

TREE SURVEY

PLOT 1A BRYN LANE, WREXHAM

AUGUST 2011

HOW Planning LLP, 40 Peter Street, Manchester, M2 5GP
Contact Partner: Gary Halman Telephone: 0161 835 1333

CONTENTS

	Page
1. INTRODUCTION	2
2. THE PROPOSED DEVELOPMENT AND IMPLICATIONS	2
3. CONCLUSIONS AND RECOMMENDATIONS	3

APPENDICES

Appendix 1: Arboricultural Implication Assessment (TEP.1997.001)

Appendix 2: Arboricultural Implication Assessment (TEP.2264.002 Rev E)

1. INTRODUCTION

- 1.1 TEP were commissioned by Kingmoor Park to undertake a Tree Survey for the Plot 1 site in 2008 (as contained in Appendix 1). In addition, Green Plan Energy commissioned TEP to update the survey in 2010 which concerned part of the Plot 1 site (as contained in Appendix 2).
- 1.2 These reports have been used to inform the proposed development of the Plot 1a site which has previously considered the arboricultural implications of developing the plot 1 site and provided recommendations and protective measures. Each survey followed *BS 5837:2005 Trees in Relation to Construction – Recommendations*. This categorisation method identifies the quality and value of the existing tree stock.
- 1.3 The two reports as contained in the appendices both contained a description of the site and contained a categorisation schedule of each tree. Therefore, this information is not presented in this report.

2. THE PROPOSED DEVELOPMENT AND IMPLICATIONS

- 2.1 Based on the previous arboricultural surveys for the Plot 1 site, it is clear that there is minimal impact on existing trees to facilitate development on Plot 1a. Only tree Group G11 will be impacted upon as part of the development. This is identified as being a Category C tree. It should be noted that Category C trees are defined as '*trees of low value and their retention should not unreasonably constrain development*' as specified in BS 5837. As this is a tree group, it is anticipated that some of trees within the group will require removal to facilitate development, whilst others maybe retained with some pruning.
- 2.2 In addition to the above, it should be noted that part of tree Group 11 and a single tree within Group 12, will require some pruning to enable adequate visibility splays to be maintained at site accesses. All tree work will be carried out in accordance with *BS 3998:1989 Recommendations for Treeworks* and in agreement with Wrexham County Borough Council.
- 2.3 All remaining trees can be successfully retained.

- 2.4 Those trees to be retained will be protected in line with the recommendations outlined in the two reports contained in the appendices.

3. CONCLUSIONS AND RECOMMENDATIONS

- 3.1 Based on previous tree surveys carried out on the site, it is clear that one tree group (Group G11) will require part removal to facilitate development. The remainder of the trees on site can be retained.
- 3.2 Part of one tree group and a single tree will require pruning to enable adequate visibility spays to be maintained at site accesses. All tree works will be carried out in accordance with *BS 3998:1989 Recommendations for Treeworks*.

HOW Planning LLP

August 2011

This report has been prepared by HOW Planning LLP, with all reasonable skill, care and diligence. The scope of this report is subject to specific agreement and has been prepared solely for the benefit of our Client and should not be relied upon by any other party. Any third parties that use this information do so at their own risk. HOW Planning LLP accepts no responsibility for information contained within this report that has been independently produced or verified.

HOW Planning LLP is a Limited Liability Partnership. Any reference to a Partner means a member of HOW Planning LLP.

Registered Office: 40 Peter Street, Manchester, M2 5GP. Registered in England and Wales. Registered Number: OC318465

APPENDIX 1

**PLOT 1 KINGMOOR PARK,
WREXHAM INDUSTRIAL ESTATE**

ARBORICULTURAL IMPLICATION ASSESSMENT

Report Ref: TEP.1997.001

for

**HOW Planning LLP
40 Peter Street
Manchester
M2 5GP**

April 2009

Written:	Checked:	Approved:
JS	SB	RR

**TEP
Genesis Centre
Birchwood Science Park
Warrington
WA3 7BH
Tel: 01925 844004
Fax: 01925 844002
e-mail: tep@tep.uk.com**



**PLOT 1 KINGMOOR PARK, WREXHAM INDUSTRIAL ESTATE
ARBORICULTURAL IMPLICATION ASSESSMENT**

CONTENTS	PAGE
1.0 INTRODUCTION	1
2.0 THE SITE AND SURROUNDINGS.....	2
3.0 TREE PRESERVATION ORDERS AND OTHER STATUTORY PROTECTION	2
4.0 TREE POPULATION & DEVELOPMENT IMPLICATIONS.....	3
5.0 TREE PROTECTION REQUIREMENTS	4
6.0 ARBORICULTURAL RECOMMENDATIONS.....	6
7.0 MITIGATION LANDSCAPING AND POST DEVELOPMENT MANAGEMENT	7
8.0 SUMMARY	8

APPENDICES

Appendix One: Arboricultural Data Sheets

Appendix Two: Survey Methodology

DRAWINGS

Drawing One: Tree Constraints Plan: D1997.001

Drawing Two: Tree Protection Fencing: TEP.HERAS.002A

1.0 INTRODUCTION

- 1.1 TEP has been commissioned by Kingmoor Park to conduct an arboricultural survey of land known as Plot 1 at Wrexham Industrial Estate, Wrexham. This report details the arboricultural implications of developing the aforementioned site, subsequent mitigation recommendations and protective measures.
- 1.2 The survey was carried out in August 2008 by means of inspection from ground level by a qualified arboriculturalist with several years experience. Weather conditions during the survey were heavy rain.
- 1.3 Under *BS 5837:2005 Trees in Relation to Construction - Recommendations* the assessment of trees is made objectively. The categorisation method identifies the quality and value of the existing tree stock.
- 1.4 This report provides the results of the survey and includes the following:
- i) A schedule of all trees located within, or in close proximity to the proposed development site (Appendix One);
 - ii) An assessment, based on *BS 5837:2005*, of trees in terms of their potential value within any future development. On the basis of this assessment, trees have been categorised into one of four categories: A, B, C or R (Appendices One & Two);
 - iii) Advice on removal, retention and management of trees (Sections 4, 5, 6 & 7);
 - iv) An assessment, based on *BS 5837:2005*, of the requirement for protection of trees during the construction phase (Appendix One);
 - v) A Tree Protection Plan detailing tree quality categories, trees to be retained and removed, protective fencing alignment and areas of special mitigation (Drawing One).
- 1.5 The client supplied a topographical survey drawing detailing tree stem locations and canopy outlines. The drawing was used to record the position of existing trees and vegetation. Due to the species mix and relative uniformity of the tree cover, trees were plotted as groups. For the purposes of this report, we have assumed that detail on the drawing is accurate.
- 1.6 A total of twelve tree groups (G1-G12) were surveyed and mapped (refer to Drawing One). All arboricultural information recorded during the survey is presented at Appendix One.
- 1.7 The nature of the soils on site was not assessed during the survey. The possibility of minor soil movement due to tree root activity cannot be discounted. The advice of a structural engineer should be sought in regard to appropriate foundation depths, with reference made to *NHBC Guidelines Chapter 4.2* where appropriate.

2.0 THE SITE AND SURROUNDINGS

- 2.1 Plot 1 is located to the north west of the existing Kingmoor Park complex at Wrexham Industrial Estate, North Wales. The site is bounded to the west by Bryn Lane and to the north, east and south by existing industrial units, access road and hard standing.
- 2.2 The roughly rectangular site rises steeply from its periphery forming a large grassed plateau at a height of between 2-3 meters. Two former ponds surrounded by dense vegetation (likely wetland outside summer months) are located adjacent to the northern boundary of the site.

Development Proposals

- 2.3 The proposed development will be constructed on the grassed plateau and comprise four individual buildings with associated hard surface parking and soft landscaping. Access will be off the existing Kingmoor Park internal road fed from Bryn Lane.
- 2.4 The detail of the proposals are shown on Drawing One and are based on the proposed site plan, no ref (Fletcher Architects) supplied by the client.

