental to the retained trees.
- 10.3 No work shall commence on site until such time as this method statement has been submitted to and approved in writing by the Local Planning Authority. All retained trees on and trees immediately adjoining the site shall be protected from damage as a result of the works on site, to the satisfaction of the Local Planning Authority in accordance with its guidance notes and relevant British Standards (e.g. BS5837:2012) for the duration of the development. In the event that trees become damaged during construction, the Local Planning Authority shall be notified and remedial action agreed and implemented. In the event that any tree(s) dies or is removed without the prior consent of the Local Planning Authority, it shall be replaced within the first available planting season, in accordance with details agreed with the Local Planning Authority.
- 10.4 All technical issues relating to arboriculture should be addressed to Arbor Consultancy Ltd in the first instance. Arbor Consultancy Ltd will liaise between the Local Planning Authority and any interested parties.





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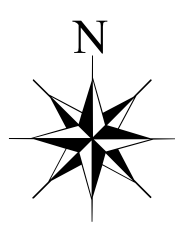
Proposed development Old Fire Station - Chirk

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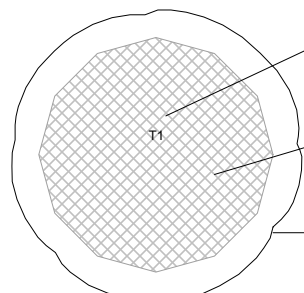
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MAP FILENAME :
Arbor 001 - Tree Survey

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Trees indicated with a dotted line are proposed for removal



Tree Number

Root Protection Area

Crown Spread



Category 'A'Category 'B'Category 'C'Category 'U'

0



25m





Arbor Consultancy Ltd
42 Broad Street, Welshpool
Powys SY21 7RR
www.arborconsultancy.co.uk

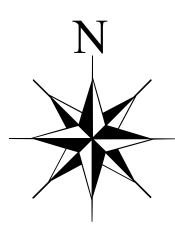
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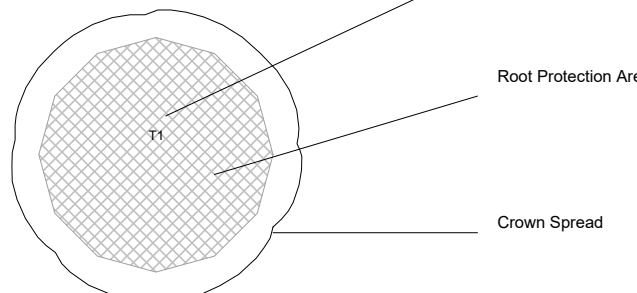
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Arbor 002 - Tree Constraints Plan

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 Proposed Buildings

 Proposed Driveway / Parking



Tree Number

Root Protection Area

Crown Spread

 Category 'A'

 Category 'B'

 Category 'C'

 Category 'U'

0



25m





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42 Broad Street, Welshpool
Powys SY21 7RR
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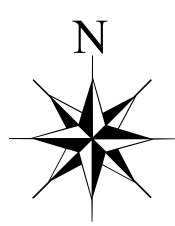
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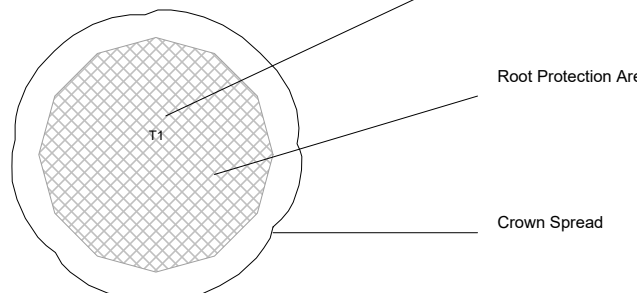
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Arbor 003 - Tree Protection Plan

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 Proposed Buildings

 Proposed Driveway / Parking



 Category 'A'

 Category 'B'

 Category 'C'

 Category 'U'

0



25m