

R I C H A R D S
M O O R E H E A D & L A I N G L T D

PROPOSED RESTORATION OF LAND AT CEFN Y BEDD

Arboricultural survey (BS5837:2005)

for

JOHN WILLIAMS

January 2012

2909/11/Arboriculture survey



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ENGINEERING, ENVIRONMENTAL and LANDSCAPE CONSULTANTS

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Prepared by:	Simon Cope	Date:	19.01.2012
Checked by:	Stephen Blunt	Date:	23.01.2012
Approved by:		Date:	

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55 WELL STREET, RUTHIN, DENBIGHSHIRE. LL15 1AF Tel: +44 (0)1824 704 366 Fax: +44 (0)1824 705 450

E mail: rml@rmlconsult.com Web: www.rmlconsult.com
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CONTENTS

	Page no.
1 INTRODUCTION	1
1.1 Background	1
1.2 Constraints	1
1.3 Surveyor qualifications	2
2 SURVEY METHOD	3
2.1 Coverage	3
2.2 Data gathered	3
3 RESULTS	5
3.1 Summary of tree descriptions	5
4 ARBORICULTURAL IMPLICATIONS ASSESSMENT	6
4.1 Introduction	6
4.2 Current value	6
4.3 Impact assessment	6
4.4 Constraints on development	7
5 RECOMMENDATIONS	8
5.1 Introduction	8
5.2 Arboricultural Method Statement	8
5.3 Other arboricultural recommendations	9
6 REFERENCES	10

List of Tables

Table 1 Potential impacts of the development on the trees adjacent to the construction zone. 7

Appendices 1-5

Appendix 1 Arboricultural survey results

Appendix 2 Tree constraints plan

Appendix 3 Criteria for the assessment of tree quality (taken from BS5837:2005)

Appendix 4 Photographs

Appendix 5 Tree Protection Plan

1 INTRODUCTION

1.1 Background

- 1.1.1 The site at Cefn-y-bedd has previously been quarried to extract sand and gravel, and then partially filled with imported colliery spoil leaving an uneven topography which has been covered by grassland, ponds, woodland and scrub. An ecological survey conducted in 2010 provides a more detailed description of the site vegetation, although considerable disturbance and surface erosion has since been caused by unauthorised motorcycle activity. The site is bounded to the west by a fragment of ancient woodland growing on the medieval archaeological feature of Wat's Dyke, to the north by Gwastad Hall and a bungalow known as Lane End, to the east by Park Road, and to the south by reclaimed agricultural land.
- 1.1.2 A planning application for the infilling and restoration of the site is currently under consideration by the planning authority. The proposed fill would merge into the western edge of the former quarry at a level below that of the undisturbed Wat's Dyke, as shown in the planning application drawings, while leaving the most ecologically valuable areas intact.
- 1.1.3 This report presents the findings of an arboricultural survey (to BS5837:2005) that was carried out on 17th January 2012. It assesses the impact of the proposed works; and it provides a method statement that will allow the work to progress with the minimum negative impact on the trees.
- 1.1.4 The detailed findings of the survey are presented in **Appendix 1**, the precise locations of the trees surveyed are shown on the Tree Constraints Plan in **Appendix 2**, the detailed criteria for assessing tree quality are presented in **Appendix 3**, a selection of photographs of the trees are included in **Appendix 4**, and the Tree Protection Plan is presented in **Appendix 5**.

1.2 Constraints

- 1.2.1 The survey was carried out during good weather conditions. The trees had lost their leaves, so this source of information regarding their health was lacking.

- 1.2.2 Trees are living organisms whose health may be adversely affected at any time by a wide range of factors. Consequently, the information contained within this report is only valid for one year.

1.3 Surveyor qualifications

- 1.3.1 The surveyor gained a Distinction in the Royal Forestry Society Certificate in Arboriculture in 2000, and is an associate member of the Arboricultural Association. The work follows their best practice guidelines.
- 1.3.2 The surveyor is also a highly trained ecologist holding licences for statutorily protected species, and his knowledge and experience of British wildlife along with considerable experience as a working arborist (since 1998), significantly enhance his ability to provide well-informed practical arboricultural advice.