3.0 TREE PRESERVATION ORDERS AND OTHER STATUTORY PROTECTION

Tree Preservation Orders & Conservation Area Designations

- 3.1 Consultation with Wrexham County Borough Council confirmed that at the time of the survey, no trees on or immediately adjacent to Plot One Kingmoor Park were subject to Tree Preservation Orders or Conservation Area status.

Protected Species

- 3.2 Mature trees often contain cavities, crevices and hollows that offer potential habitat for species such as bats and barn owls. Both are afforded protection under the Schedule 1 and 5 of the *Wildlife and Countryside Act 1981* (as amended), as well as under Schedule 2 of the *Conservation (Natural Habitats) Regulations 1994* (as amended).
- 3.3 A preliminary ground level appraisal of the wildlife habitat value of each tree was undertaken as part of the arboricultural survey. Tree Group G10 was found to have features of a size and condition desirable to bats and/or owls.
- 3.4 Should the presence of a bat roost be suspected whilst undertaking any works on trees and groups on site, operations must be halted until a licensed bat handler or ecologist can provide advice.

4.0 TREE POPULATION & DEVELOPMENT IMPLICATIONS

Existing Tree Stock

- 4.1 A schedule of all trees and tree groups in terms of species, condition, age, recommendations, and retention values is provided at Appendix One.
- 4.2 All the trees on site are planted specimens and confined to the site periphery, growing either at the base or on the sloping sides of the central plateau.
- 4.3 Small stands of fast growing species have been planted along the northern and eastern boundary (willow, poplar, birch, ash) and contain many small, remedial defects such as broken branches and minor deadwood.
- 4.4 A linear group of ash (G12) forms an attractive feature adjacent to Bryn Lane. Collectively these trees provide effective screening from the proposed development and have the potential to develop into a valuable arboricultural feature.
- 4.5 Tree and group locations, their quality categories and canopy spreads are shown on Drawing One.

Implications of the Proposed Development

- 4.6 Table 1 lists trees and tree groups that require removal to facilitate development and those likely to be unaffected by the proposal. This assessment is based on the proposed site plan supplied by the client.
- 4.7 The categories are the result of objective assessment based on *BS 5837:2005 Trees in Relation to Construction – Recommendations*.
- 4.8 Category A trees are of high value and include those that are particularly good examples of their species and/or those that are visually dominant within the landscape.
- 4.9 Category B trees are of moderate value and include those that do not qualify as Category A due to minor remedial defects and/or those that collectively form distinct landscape features, thereby attracting a higher rating than they might as individuals.
- 4.10 Category C trees are trees of low value and their retention should not unreasonably constrain development.
- 4.11 Category R trees are unsuitable for long-term retention and should ideally be removed prior to the commencement of construction unless otherwise advised.

Table 1: Arboricultural implications of the proposed development

	Tree Quality Assessment Category/Retention Value			
	A	B	C	R
Trees and groups that can be retained		Part of G2, Part of G3, G5, G7, G9, G12	G4, G6, G8, G10, G11	
Trees and groups that require removal to facilitate development		Part of G2, Part of G3	G1	

See Appendix One, Arboricultural Data Sheets for subcategories

- 4.12 One group and the majority of two further groups will require removal to facilitate the proposed development. All remaining trees can be successfully retained.

5.0 TREE PROTECTION REQUIREMENTS

Root Protection Areas (RPAs) and Construction Exclusion Zones (CEZ)

- 5.1 As per *BS 5837:2005*, the RPA is calculated using the trees diameter at 1.5 metres (refer to Appendix One: Arboricultural Data Sheets) and represents the minimum area around each tree that must be left undisturbed during development to prevent direct and indirect damage to tree roots and the soil structure.
- 5.2 Tree roots spread two to five times the width of the crown. The majority of tree roots are found in the top 600 mm of soil, with most of the roots that absorb water and nutrients being found in the top 100 mm.
- 5.3 The morphology of roots is influenced by past and present site conditions (the presence of roads, structures and underground services), soil type, topography and drainage. This means that a tree's roots may not be uniform in their extent and the RPA may not be a circular area centred on the tree stem.
- 5.4 The RPA can be adjusted to include the canopy to prevent it being damaged by construction machinery. This area forms a **Construction Exclusion Zone (CEZ)** (refer to Drawing One).

Protective Fencing and Ground Protection

- 5.5 Protective barrier fencing must be installed to demarcate the CEZs prior to the commencement of any development works, including bringing machinery or materials onto site and the erection of site huts.

- 5.6 The fencing must be fixed into the ground to withstand accidental impact from machinery and to ensure that a sufficient protective area is maintained. Details of the recommended Heras protective fencing are shown in Drawing Two.
- 5.7 Once erected, the fencing should be inspected and approved by an arboriculturist prior to the commencement of any site activity, including preparatory and demolition work. The protective fencing must not be removed until the physical construction phase has been completed and all vehicles have been removed from site, to the satisfaction of the appointed arboriculturist.
- 5.8 The details and siting of all construction activities (such as service runs, soakaways, contractor car parking, ground level changes, site huts, temporary and long-term storage and temporary latrines including their drainage) must be set out in detail prior to the commencement of works to avoid damage to the surrounding tree population.
- 5.9 Storage areas for liquids such as fuels, oil or paint should be located away from any trees on site due to the risk of soil contamination caused by accidental spillage. If contamination occurs, then remediation advice should be sought from an experienced arboriculturist.

Underground Utility Issues

- 5.10 Guidelines set out in the National Joint Utilities Group publication *NJUG Volume 4, Guidelines for the Planning, Installation and Maintenance of Utility apparatus in Proximity to Trees* will be adhered to during excavation works close to or partially within RPAs.
- 5.11 NJUG Volume 4 can be downloaded free of charge from – <http://www.njug.org.uk>
- 5.12 If utilities must enter the RPAs of retained trees, works should be detailed in an Arboricultural Method Statement (see below).

Ground Level Changes

- 5.13 A rise or reduction in soil level can have major implications to the longevity and health of the trees on site.
- 5.14 Existing ground levels within the CEZ of all trees identified for retention are to be maintained and all fenced-out areas shall be regarded as sacrosanct.
- 5.15 If a change in existing ground levels cannot be avoided then early consultation with an Arboricultural Consultant should be sought.

Drainage Issues

- 5.16 Run-off and drainage is an important consideration to mature established trees. An increase in water will reduce soil aeration and kill roots; a reduction will result in drought stress.
- 5.17 Storm water run-off and drainage must be carefully considered during detailed design with the use of permeable hard surfacing etc. to reduce excessive or polluted run-off where permissible.

6.0 ARBORICULTURAL RECOMMENDATIONS

Tree Work

- 6.1 Tree groups G10 and G11 may require pruning to allow clearance for the proposed access road and footpath.
- 6.2 All tree work will be carried out in accordance with *BS3998:1989 Recommendations for Treeworks* and in agreement with Wrexham County Borough Council.

Footpath Construction within the CEZ

- 6.3 Footpath construction is proposed within the CEZ of groups G9 and G11. Where practicable this should be constructed above existing ground levels avoiding excessive compaction of the underlying soil.
- 6.4 Where above ground construction cannot be avoided a hand-dig system to minimise root damage should be used to excavate to formation level within the CEZ. This is in compliance with *BS 5837:2005* Clause 11.3.5. The use of hand-held power tools that utilise high-pressure gas to loosen soil aggregates (for example the airspade or airknife) is recommended.
- 6.5 During excavation, any roots encountered will be pruned back (ideally to a lateral root branch) using bypass secateurs or a handsaw.
- 6.6 Displaced soil from the excavation should be moved outside of the CEZ and disposed of appropriately. No materials should be stored in the CEZ.
- 6.7 All construction activities within the CEZ should be supervised by a suitably qualified Arboriculturist.

Arboricultural Method Statement

- 6.8 Should any activities other than those detailed above be required within the Construction Exclusion Zones identified on Drawing One then an Arboricultural Method Statement (AMS) will be required.

- 6.9 An AMS details 'special mitigation construction and procedure' that minimises damage to tree roots and the surrounding soil. Special mitigation construction works are likely to require more time and proprietary materials, thus early consultation and discussion with an appropriately qualified arboriculturalist when detailing plans would help with resource allocation.

7.0 MITIGATION LANDSCAPING AND POST DEVELOPMENT MANAGEMENT

- 7.1 Mitigation for the loss of trees and associated habitats will be provided in the form of replacement tree planting. The extent of mitigation planting should be determined in agreement with Wrexham County Borough Council.
- 7.2 The choice of replacement trees should include species of varied ultimate size and height, incorporating where possible the larger tree species with the potential to provide benefit beyond their immediate environment and to a more diverse range of ecology (for example oak, lime, beech, ash etc.).
- 7.3 Aftercare is vital to the survival of newly planted trees. Provision should be made for the maintenance of newly planted trees and include watering, formative pruning and the checking of tree ties and stakes.
- 7.4 Hazard recommendations are based on observations at the time of survey. Trees are dynamic living organisms whose structure is constantly changing. Even those in good condition can suffer from damage or stress. Following site development, regular (annual or biannual) inspections of all retained trees should be undertaken by a qualified arboriculturalist.

8.0 SUMMARY

- 8.1 Based on an objective assessment made in accordance with *BS 5837:2005 Trees in Relation to Construction – Recommendations*, there are six Category B tree groups and six Category C tree groups on site.
- 8.2 One group (G1) and the majority of two further groups (G2 and G3) will require removal to facilitate the proposed development. The remainder of the trees on site can be retained.
- 8.3 Tree groups G10 and G11 are likely to require pruning to allow clearance for the new access road and footpath. All tree work will be carried out in accordance with *BS3998:1989 Recommendations for Treeworks*.
- 8.4 The proposed footpath will impinge with the Construction Exclusion Zone (CEZ) of tree group G9 and G11. Where practicable footpath construction within the CEZ should occur above existing ground levels. If this cannot be achieved then a hand-dig technique should be used to excavate to formation level under the supervision of a suitably qualified Arboriculturist (see sections 6.3 - 6.7).
- 8.5 At the time of the survey no trees within or immediately adjacent to the site were subject to Tree Preservation Orders or within a Conservation Area.
- 8.6 Tree group G10 was found to have features of a size and condition desirable to bats and/or owls.
- 8.7 The extent of mitigation planting for the loss of trees will be agreed with Wrexham County Borough Council.
- 8.8 Following site development, regular (annual or biannual) inspections of all retained trees should be undertaken by a qualified Arboricultural Consultant.

APPENDIX ONE

ARBORICULTURAL DATA SHEETS

APPENDIX ONE: Arboricultural Survey Data Sheets



Surveyor JS/HS
 Date 05.08.2008
 Town Wrexham
 Site Plot 1 Kingmoor Park
 Dwg Ref D1997.001

Ref	Species	Height	Stem Dia.	No. of stems/individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA	Management Recommendations	Estimated Remaining Contribution
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature, Veteran	Good, Fair, Poor		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short
Groups																	
G1	London Plane	to 12								Young	Good	5 trees in group. Linear planting.	C,2				Long
G2	Poplar sp.	to 17								Middle Age	Good	Linear planting. Trees of form typical to species.	B,2				Long
G3	Ash	to 12								Middle Age	Good	4 trees in group. Structured planting. All individually of good form.	B,1,2				Long
G4	Silver Birch	to 8								Middle Age	Good	3 trees in group. Structured planting.	C,2				Long
G5	White Willow	to 18								Middle Age	Good	5 trees in group, all basally multi-stemmed with tight unions.	B,1,2				Long
G6	Hawthorn	to 4								Middle Age	Good	3 trees in group. Shrubby trees of reasonable form.	C,1,2				Long
G7	Silver Birch	to 7								Middle Age	Good	2 trees in group, reasonable form.	B,2				Long
G8	Crack Willow	to 7								Young to Middle Age	Poor	3 trees in group of poor form. Previous branch failures.	C,2				Medium
G9	White Willow	to 16								Middle Age	Fair	31 trees of mixed form and condition. Structured planting along existing site entrance. Minor deadwood and decay.	B,2			Monitor decay of affected trees	Long
G10	hawthorn, Blackthorn, Cherry, Field Maple	to 4								Middle Age	Good	Dense vegetation. Good bird habitat.	C,3				Long
G11	Grey Willow	to 6								Mature	Fair	Group of shrubby, multi-stemmed trees around old pond area. Some broken branches and minor deadwood.	C,2				Medium
G12	Ash	to 9								Middle Age	Good	Linear planting providing screening. Trees are of good form and are vigorous. Minor inclusions.	B,2				Long

APPENDIX TWO

SURVEY METHODOLOGY

APPENDIX TWO: ARBORICULTURE SURVEY METHOD

Arboricultural surveys are limited by being from ground level only. The nature of the soils on site is not assessed during the survey. The possibility of minor soil movement due to the root activity of the trees cannot be discounted; therefore, the advice of a structural engineer should be sought with regard to appropriate foundation depths.

Trees are dynamic living organisms with a constantly changing structure; even trees in good condition can suffer from damage or stress. Regular annual or bi-annual inspections by a qualified arboriculturalist can help to identify potential problems before they become acute.

The following features of each tree, group of trees or wood may have been recorded in the Arboricultural Data Sheets (Appendix One).

Trees are surveyed without reference to any proposed development. The implications of any development are discussed in the Arboricultural Implication Assessment.

Species	The common name is given. The Latin name may also be given if further clarification is required.	
Height	Top height of tree recorded in metres.	
Stem Diameter	For single-stemmed trees the measurement is taken as high as possible up to 1.5 metres above ground and recorded in millimetres. For multi-stemmed trees the measurement is taken directly above the root flare in millimetres. For tree group's the measurement is taken in the same way as with single-stemmed trees and range of minimum and maximum diameters is recorded in millimeters.	
No. of Stems	A count of stems arising below a height of 1.5m.	
Crown Spread	The N, S, E and W branch spreads are recorded in metres to provide a representative crown shape.	
Height of Lowest Branch	Crown clearance above ground level recorded in metres.	
Tree Age	Young	Trees than can reasonably be relocated or replaced like for like, without undue cost;
	Middle Age	Trees in the established growth stage of their life with the potential to continue increasing in size;
	Mature	Trees that have reached their ultimate size, given their location and surroundings;
	Veteran	A tree recognised by features of a biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.

Condition

An overall assessment of a trees physiological and structural state in which factors that may increase its susceptibility to the effects of development are taken into account.

Comments

A brief evaluation and description of the tree with comments on the form, vitality, health and any significant defects that may be present.

Tree Quality Assessment

The tree quality assessment is based on Table 1 of BS 5837:2005 (See below). Four categories (A, B, C and R) are used to denote tree quality (A = High, B = Moderate, C = Low, R = Unsuitable for retention). Subcategories (1-3) denote the specific function value of the trees and the reasoning behind the assessment (the subcategories may be used in combination but do not accumulate collective weight).

BS 5837 Root Protection Area (RPA)

The Root Protection Area (RPA) is allocated to ensure that a sufficient area is left undisturbed during development to prevent direct and indirect damage to tree roots and the soil structure.

The RPA is calculated using a mathematical equation included in BS 5837:2005 (Table 2) and is based on a trees stem diameter. In some cases the RPA may need to be adapted to ensure survival based on criteria such as the tree's condition, species and crown spread. Any alteration should be justifiable but is made at the arboriculturists discretion.

The surrounding RPA should remain undisturbed and be treated as a sacrosanct Construction Exclusion Zone (CEZ) until development completion and removal is approved by an arboriculturist.

APPENDIX TWO: ARBORICULTURE SURVEY METHOD

Recommendations

Recommendations for arboricultural works, etc. are based on the **current** land use, and take into account the tree or group attributes without bias to the proposed development.

Estimated Remaining Contribution

An estimation of the trees Safe Useful Life Expectancy (SULE).