2 SURVEY METHOD

2.1 Coverage

- 2.1.1 In the preliminary arboricultural report (RML 2010), all of the trees within or adjacent to the construction zone were classified as Category 3 trees, according to the quality criteria given in BS5837:2005.
- 2.1.2 In this survey, all significant trees on or adjacent to the eastern and northern boundaries of the site have been individually recorded. Since nearly all of the trees have arisen by natural regeneration from common and widespread species, and none are particularly attractive or unusual in any way, ‘significant’ in this case was taken to mean all trees that have grown beyond the ‘young’ age classification. Two additional trees on the eastern side of the site were also included because they lie in the vicinity of the proposed site entrance from the public highway. All of these trees were tagged and accurately located by topographic survey (see **Appendix 2**).
- 2.1.3 Trees higher on Wat’s Dyke, and more distant from the northern boundary, were not individually recorded where their RPA would be outside the zone that could be influenced by the proposed site restoration works.

2.2 Data gathered

- 2.2.1 The methodology followed Arboricultural Association best practice guidelines (Fay *et al.*, 2005) and additional guidance given in BS5837:2005. All plant names are taken from Stace (2010). The following data were recorded for each tree or group:
- Height;
 - Stem Diameter at Breast Height (DBH) – measured at 1.5m above ground (upslope on sloping ground, above root flare on multi-stemmed trees);
 - Crown spread – in four cardinal directions, and;
 - Age class – Young (Y), Mature (M), Senescent (S) or Veteran (V).
- 2.2.2 The radius of the Root Protection Area (RPA) for each tree/group is given (single stem DBH × 12, multi-stem DBH × 10).

- 2.2.3 Tree condition was evaluated using the Visual Tree Assessment (VTA) protocol described by Lonsdale (1999), aided by Mattheck & Breloer (1998) and Strouts & Winter (1998). This involves a systematic, non-invasive, ground-based examination of each tree (aided by binoculars), looking for signs of ill-health, vulnerability or damage and their causes.
- 2.2.4 The physiological and structural condition of each tree was graded (good, fair, poor or physiologically dead). This is a judgement based on the knowledge and experience of the surveyor, and is derived from elements of the VTA and the known characteristics of the tree species.
- 2.2.5 The remaining contribution of each tree was noted: <10, 10-20, 20-40 or >40 years. This can only be an informed opinion based on the surveyor's experience and the current condition of the tree.

3 RESULTS

3.1 Summary of tree descriptions

- 3.1.1 A total of 25 trees and one group of trees were recorded during the survey, and the detailed findings are presented in **Appendix 1**.
- 3.1.2 In summary, the majority of these trees are fully mature specimens (15 trees), with lower numbers of trees on the cusp between young and mature growth stages, i.e., just acquiring the stature and ability to produce large amounts of seed. One tree (#1435) is dead and has collapsed.
- 3.1.3 A wide range of species were found, including Pedunculate oak (*Quercus robur*), Sycamore (*Acer pseudoplatanus*), Holly (*Ilex aquifolium*), Downy Birch (*Betula pubescens*), Wych Elm (*Ulmus glabra*), Wild Cherry (*Prunus avium*), Ash (*Fraxinus excelsior*), Scots Pine (*Pinus sylvestris*), Goat Willow (*Salix caprea*) and Elder (*Sambucus nigra*).
- 3.1.4 Most of the trees are in good or fair physiological and structural condition, in keeping with their age, although the dead tree and its near-neighbours (#1436 and #1438) have a pronounced lean, and are perhaps only held up by the adjacent trees. The root plates of trees #1441 and #1443 have been undercut by erosion along the original line of quarry excavation, and their structural integrity has been compromised.
- 3.1.5 Approximately half of the trees in the line of Holly trees adjacent to (outside) part of the northern boundary have been pruned, i.e., topped at about three metres and delimbed, and are currently re-sprouting vigorously.
- 3.1.6 In keeping with their ages, most of the trees are predicted to have a long life ahead of them (>40 years), barring unforeseen circumstances.

4 ARBORICULTURAL IMPLICATIONS ASSESSMENT

4.1 Introduction

- 4.1.1 This section sets out the current value of the trees on the site and discusses how that value would change as a result of the proposed development. It also identifies any constraints on the development that arise from the protection of the trees.