Long	> 40 years
Medium	20 – 40 years
Short	10 – 20 years
Very Short	< 10 years

Table 1 — Cascade chart for tree quality assessment

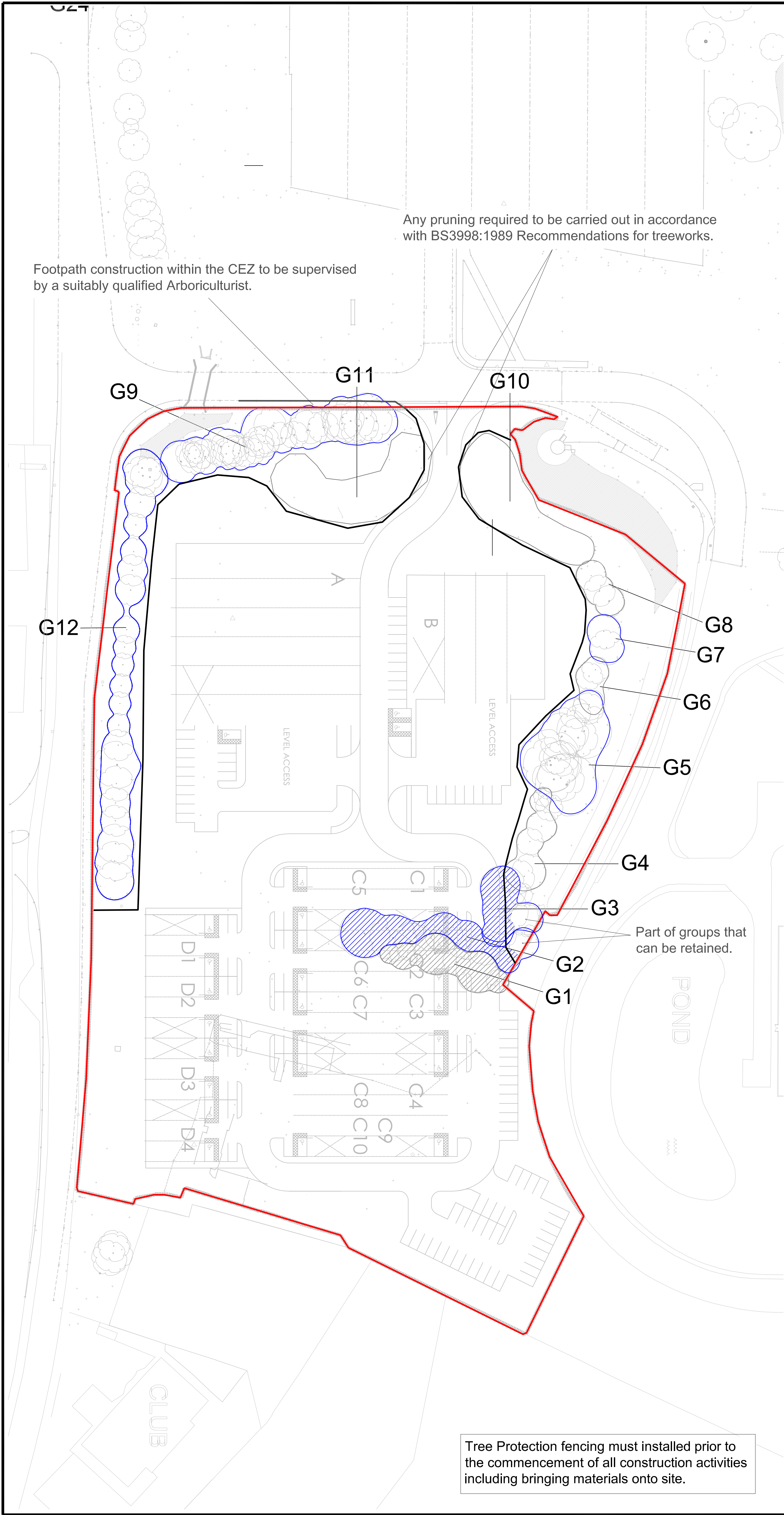
TREES FOR REMOVAL				
Category and definition	Criteria			Identification on plan
Category R Those in such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed for reasons of sound arboricultural management	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other R category trees (i.e. 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 (e.g. Dutch elm disease), or very low quality trees suppressing adjacent trees of better quality NOTE: Habitat reinstatement may be appropriate (e.g. R category tree used as a bat roost: installation of bat box in nearby tree).			DARK RED
TREES TO BE CONSIDERED FOR RETENTION				
Category and definition	Criteria — Subcategories			Identification on plan
	1 Mainly arboricultural values	2 Mainly landscape values	3 Mainly cultural values, including conservation	
Category A Those of high quality and value: in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested)	Trees that are particularly good examples of their species, especially if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands which provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance (e.g. avenues or other arboricultural features assessed as groups)	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	LIGHT GREEN
Category B Those of moderate quality and value: those in such a condition as to make a significant contribution (a minimum of 20 years is suggested)	Trees that might be included in the high category, but are downgraded because of impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage)	Trees present in numbers, usually as groups or woodlands, such that they form distinct landscape features, thereby attracting a higher collective rating than they might as individuals but which are not, individually, essential components of formal or semi-formal arboricultural features (e.g. trees of moderate quality within an avenue that includes better, A category specimens), or trees situated mainly internally to the site, therefore individually having little visual impact on the wider locality	Trees with clearly identifiable conservation or other cultural benefits	MID BLUE
Category C Those of low quality and value: currently in adequate condition to remain until new planting could be established (a minimum of 10 years is suggested), or young trees with a stem diameter below 150 mm	Trees not qualifying in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary screening benefit	Trees with very limited conservation or other cultural benefits	GREY
	NOTE: Whilst C category trees will usually not be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150 mm should be considered for relocation.			

British Standards Institute 2005, p.6

NOTE: All young trees are assessed as category 'C' quality but this does not preclude their retention within a development; all retention and removal recommendations will be detailed within the Arboricultural Implications Assessment report.

DRAWING ONE

TREE PROTECTION PLAN



KEY

- T1 Individual tree
- G1 Tree group
- Development area
- Protective fencing alignment
Defining a Construction Exclusion Zone

Trees/Groups to be Retained

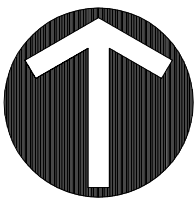
Quality values based on BS 5837:2005 Trees in Relation to Construction - Recommendations

- Category A Trees/Groups
Trees of high quality and value
- Category B Trees/Groups
Trees of moderate quality and value
- Category C Trees
Trees of low quality and value
- Category R Trees
Trees unsuitable for long term retention

Trees/Groups to be Removed

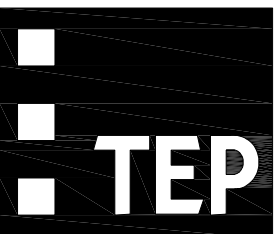
- Category A Trees/Groups
Trees of high quality and value
- Category B Trees/Groups
Trees of moderate quality and value
- Category C Trees
Trees of low quality and value
- Category R Trees
Trees unsuitable for long term retention

NOTE: see Arboricultural Data Sheets (Appendix One) for further information.



Reproduced from the Ordnance Survey with the permission of The Controller of Her Majesty's Stationery Office, Crown Copyright TEP, The Environment Partnership, Genesis Centre, Birchwood Science Park, Warrington, Cheshire. WA3 7BH. Licence No. AL 52685A

Rev	Description	Drawn	Approved	Date



Genesis Centre
Birchwood Science Park Warrington
WA3 7BH
Tel 01925 844004
Fax 01925 844002
e-mail tep@tep.uk.com

Project

PLOT 1 - BRYN LANE,
WREXHAM

Title

TREE PROTECTION PLAN

Drwg No
D1997.001

Scale
1:500 @ A1

Date
23/04/09

Drawn
RO

Checked
JS

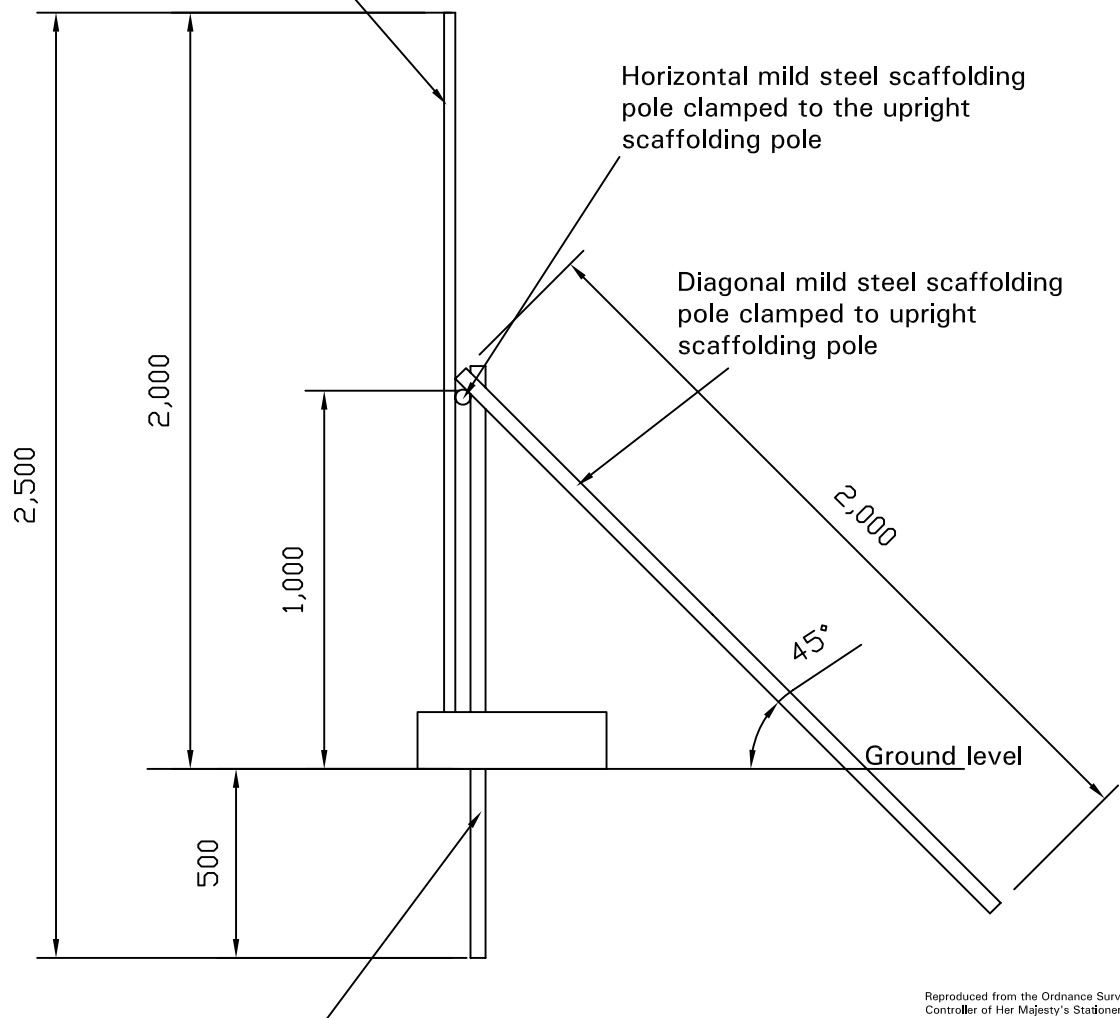
Approved
PM

DRAWING TWO

RECOMMENDED PROTECTIVE FENCING

Temporary Supported Heras Fence Detail
Scale 1:20

Heras fencing is clamped to the upright scaffolding pole and positioned in support footing



Upright scaffolding pole pierces through Heras fence support footing and into ground

Reproduced from the Ordnance Survey with the permission of The Controller of Her Majesty's Stationery Office, Crown Copyright TEP, The Environment Partnership, Genesis Centre, Birchwood Science Park, Warrington, Cheshire, WA3 7BH, Licence No. AL 52685A

A	Scaffold support alterations, and Tree Protection Notice	TH	16/01/06
Revision	Description	Amended by	Date

	Genesis Centre Birchwood Science Park Warrington WA3 7BH Tel 01925 844004 Fax 01925 844002 e-mail tep@tep.uk.com
---	---

Project		
TEP Standard Detail		
Title		
Temporary Supported Heras Fence Detail for Tree Protection around Designated Root Protection Area/Construction Exclusion Zone.		
Drwg No	TEP.HERAS.002A	
Scale	1:20 @ A4	Date 02/10/03
Drawn by RJC	Checked by ID	Approved by DS

Note:
Fencing to be Heras anticlimb panels (3.5m wide x2m high)



Tree Protection Notice is to be attached to the fencing 1.5m from the ground, facing out of the Construction Exclusion Zone located at regular intervals along the fence line.
The notice must be at least A4 in size

APPENDIX 2



**GREEN PLAN ENERGY LTD
KINGMOOR PARK, WREXHAM INDUSTRIAL ESTATE
ARBORICULTURAL IMPLICATIONS ASSESSMENT
(Report Ref: TEP.2264.002 Revision E)**

for

**Green Plan Energy
City Point
Great Homer Street
Liverpool
LS 3LD**

Genesis Centre
Birchwood Science Park
Warrington
WA3 7BH

T: 01925 844004
F: 01925 844002
E: tep@tep.uk.com
W: www.tep.uk.com



**GREEN PLAN ENERGY LTD, KINGMOOR PARK, WREXHAM INDUSTRIAL ESTATE
ARBORICULTURAL IMPLICATIONS ASSESSMENT**

CONTENTS	PAGE
1.0 INTRODUCTION	1
2.0 THE SITE AND SURROUNDINGS.....	2
3.0 TREE PRESERVATION ORDERS AND OTHER STATUTORY PROTECTION	2
4.0 TREE POPULATION & DEVELOPMENT IMPLICATIONS.....	3
5.0 TREE PROTECTION REQUIREMENTS	5
6.0 ARBORICULTURAL RECOMMENDATIONS.....	6
7.0 SUMMARY	8

APPENDICES

Appendix 1: Arboricultural Survey Data Sheets

Appendix 2: Survey Methodology

DRAWINGS

Drawing 1: Tree Implications and Protection Plan: D2264.003C

Drawing 2: Recommended Tree Protection Fencing: TEP.HERAS.003A

Written:	Checked:	Approved:
AM	JS	JS



1.0 INTRODUCTION

- 1.1 TEP has been commissioned by Green Plan Energy to conduct an arboricultural survey of land off Bryn Lane, Wrexham Industrial Estate. This report details the arboricultural implications of developing the site, subsequent mitigation recommendations and protective measures.
- 1.2 An initial survey was carried out in January 2010 by means of inspection from ground level by a qualified Arboricultural Consultant (BSc in Arboriculture). A further visit to collect additional information was conducted in November 2010. Weather conditions during both surveys were fine.
- 1.3 Under *BS 5837:2005 Trees in Relation to Construction - Recommendations* the assessment of trees is made objectively. The categorisation method identifies the quality and value of the existing tree stock.
- 1.4 16 trees (T1-T16) and 12 groups of trees (G1–G12) were surveyed and mapped (Drawing 1). All arboricultural information recorded during the survey is presented at Appendix 1.
- 1.5 A topographical survey drawing detailing tree stem locations and canopy outline (Ref: 5756/01, Powers & Tiltman) was used to record the position of existing trees and vegetation. A number of trees were omitted from the topographical drawing and as such their position on Drawing 1 was recorded using GPS equipment with sub-metre accuracy (trees T1-T16).
- 1.6 The nature of the soils on site was not assessed during the survey. The possibility of minor soil movement due to tree root activity cannot be discounted. The advice of a structural engineer should be sought in regard to appropriate foundation depths.
- 1.7 This report provides the results of the survey and includes the following:
 - A schedule of all trees located within, or in close proximity to the proposed development site (Appendix 1);
 - An assessment based on *BS 5837:2005*, of trees in terms of their potential value within any future development. On the basis of this assessment trees have been categorised into one of four categories: A, B, C or R (Appendices 1 & 2);
 - An assessment, based on *BS 5837:2005*, of the requirement for protection of trees during the construction phase (Section 5);
 - Advice on removal, retention and management of trees (Sections 4 and 6); and
 - A Tree Implications and Protection Plan detailing the development proposals, trees to be retained and protection fencing alignment (Drawing 1).