4.2 Current value

- 4.2.1 All of the trees were assessed with regard to their quality and assigned to a category in accordance with the guidelines given in BS5837. Under this scheme, trees can be of high, moderate or low quality (Category A, B and C respectively), due to their arboricultural, landscape and/or cultural value (sub-categories 1, 2 or 3). Often, trees qualify in more than one category, in which case the highest qualification level is given. Category R trees are recommended for immediate removal for over-riding reasons of poor condition. The detailed definitions of the criteria are given in **Appendix 2**.
- 4.2.2 The majority of the trees surveyed are in quality Category C. They are naturally-regenerated, commonly-occurring pioneer species; they are of no special arboricultural value, are of relatively low landscape value and have limited conservation and cultural value. Any wildlife value that they do lend to the site will be maintained by the retention of the designated ‘nature conservation areas’.
- 4.2.3 Only three trees attain Category B status: Trees #1428 and #1430 are mature Pedunculate Oaks, valuable in landscape and wildlife conservation terms as part of the adjacent woodland to the east, and tree #1444 is a mature Scots Pine that has moderate arboricultural and landscape value. All of these are well outside the construction zone, and were included for the sake of completeness.
- 4.2.4 Four trees (#1435, #1436, #1438 & #1441) are judged to be structurally unsafe and their removal is recommended (Category R).

4.3 Impact assessment

- 4.3.1 The construction zone will extend up to the 80.0m contour in the northern half of the site. This will entail the felling of all trees within the construction zone, including

tagged trees #1442, #1448, #1449, #1451 and #1452. Trees adjacent to this zone may be damaged by site traffic during the construction process. Table 1 outlines the implications of such damage.

Table 1 Potential impacts of the development on the trees adjacent to the construction zone.

EVENT	LIKELIHOOD	SIGNIFICANCE	DURATION OF HARM
Localised compacting and crushing of tree root networks by machinery	Moderate	Moderate – interruption of water/nutrient supply, provide access for pathogens	Immediate and residual
Collision with machinery	Moderate	Moderate - interruption of water/nutrient supply, provide access for pathogens	Immediate and residual

4.4 Constraints on development

- 4.4.1 The trees outside the construction zone, and their RPAs, should be avoided by site traffic during the construction process. Access across the site, both during and after construction, should be carried out in accordance with the method statement given in Section 5.

5 RECOMMENDATIONS

5.1 Introduction

- 5.1.1 A Tree Protection Plan is given in **Appendix 4**; the following arboricultural method statement will allow the work to progress with negligible negative impact on the trees.

5.2 Arboricultural Method Statement

Protection of the Root Protection Zone

- 5.2.1 If possible, exclude all site traffic (vehicular and pedestrian) and works from the RPAs shown on the Tree Protection Plan in **Appendix 5**. This exclusion can be achieved by the erection of barriers, which should be fit for purpose and maintained upright and complete. This will effectively establish a Construction Exclusion Zone (CEZ), which should not be used to stockpile materials and store machinery during the development.
- 5.2.2 If the passage of some site traffic over the RPA cannot be avoided, ground protection should be installed as follows: i) pedestrian traffic - a single thickness of scaffold planks on top of a compressible layer laid onto a geotextile; ii) vehicular traffic - the ground protection should be formulated by a suitably qualified person using a no-dig design to accommodate the likely loading, e.g., CellWeb (http://www.geosyn.co.uk/products/cellweb-trees.asp?product_id=21). Where the new access would cover more than 20% of the RPA, or be wider than 3m within it, it should be constructed so as to allow moisture infiltration and gaseous diffusion.
- 5.2.3 Ground levels should not be lowered within the RPA. If levels must be raised, the fill should be a granular material that does not inhibit vertical gaseous diffusion.
- 5.2.4 New impermeable surfaces within the RPA should be restricted to a maximum width of 3m and situated tangentially to one side of a tree only, or confined to an area no greater than 20% of the RPA, whichever is the smaller.
- 5.2.5 Excess water in the RPA should be avoided. Any adjacent landscaping works should promote drainage away from the trees to prevent ponding and water-logging.