2.0 THE SITE AND SURROUNDINGS

- 2.1 The site is located to the north-east of Wrexham Industrial Estate. The survey area is bordered to the west by Bryn Lane and to the south and east by existing industrial units. An area of farmland allocated for development by a single-user in the Wrexham County Borough Council Local Development Plan is located to the north.
- 2.2 The development area currently comprises a grassed plateau that sits approximately 2.5m higher than the surrounding estate. Small clusters of trees have been planted at its fringe and along the sloped embankments rising to the plateau.

3.0 TREE PRESERVATION ORDERS AND OTHER STATUTORY PROTECTION

Tree Preservation Orders & Conservation Area Designations

- 3.1 Consultation with Wrexham County Borough Council confirmed that at the time of the survey no trees within the development boundary were subject to a Tree Preservation Order (TPO). The proposed development site does not lie within a Conservation Area.

Protected Species

- 3.2 Mature trees often contain cavities, crevices and hollows that offer potential habitat for species such as bats and birds. Both are afforded protection under the Schedule 1 and 5 of the *Wildlife and Countryside Act 1981* (as amended), as well as under Schedule 2 of the *Conservation (Natural Habitats) Regulations 1994* (as amended).
- 3.3 A preliminary ground level appraisal of the wildlife habitat value of each tree was undertaken as part of the arboricultural survey. Trees and groups listed in Table 1 were found to have features of a size and condition desirable to bats.

Table 1: Trees on site with bat potential

Tree number	Feature of bat potential
Groups	G3, G4

- 3.4 Should the presence of a bat roost be suspected whilst undertaking any works on trees and groups on site, operations must be halted until a licensed bat handler or ecologist can provide advice.
- 3.5 Nesting birds, their nests and eggs are protected under the *Wildlife and Countryside Act 1981* (as amended). It is an offence to intentionally or recklessly, damage or destroy nests and all tree work should ideally be undertaken outside the bird nesting season (March to September inclusive).

- 3.6 If this is not possible then a detailed inspection of each tree should be undertaken by a qualified ecologist immediately prior to the arboricultural works. Should an active nest be found (being built, containing eggs or chicks) then any work likely to affect the nest must be halted until the nest becomes inactive.

4.0 TREE POPULATION & DEVELOPMENT IMPLICATIONS

Population

- 4.1 16 trees (T1-T16) and 12 groups of trees (G1-G12) were surveyed on or within influencing distance of the development site. A schedule of their species, condition, age, BS 5837:2005 quality value and management recommendations is provided at Appendix 1.
- 4.2 Trees recorded as individuals are located in the south-eastern corner of the site. The collection is dominated by several vigorous, well-balanced ash trees above which rise the columnar forms of 6 Lombardy poplars to a height of 12 metres. A number of sycamore trees provide limited contribution due to their smaller size and more diffuse position on the southern edge of the grouping.
- 4.3 Groups G1 – G8 run along the top of a bank that defines the northern boundary of the survey area. The majority of groups are young to middle aged amenity planting and have established into specimens that display good individual form and condition.
- 4.4 Groups G9 and G12 are situated on a bank that runs along the northern and western boundaries respectively. Group G9 contains 31 middle aged white willow specimens with varying form and condition, collectively contributing to the visual amenity of the estate entrance. Group G12 is a line of middle aged ash specimens that have good form and vigour and have the potential to provide valuable screening to the development area from Bryn Lane.
- 4.5 Groups G10 and G11 comprise of shrub species such as hawthorn, blackthorn, grey willow and field maple. Although of limited arboricultural value they provide valuable foraging and habitat potential for birds and small mammals.
- 4.6 Tree and group locations, their quality categories and canopy spreads are shown on Drawing 1.

Tree Quality Categorisation

- 4.7 Under *BS 5837:2005 Trees in Relation to Construction – Recommendations* trees and groups are objectively assigned a quality category designed to quantify their value within any future development. Table 2 presents a summary of the categories presented in 'Table 1 – Cascade chart for tree quality assessment' of the British Standard. The full table has been reproduced at Appendix 2.

Table 2: BS 5837:2005 tree quality categories

Category A	Trees of high value including those that are particularly good examples of their species and/or those that are visually dominant within the landscape
Category B	Trees of moderate value including those that do not qualify as Category A due to minor remedial defects and/or those that collectively form distinct landscape features, thereby attracting a higher rating than they might as individuals
Category C	Trees of low value, the retention of which should not unreasonably constrain development
Category R	Trees unsuitable for long-term retention that should ideally be removed prior to the commencement of construction unless otherwise advised

Implications of the Proposed Development

- 4.8 Table 3 lists the BS 5837:2005 quality categories of trees that will require removal in order to facilitate the development proposals and those that can be retained. This is the result of an assessment based on the proposed site plan supplied by the client.

Table 3: Arboricultural implications of the proposed development

	Tree Quality Assessment Category/Retention Value			
	A	B	C	R
Trees and groups that can be retained	-	1 tree in G1, 3 trees in G2, G3, G5, G7, G9, G12	T6, G4, G6, G8, G10, G11	-
Trees and groups that require removal to facilitate development	-	5 trees in G2	T1, T2, T3, T4, T5, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, 6 trees in G1	-

See Appendix 1, Arboricultural Data Sheets for subcategories

- 4.9 15 Individual trees and part of 2 tree groups will require removal to facilitate the development proposals; totalling the loss of 26 trees.

5.0 TREE PROTECTION REQUIREMENTS

Root Protection Areas (RPAs) and Construction Exclusion Zones (CEZ)

- 5.1 As per *BS 5837:2005*, the **RPA** is calculated using the trees diameter at 1.5 metres (refer to Appendix 1) and represents the minimum area around each tree that must be left undisturbed to ensure their survival.
- 5.2 Tree roots spread on average two times the width of the crown. The majority of tree roots are found in the top 600 mm of soil and most of the fine roots that absorb water and nutrients are found in the top 100 mm.
- 5.3 The morphology of roots is influenced by past and present site conditions (the presence of roads, structures and underground services), soil type, topography and drainage. This means that a tree's roots may not be uniform in their extent and the **RPA** may not be a circular area centred on the tree stem.
- 5.4 The **RPA** for trees on site has been used to inform the **Construction Exclusion Zone (CEZ)** shown on Drawing 1. Where deemed appropriate this has included an extension of the **RPA** to include the canopy to prevent it being damaged by construction machinery.

Protective Fencing

- 5.5 Protective barrier fencing will be required to demarcate a **CEZ** around retained trees in close proximity to proposed construction. This must be installed prior to the commencement of any development works, including bringing machinery or materials onto site and the erection of site huts. Protective fencing alignment is shown on Drawing 1 and assumes that all trees identified for removal have been felled prior to installation.
- 5.6 The fencing must be fixed into the ground to withstand accidental impact from machinery and to ensure that a sufficient protective area is maintained. Details of the recommended Heras protective fencing are shown in Drawing 2.
- 5.7 Where it is not practicable to install the recommended fencing specification due to site topography or other immovable object, then an alternative fencing design will need to be agreed with the Council's Arboricultural Officer prior to installation.
- 5.8 Any alteration to the fencing alignment to allow for approved activities will be made in agreement with the Council's Arboricultural Officer.
- 5.9 The protective fencing must not be removed until the physical construction phase has been completed and all vehicles have been removed from site, to the satisfaction of the Council's Arboricultural Officer

Ground Contamination

- 5.10 Storage areas for liquids such as fuels, oil or paint should not be located within 10m of any trees on or within proximity the site due to the risk of soil contamination caused by accidental spillage.
- 5.11 If contamination does occur, then remediation advice should be sought from a qualified arboriculturist.

Underground Utility Issues

- 5.12 Guidelines set out in the National Joint Utilities Group publication *NJUG Volume 4, Guidelines for the Planning, Installation and Maintenance of Utility apparatus in Proximity to Trees* will be adhered to during excavation works close to or partially within RPAs.
- 5.13 NJUG Volume 4 can be downloaded free of charge from – <http://www.njug.org.uk>

6.0 ARBORICULTURAL RECOMMENDATIONS

Trench Excavation

- 6.1 The requirement for trench excavation within the Construction Exclusion Zone surrounding group G3 has been identified to facilitate connection with existing pipe work.
- 6.2 In order to minimise potential damage to retained trees it will be necessary for any excavation within the CEZ to be carried out in a controlled and sensitive manner.
- 6.3 The existing vegetation will be skimmed by hand to assess the presence of any underlying surface roots. The trench will then be excavated using handtools to the required depth. During this process, any roots encountered will be excavated back to the trench face; roots smaller than 25mm in diameter may be pruned back (ideally to a lateral root branch) using bypass secateurs or handsaw. Roots larger than 25mm should not be removed without prior consultation with a qualified Arboricultural Consultant and retained where practicable.
- 6.4 The Tree Officer at Wrexham County Borough Council should be notified at least 48 hours in advance of the work taking place.

Arboricultural Method Statements

- 6.5 Should a requirement for construction activities other than those outlined above be identified within the **CEZ**, then consultation with a qualified Arboricultural Consultant must be sought. This will assess the feasibility of any such requirements and identify any special measures that will need to be taken to minimise disturbance and ensure successful tree survival. Any activities proposed within the **CEZs** identified on Drawing 1 will require an Arboricultural Method Statement.
- 6.6 Special mitigation construction works are likely to require more time and proprietary materials, thus discussions as early as possible in the development process will help with resource allocation.

Mitigation Landscaping and Post Development Management

- 6.7 A total of 22 trees will be lost as a result of the development. 17 of these are of low value and the remainder are of moderate value under BS 5837:2005.
- 6.8 Mitigation for the loss of trees and associated habitats will be provided in the form of replacement tree planting. The extent of mitigation planting will be determined in agreement with Wrexham County Borough Council.
- 6.9 It is the recommendation of this report that the proposed tree loss can be adequately mitigated for through a replacement planting scheme similar to that indicated on Drawing 1, provided that trees of a suitable size, quality and species are selected. This should include species of varied ultimate size and height, incorporating where possible the larger tree species with the potential to provide benefit beyond their immediate environment and to a more diverse range of ecology (for example oak, lime, beech, ash etc.).
- 6.10 Aftercare is vital to the survival of newly planted trees. Provision should be made for the maintenance of newly planted trees and include watering, formative pruning and the checking of tree ties and stakes.
- 6.11 Hazard recommendations are based on observations at the time of survey. Trees are dynamic living organisms whose structure is constantly changing. Even those in good condition can suffer from damage or stress. Following site development, regular (annual or biannual) inspections of all retained trees should be undertaken by a qualified Arboricultural Consultant.

7.0 SUMMARY

- 7.1 Based on an objective assessment made in accordance with *BS 5837:2005 Trees in Relation to Construction – Recommendations*, there are 6 Category B groups and 22 Category C trees/groups and 16 on or near to the area of development.
- 7.2 A total of 26 trees will require removal to facilitate the development proposals. Of these, 5 are of moderate value (Category B) and 21 are of low value (Category C).
- 7.3 At the time of the survey no trees within or immediately adjacent to the site were subject to Tree Preservation Orders or within a Conservation Area.
- 7.4 Groups G3 and G4 were found to have features of a size and condition desirable to bats.
- 7.5 Protective barrier fencing will be required to demarcate a **Construction Exclusion Zone (CEZ)** around retained trees prior to the commencement of development. Fencing alignment is shown on Drawing 1 and details of the recommended Heras fencing are shown on Drawing 2.
- 7.6 Trench excavation within the CEZ of group G3 will need to be carried out by hand.
- 7.7 An **Arboricultural Method Statement (AMS)** will be required where construction activities, other than those detailed in subsection 6.1 - 6.4, cannot be avoided within the **CEZs** shown on Drawing 1. The **AMS** will detail 'special mitigation construction and procedure' that will minimise damage to tree roots and the surrounding soil.
- 7.8 Mitigation for the loss of trees and associated habitats will be provided in the form of replacement tree planting. The extent of mitigation planting will be determined in agreement with Wrexham County Borough Council.

APPENDIX 1

ARBORICULTURAL SURVEY DATA SHEETS

APPENDIX 1: Arboricultural Survey Data Sheets



Surveyor JS
Date 08.01.10 and 12.11.10
Town Wrexham
Site Green Plan Energy Ltd
Dwg Ref D2264.003 Rev A

Ref	Species	Height	Stem Dia.	No. of stems/individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA	Management Recommendations	Estimated Remaining Contribution
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature, Veteran	Good, Fair, Poor		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short
Trees																	
T1	Common ash	8.0	330.0	1.0	4.0	4.0	4.0	4.0	2.0	Middle Age	Good	Vigorous tree of good form and future potential.	C,1	4.0	49.3		Long
T2	Common ash	9.0	260.0	1.0	3.0	3.0	3.0	3.0	2.0	Middle Age	Good	Vigorous tree of good form. Good future potential. Recently crown raised.	C,1	3.1	30.6		Long
T3	Lombardy poplar	1.0	520.0	9.0	2.0	2.0	2.0	2.0	2.0	Middle Age	Good	Typical form for species. No visible defects. Minor basal epicormic shoot growth.	C,1	5.2	84.9		Long
T4	Common ash	8.0	280.0	1.0	4.0	4.0	3.0	3.0	2.0	Middle Age	Good	Vigorous tree of good form. Good future potential. Recently crown raised.	C,1	3.4	35.5		Long
T5	Common ash	8.0	320.0	1.0	4.0	3.0	4.0	4.0	2.0	Middle Age	Good	Vigorous tree with a slightly atypical conical crown form. Good future potential. Recently crown raised.	C,1	3.8	46.3		Long
T6	Common ash	9.0	300.0	1.0	3.0	3.0	4.0	4.0	1.0	Middle Age	Good	Vigorous tree of good form. Recently crown raised.	C,1	3.6	40.7		Long
T7	Sycamore	3.0	100.0	1.0	2.0	1.0	2.0	2.0	1.0	Young	Good	Established planting of reasonable form.	C,1	1.2	4.5		Long
T8	Lombardy poplar	1.0	580.0	12.0	3.0	2.0	1.0	3.0	2.0	Middle Age	Good	Typical form for species. No visible defects. Minor basal epicormic shoot growth.	C,1	5.8	105.7		Long
T9	Lombardy poplar	1.0	450.0	1.0	2.0	2.0	2.0	2.0	2.0	Middle Age	Good	Typical form for species. No visible defects. Minor basal epicormic shoot growth.	C,1	5.4	91.6		Long
T10	Lombardy poplar	1.0	470.0	5.0	2.0	1.0	1.0	1.0	2.0	Middle Age	Good	Typical form for species. No visible defects. Minor basal epicormic shoot growth.	C,1	4.7	69.4		Long
T11	Lombardy poplar	1.0	480.0	12.0	2.0	2.0	2.0	1.0	2.0	Middle Age	Good	Typical form for species. No visible defects. Minor basal epicormic shoot growth.	C,1	4.8	72.4		Long
T12	Sycamore	3.0	90.0	1.0	1.0	1.0	1.0	1.0	2.0	Young	Good	Established planting of reasonable form.	C,1	1.1	3.7		Long
T13	Lombardy poplar	1.0	430.0	1.0	2.0	2.0	2.0	1.0	2.0	Middle Age	Good	Typical form for species. No visible defects. Minor basal epicormic shoot growth.	C,1	5.2	83.6		Long
T14	Sycamore	6.0	220.0	1.0	3.0	2.0	3.0	2.0	2.0	Middle Age	Good	Established planting of good form.	C,1	2.6	21.9		Long
T15	Sycamore	5.0	130.0	1.0	2.0	2.0	2.0	2.0	2.0	Young	Good	Established planting of reasonable form. Minor basal mower damage.	C,1	1.6	7.6		Long
T16	Sycamore	5.0	150.0	1.0	2.0	2.0	2.0	2.0	2.0	Young	Good	Established planting of good form.	C,1	1.8	10.2		Long
Groups																	
G1	London Plane	to 12								Young	Good	5 trees in group. Linear planting.	C,2				Long
G2	Poplar sp.	to 17								Middle Age	Good	Linear planting. Trees of form typical to species.	B,2				Long