- 5.2.6 Use no-dig, trenchless excavation techniques for the installation of underground services within the RPA where possible. As a last-resort alternative to machine-cut trenches, hand-dig a trench along the shortest distance across the relevant RPA.
- 5.2.7 Any excavations which have to be undertaken within the RPA should be carried out carefully by hand or by using an air-spade, avoiding damage to the protective bark covering larger roots. While exposed, these roots should be wrapped in dry, clean hessian sacking. Roots smaller than 25mm diameter may be pruned back, preferably to a side branch, using a sharp cutting tool such as secateurs, loppers or a handsaw. Roots larger than 25mm should only be severed following consultation with an arboriculturist. Prior to backfilling, any hessian wrapping should be removed, and retained roots should be surrounded by sharp sand (not builder's sand) before soil or other material is replaced. This material should be free of contaminants and other foreign objects potentially injurious to tree roots.
- 5.2.8 If hard standing within the RPA does need to be removed using an excavator, park the excavator outside the RPA and reach in with the hydraulic arm, keeping the weight of the machine outside the RPA

5.3 Other arboricultural recommendations

- 5.3.1 All tree work should be carried out to BS3998 by appropriately qualified personnel.
- 5.3.2 Trees #1435, #1436, #1438, #1441, #1442, #1448, #1449, #1451 and #1452 should be felled. In order to retain some wildlife conservation value, the wood should be left in large sections, and placed in the adjacent woodland. The brash can also be stacked nearby.

6 REFERENCES

- BS5837:2005 'Trees in relation to construction – Recommendations.' British Standards Institute
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APPENDIX 1

Arboricultural survey results

Tree no.	Species	Height (m)	Stem Ø (cm)	RPA radius (m)	Crown spread (m)				Crown clearance (m)	Age class	Physiological condition	Structural condition	Remaining contribution (yrs)	Quality Grade
					N	E	S	W						
1428	<i>Quercus robur</i>	16	86M	8.60	6	6	5	4	3	Mature	Good – minor deadwood	Good – minor deadwood	>40	B2/C2
1429	<i>Acer pseudoplatanus</i>	10	39	4.68	5	8	5	0	2	Mature	Fair – suppressed by shade	Fair – poor balance, minor deadwood, wire included	>40	C
1430	<i>Quercus robur</i>	15	64	7.68	6	4	3	5	4	Mature	Good – minor deadwood	Good – minor deadwood	>40	B2/C2
1431	<i>Ilex aquifolium</i>	10	59M	5.90	3	4	3	3	0	Mature	Good	Good	>40	C
1432	<i>Betula pubescens</i>	18	35	4.20	3	3	4	3	4	Mature	Good – minor deadwood	Good – minor deadwood	20-40	C
1433	<i>Ulmus glabra</i>	17	38	4.52	8	5	5	4	3	Young - mature	Good – minor deadwood	Good – minor deadwood	>40	C
1434	<i>Ulmus glabra</i>	15	39	4.64	6	6	4	1	2	Young - mature	Good – minor deadwood	Good – minor deadwood	>40	C
1435	<i>Prunus avium</i>	8	35	4.20	1	14	1	0	0	Dead	Dead	Poor – collapsed & lodged	10-20	R
1436	<i>Prunus avium</i>	12	36	4.32	4	12	2	0	1	Mature	Fair – suppressed by shade	Poor – partially collapsed & lodged	10-20	R
1437	<i>Prunus avium</i>	11	41M	4.10	5	8	3	0	3	Mature	Good	Fair – poor balance	20-40	C

Tree no.	Species	Height (m)	Stem Ø (cm)	RPA radius (m)	Crown spread (m)				Crown clearance (m)	Age class	Physiological condition	Structural condition	Remaining contribution (yrs)	Quality Grade
					N	E	S	W						
1438	<i>Prunus avium</i>	14	31	3.72	2	6	5	3	1	Mature	Good – minor deadwood	Poor – poor balance, possible movement of root plate, minor deadwood	10-20	R
1439	<i>Quercus robur</i>	15	39	4.68	4	11	4	2	3	Mature	Good – minor deadwood	Fair – poor balance, minor deadwood	>40	C
1440	<i>Fraxinus excelsior</i>	18	43M	4.30	2	6	6	3	5	Young - mature	Good – minor deadwood	Good – minor deadwood, wire included	>40	C
1441	<i>Acer pseudoplatanus</i>	17	104M	10.40	6	8	6	7	1	Mature	Good	Fair -exposed decay pocket at base, tight forks with included bark, wire included, root plate undercut	<10	R
1442	<i>Ulmus glabra</i>	20	66M	6.60	9	8	4	2	2	Mature	Good – minor deadwood	Good – minor deadwood, included bark in basal fork	>40	C
1443	<i>Fraxinus excelsior</i>	13	106M	10.60	8	9	8	8	2	Young – mature (coppice)	Good – minor deadwood	Good – minor deadwood, root plate undercut	>40	C

Tree no.	Species	Height (m)	Stem Ø (cm)	RPA radius (m)	Crown spread (m)				Crown clearance (m)	Age class	Physiological condition	Structural condition	Remaining contribution (yrs)	Quality Grade
					N	E	S	W						
1444	<i>Pinus sylvestris</i>	18	60	7.20	3	6	4	3	6	Mature	Good – minor deadwood	Poor – root plate undercut by excavation to west, poor balance, minor deadwood	10-20	A2/B2
1445	<i>Fraxinus excelsior</i>	11	59M	5.90	4	4	3	3	0	Young - mature	Good	Fair – one main stem removed, cavity and distorted stem @ 6m	>40	C
1446	<i>Acer pseudoplatanus</i>	13	32	3.84	4	4	2	4	5	Mature	Fair – moribund branches due to squirrel-stripped bark	Fair – wounds (squirrel-damage), minor deadwood	>40	C
1447	<i>Ulmus glabra</i>	13	43	5.16	5	6	7	1	2	Young - mature	Good	Good	>40	C
1448	<i>Acer pseudoplatanus</i>	8	33M	3.30	4	4	4	4	0	Young	Good	Good	>40	C
1449	<i>Sambucus nigra</i>	5	23M	2.30	3	2	3	3	1	Mature	Good	Good	20-40	C
1450	<i>Pinus sylvestris</i>	6	17	2.04	3	3	3	3	0	Young	Good	Good	>40	C
1451	<i>Salix caprea</i>	9	160M	16.00	3	7	7	6	0	Mature	Good	Fair – partially collapsed stem	20-40	C

Tree no.	Species	Height (m)	Stem Ø (cm)	RPA radius (m)	Crown spread (m)				Crown clearance (m)	Age class	Physiological condition	Structural condition	Remaining contribution (yrs)	Quality Grade
					N	E	S	W						
1452	<i>Ulmus glabra</i>	14	28	3.36	5	5	4	4	3	Young - mature	Good	Good	>40	C
-	<i>Ilex aquifolium</i> hedge	≤9	≤25	2.50	4	1	4	4	0	Mature	Good	Good – the trees in the western half of this hedge have been topped @ 3m and side branches have been removed	>40	C

APPENDIX 2

Tree Constraints Plan



Client / Client:

MOORBRIDGE CONSTRUCTION LIMITED
Cedar Bank
12 Rhyddyn Hill
Wrexham LL12 9EB

Enw project / Project name:

**RESTORATION OF LAND
PARK ROAD, CEFN Y BEDD**

Tefl Huniad / Drawing title:

Tree Constraints Plan

Eglurhad / Key:

- Significant tree
- Category R
Trees which should be removed
- Category A
Trees of high quality and value
- Category B
Trees of moderate quality and value
- Category C
Trees of low quality and value
- Root protection area (RPA)
- Significant Japanese Knotweed stand
- Extent of ground disturbance
- Trees and shrubs
- Trees and shrubs to be removed
- Proposed boundary fence
- Proposed security fence
- Proposed vehicular access gate
- Indicative site and access layout
- Existing terrain (contours at 1.0 m intervals)

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01	19/01/2012	Issued for information	RHE	SMB	IGR

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Dyddiad / Date: Jan 2012

Rheolwr / Checked by: RHE

Arddangoswr / Drawn by: SMB

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Richards Moorehead & Laing Ltd

55 Stryd Y Ffynnon, Rhuthun, Sir Ddinbych, LL15 1AF,
55 Well Street, Ruthin, Denbighshire, LL15 1AF, UK.

Rhif Ffôn/Fax: +44 (0)1824 708466, Ffôn/Fax: +44 (0)1824 708465,
e-bost/e-mail: rm@richardsmoorehead.co.uk, laing@richardsmoorehead.co.uk