APPENDIX 1: Arboricultural Survey Data Sheets

Ref	Species	Height	Stem Dia.	No. of stems/individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA	Management Recommendations	Estimated Remaining Contribution
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature, Veteran	Good, Fair, Poor		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short
G3	Ash	to 12								Middle Age	Good	4 trees in group. Structured planting. All individually of good form.	B,1,2				Long
G4	Silver Birch	to 8								Middle Age	Good	3 trees in group. Structured planting.	C,2				Long
G5	White Willow	to 18								Middle Age	Good	5 trees in group, all basally multi-stemmed with tight unions.	B,1,2				Long
G6	Hawthorn	to 4								Middle Age	Good	3 trees in group. Shrubby trees of reasonable form.	C,1,2				Long
G7	Silver Birch	to 7								Middle Age	Good	2 trees in group, reasonable form.	B,2				Long
G8	Crack Willow	to 7								Young to Middle Age	Poor	3 trees in group of poor form. Previous branch failures.	C,2				Medium
G9	White Willow	to 16								Middle Age	Fair	31 trees of mixed form and condition. Structured planting along existing site entrance. Minor deadwood and decay.	B,2			Monitor decay of affected trees	Long
G10	hawthorn, Blackthorn, Cherry, Field Maple	to 4								Middle Age	Good	Dense vegetation. Good bird habitat.	C,3				Long
G11	Grey Willow	to 6								Mature	Fair	Group of shrubby, multi-stemmed trees around old pond area. Some broken branches and minor deadwood.	C,2				Medium
G12	Ash	to 9								Middle Age	Good	Linear planting providing screening. Trees are of good form and are vigorous. Minor inclusions.	B,2				Long

APPENDIX 2

SURVEY METHODOLOGY

APPENDIX 2: ARBORICULTURE SURVEY METHOD

Arboricultural surveys are conducted from ground level only. The nature of the soils on site is not assessed during the survey. The possibility of minor soil movement due to the root activity of the trees cannot be discounted; therefore, the advice of a structural engineer should be sought with regard to appropriate foundation depths.

Trees are dynamic living organisms with a constantly changing structure; even trees in good condition can suffer from damage or stress. Regular annual or bi-annual inspections by a qualified arboriculturalist can help to identify potential problems before they become acute.

The following features of each tree, group of trees or wood may have been recorded in the Arboricultural Data Sheets (Appendix One).

Species	The common name is given. The Latin name may also be given if further clarification is required.	
Height	Top height of tree recorded in metres.	
Stem Diameter	For single-stemmed trees the measurement is taken at 1.5 metres above ground level and recorded in millimetres. For multi-stemmed trees the measurement is taken directly above the root flare in millimetres. For tree groups the measurement is taken in the same way as with single-stemmed trees and is recorded in millimetres as a range from minimum to maximum diameters.	
No. of Stems	A count of stems arising below a height of 1.5m.	
Crown Spread	The N, S, E and W branch spreads are recorded in metres to provide a representative crown shape.	
Height of Lowest Branch	Crown clearance above ground level recorded in metres.	
Tree Age	Young	Trees than can reasonably be relocated or replaced like for like, without undue cost;
	Middle Age	Trees in the established growth stage of their life with the potential to continue increasing in size;
	Mature	Trees that have reached their ultimate size, given their location and surroundings;
	Veteran	A tree recognised by features of a biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.

Condition

An overall assessment of a tree's physiological and structural state in which factors that may increase its susceptibility to the effects of development are taken into account.

Comments

A brief evaluation and description of the tree with comments on the form, vitality, health and any significant defects that may be present.

Trees are surveyed without reference to any proposed development. The implications of any development are discussed in the Arboricultural Implication Assessment.

Tree Quality Assessment

The tree quality assessment is based on Table 1 of BS 5837:2005 (See below). Four categories (A, B, C and R) are used to denote tree quality (A = High, B = Moderate, C = Low, R = Unsuitable for retention). Subcategories (1-3) denote the specific function value of the trees and the reasoning behind the assessment (the subcategories may be used in combination but do not accumulate collective weight).

BS 5837 Root Protection Area (RPA)

The Root Protection Area (RPA) is allocated to ensure that a sufficient area is left undisturbed during development to prevent direct and indirect damage to tree roots and the soil structure.

The RPA is calculated using a mathematical equation included in BS 5837:2005 (Table 2) and is based on a trees stem diameter. In some cases the RPA may need to be adapted to ensure survival based on criteria such as the tree's condition, species and crown spread. Any alteration should be justifiable but is made at the arboriculturists discretion.

The surrounding RPA should remain undisturbed and be treated as a sacrosanct Construction Exclusion Zone (CEZ) until development completion and removal is approved by an arboriculturist.

APPENDIX 2: ARBORICULTURE SURVEY METHOD

Recommendations

Recommendations for arboricultural works, etc. are based on the **current** land use, and take into account the tree or group attributes without bias to the proposed development.

Estimated Remaining Contribution

An estimation of the trees useful life expectancy.

Long	> 40 years
Medium	20 – 40 years
Short	10 – 20 years
Very Short	< 10 years

Table 1 — Cascade chart for tree quality assessment

TREES FOR REMOVAL				
Category and definition	Criteria			Identification on plan
Category R Those in such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed for reasons of sound arboricultural management	• 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 R category trees (i.e. 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 (e.g. Dutch elm disease), or very low quality trees suppressing adjacent trees of better quality NOTE: Habitat reinstatement may be appropriate (e.g. R category tree used as a bat roost: installation of bat box in nearby tree).			DARK RED
TREES TO BE CONSIDERED FOR RETENTION				
Category and definition	Criteria — Subcategories			Identification on plan
	1 Mainly arboricultural values	2 Mainly landscape values	3 Mainly cultural values, including conservation	
Category A Those of high quality and value: in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested)	Trees that are particularly good examples of their species, especially if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands which provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance (e.g. avenues or other arboricultural features assessed as groups)	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	LIGHT GREEN
Category B Those of moderate quality and value: those in such a condition as to make a significant contribution (a minimum of 20 years is suggested)	Trees that might be included in the high category, but are downgraded because of impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage)	Trees present in numbers, usually as groups or woodlands, such that they form distinct landscape features, thereby attracting a higher collective rating than they might as individuals but which are not, individually, essential components of formal or semi-formal arboricultural features (e.g. trees of moderate quality within an avenue that includes better, A category specimens), or trees situated mainly internally to the site, therefore individually having little visual impact on the wider locality	Trees with clearly identifiable conservation or other cultural benefits	MID BLUE
Category C Those of low quality and value: currently in adequate condition to remain until new planting could be established (a minimum of 10 years is suggested), or young trees with a stem diameter below 150 mm	Trees not qualifying in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary screening benefit	Trees with very limited conservation or other cultural benefits	GREY
NOTE: Whilst C category trees will usually not be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150 mm should be considered for relocation.				

British Standards Institute 2005, p.6

NOTE: All young trees are assessed as category 'C' quality but this does not preclude their retention within a development; all retention and removal recommendations will be detailed within the Arboricultural Implications Assessment report.

DRAWING 1

TREE IMPLICATIONS AND PROTECTION PLAN

DRAWING 2

RECOMMENDED TREE PROTECTION FENCING