APPENDIX 3

Criteria for the assessment of tree quality (taken from BS5837:2005)

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 category R trees, i.e., where, for whatever reason, the loss of companion shelter cannot be mitigated for by pruning; - Trees that are dead, or are showing signs of significant, immediate and irreversible 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., EPS mitigation and compensation.			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 Trees of high quality and value: those in such a condition as to be able to make a substantial contribution (min. 40 yrs).	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 Trees of moderate quality and value: those in such a condition as to make a significant contribution (min. 20 yrs).	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, category A 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 Trees of low quality and value: those currently in adequate condition to remain until new planting could be established (min. 10 yrs), or young trees with a stem diameter of less than 15cm.	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 Category C trees will not usually be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 15cm should be considered for relocation.			

APPENDIX 4

Photographs



Photo 1. Tree #1428
(a Pedunculate Oak)
suppressing tree #1429
(a Sycamore).

Photo 2. Tree #1431 (a Holly) is just visible through the relatively dense cover of naturally regenerated young trees that cloak the steep east-facing slope along the western boundary of the site.





Photo 3. A more mature Downy Birch (tree #1432) amongst the press of younger trees.

Photo 4. One of the young-mature Wych Elms recorded during the survey. No signs of Dutch Elm Disease were observed on the site.





Photo 5. Tree #1435 (a Wild Cherry) is dead and has fallen and lodged in the adjacent trees to the east.



Photo 6. Tree #1436 (a Wild Cherry) has also fallen and lodged in the surrounding trees, but is still alive.



Photo 7. Tree #1437 (a Wild Cherry) with poor balance, and possible movement on its root plate.

Photo 8. Tree #1439 (a Pedunculate Oak) with poor balance. Due to its relatively deep-rooting habit, this tree is more likely to stay upright than the Wild Cherries.





Photo 9. Trees #1440 and #1441 (an Ash and a Sycamore) on the top of the ridge (Wat's Dyke).

Photo 10. An exposed pocket of decay and a tight fork with included bark at the base of tree #1441.





Photo 11. Erosion along the original quarry excavation line has seriously undercut the root plate of this Sycamore (tree #1441), earning it a recommendation for removal.



Photo 12. Tree #1442 (a Wych Elm) is within the proposed construction zone, and will need to be felled.



Photo 13. Part of the root plate of tree #1444 (a Scots Pine) has been excavated, leading to potential structural instability.



Photo 14. A young self-sown Scots Pine (tree #1450) established on the south-facing bank at the north end of the site.



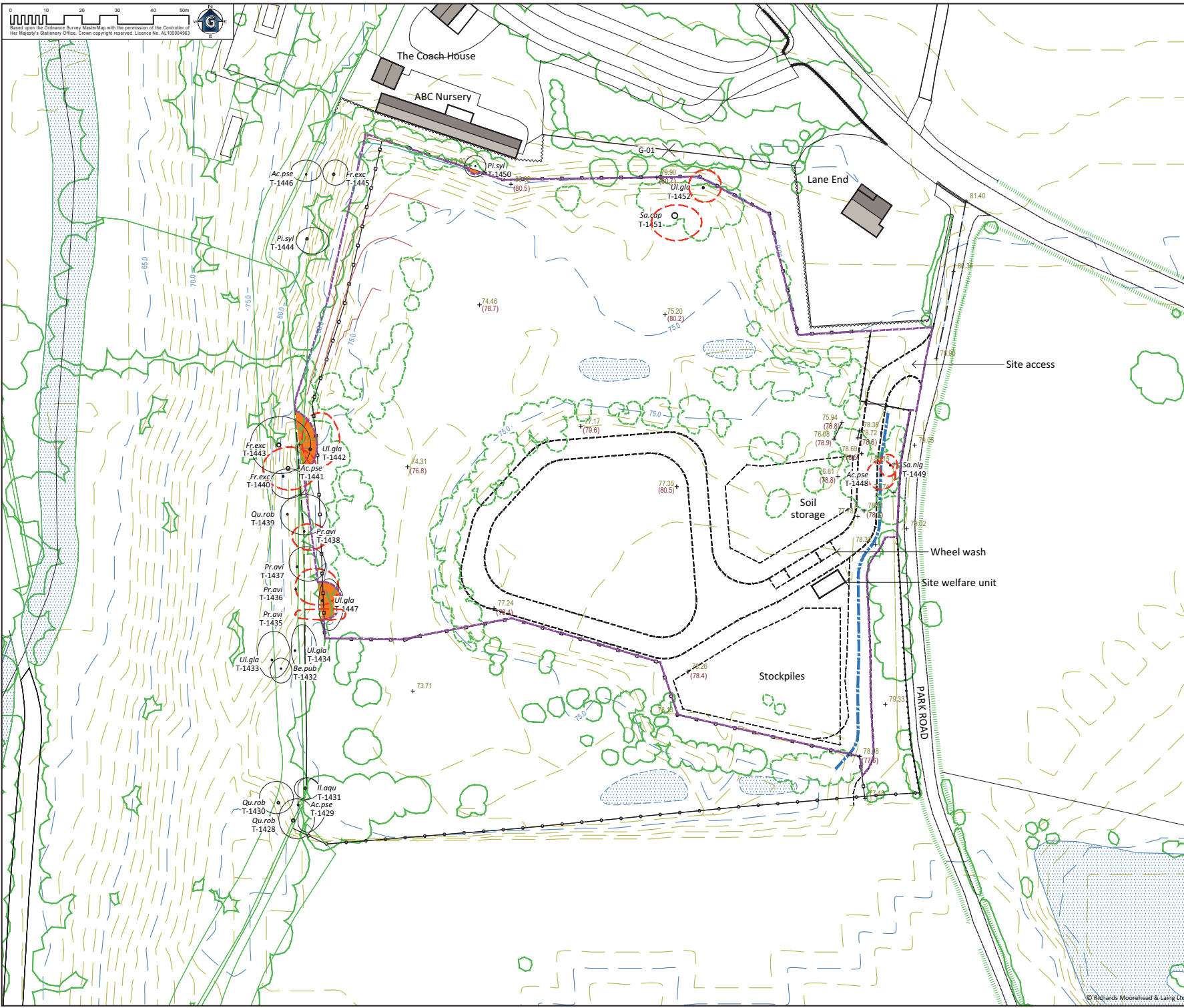
Photo 15. A wide-spreading Goat Willow (tree #1451) that is within the construction zone.



Photo 16. The line of Hollies along part of the northern boundary of the site.

APPENDIX 5

Tree Protection Plan



Client / Client:

MOORBRIDGE CONSTRUCTION LIMITED
Cedar Bank
12 Rhyddyn Hill
Wrexham LL12 9EB

Enw project / Project name:

**RESTORATION OF LAND
PARK ROAD, CEFN Y BEDD**

Titl luniad / Drawing title:

Tree Protection Plan

Eglurhad / Key:

- Significant tree
- Extent of ground disturbance
- Significant trees to be felled
- Construction exclusion zone (filling contours to be adjusted locally as required)
- Existing trees and shrubs
- Trees and shrubs to be removed
- Proposed boundary fence
- Proposed security fence
- Proposed vehicular access gate
- Site and access layout
- Proposed drainage swale
- Existing terrain (contours at 1.0 m intervals)
- Proposed terrain (contours at 1.0 m intervals)
- Existing ground levels (100.00) Proposed ground levels (100.0)

01	23/01/2012	Issued for information	RHE	SMB	IGR
Client Rev.	Original Date	Original Description	Drawn By	Checked By	Checked By
Graddfa / Scale (A3):		Dyddiad / Date:	Darlunwyd gan: RHE		
1:1,000 @A3		Jan 2012	Darlunwyd gan: SMB		
Rhif luniad / Drawing number:		2909 / 13	Darlunwyd gan: 01		

Darparwyd gan / Prepared by:

**RICHARDS
MOOREHEAD & LAING LTD**

55 Stryd Y Ffynnon, Rhuthun, Sir Ddinbych, LL15 1AF,
55 Well Street, Ruthin, Denbighshire, LL15 1AF, UK.

Rhif ffon/fax: +44 (0)1824 708486, Ffôn/fax: +44 (0)1824 708485,
e-bost/e-mail: rm@richardsmoorehead.com, www.richardsmoorehead.com