

MVV Umwelt GmbH
Energy from Waste Combined Heat and
Power Facility
North Yard, Devonport
Tree Survey

October 2010



Prepared for



Revision Schedule

Tree Survey October 2010

Rev	Date	Details	Prepared by	Reviewed by	Approved by
00	18/10/10	Draft	Tim Arkell Landscape Architect	Adam King Associate	Adam King Associate
01	22/10/10	Final	Tim Arkell Landscape Architect	Adam King Associate	Adam King Associate

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1 Introduction

MVV Umwelt is bidding for the South West Devon Waste Partnership's (SWDWP) residual waste treatment contract. The SWDWP is a collaboration that has been established between Plymouth City Council, Torbay Council and Devon County Council to provide a long term solution to deal with the waste from the South West Devon area that cannot be recycled, reused or composted. MVV is submitting a bid for the site in North Yard, Devonport.

Scott Wilson has been commissioned by MVV Umwelt to undertake a survey of existing trees within a wooded bank area to the north of the site known as Blackies Wood.

It is understood the information contained within this report will in due course be used in support of a Planning Application for the Energy from Waste Combined Heat and Power (EfW CHP) facility proposed on the adjoining site. This will determine whether the existing trees impose any significant constraints to the development of the adjoining site and will inform the management of the woodland generally. The survey and the accompanying notes provide guidance as to the nature and quality of the existing tree stock, the implications of any known construction works in the vicinity of these trees including best practice for retention of trees in this context.

2 Methodology

The tree survey was based upon existing topographical information relating to the site, provided by Merrett Survey Partnership – D127470 Devonport Dockyard drawing No. SW1660/00 Rev B, and conducted in accordance with the requirements of BS5837(2005). Fieldwork was undertaken on 14th October 2010 during which dimensional data and observational information were collected. A DBH tape measure and Bosch DLE50 Distometer were used in the collection of this, which now form the basis of this report.

The densely wooded character limited access within the survey area, so the collection of detailed survey information was restricted to the trees immediately bounding the EfW CHP site. Arboricultural information from the remainder of the survey area has been more generalised in nature, but sufficient to inform future management recommendations.

3 Schedule of Existing Trees

Ref. No	Species	Est. Height (m)	Stem Dia. (mm)	Canopy Spread (m)				Crown Clearance (m)	Physiological Condition	Age	Structural Condition	Preliminary Management Recommendations	Est. Remaining Contribution (yrs)	Cat.
				N	S	E	W							
T1	English Oak (<i>Quercus robur</i>)	12.0	1200 (Comprising 4No. x 360 stems)	5.6	7.3	7.3	7.6	0.0 (MS)	Fair	M	Four main trunks rising from base (and are presumably the same tree). Deadwood within canopy. Pruning wounds visible on SE edge with wound wood developing. Ivy cover to main trunk and limbs limits further inspection.	Of possible ecological value. Monitor pruning wounds to main trunk for decay. Remove dead wood only where this represents a Health and Safety hazard	20-40	C2
T2	English Oak (<i>Quercus robur</i>)	10.0	500*	5.0*	7.3	6.5	5.6	0.0 (MS)	Fair	M	Three main trunks rising up from low level and bias to SE. Ground levels appear to have been raised at base on S side. Dead wood visible within canopy including epicormic growth to main limbs. Low canopy tips on S side. To 1.0m Ht.	Of possible ecological value. Monitor pruning wounds for decay and general health re: levels increase at base. Remove dead wood only where this represents a Health and Safety hazard	10-20	C2
T3	English Oak (<i>Quercus robur</i>)	15.0	420	5.2	5.5	6.8	4.9	4.0	Fair/Good	M	Isolated tree within area of dense undergrowth. Of generally balanced form with minor deadwood within canopy. Ivy cover to main trunk and branches limits further inspection	Of amenity/ecological value to location. Sever Ivy and reassess. Sever/remove Ivy to lowest 1.0m of trunk and reassess. Remove dead wood only where this represents a Health and Safety hazard	40+	B2
T4	English Oak (<i>Quercus robur</i>)	15.0+	990	3.4	8.7	9.5	7.2	1.5	Fair/Good	M	Growing at base of bank on woodland edge and in competition with adjacent trees. Ivy becoming established on main trunk. Deadwood visible within canopy with occasional torn branch stubs and decay visible. Canopy bias and leaning to SE due to competition with adjacent trees. Long lateral limbs extending towards site.	Of amenity/ecological value as part of woodland group. Sever/remove Ivy to lowest 1.0m of trunk and reassess.	40+	B2
T5	English Oak (<i>Quercus robur</i>)	12.0	E=1000* W=800*	3.4	8.8	8.0	3.9	E=0.5 (MS) W=1.0 (MS)	Fair	M	Growing on bank area on woodland edge and in competition with adjacent trees. Canopy bias to SE with long lateral limbs extending towards site. Base of tree being slowly undermined by erosion of bank	Of amenity/ecological value as part of woodland group. Monitor bank erosion/tree stability. Consider reduction of long, lateral limbs to re-balance. Sever/remove Ivy to lowest 1.0m of trunk and reassess	20-40	E=B2 W=C2
T6	English Oak (<i>Quercus robur</i>)	15.0+	E=810 W=420*	5.8	10.5	10.6	4.1	5.0	E=Fair/Good W=Fair	M	Growing on bank area on woodland edge and in competition with adjacent trees. Canopy bias to SE with long lateral limbs extending towards site. Deadwood within canopy. Large buttress roots exposed where soil has been progressively eroded from bank. Ivy becoming established on main trunk	Of amenity/ecological value as part of woodland group. Sever/remove Ivy to lowest 1.0m of trunk and reassess. Remove dead wood only where this represents a Health and Safety hazard. Assess stability and consider reduction of long, lateral limbs to re-balance	E=40+ W=20-40	E=A2 W=C2
T7	English Oak (<i>Quercus robur</i>)	12.0	650*	0.0	0.0	7.7	5.2	4.0	Fair	M	Growing on bank area on woodland edge and in competition with adjacent trees. Main trunk emerges from bank horizontally before log-logging vertically at 3.0m. Long lateral limbs extending towards site. Deadwood within canopy. Ivy becoming established on main trunk	Of ecological value as part of woodland group. Sever/remove Ivy to lowest 1.0m of trunk and reassess. Remove dead wood only where this represents a Health and Safety hazard. Assess stability and consider reduction of long, lateral limbs to re-balance	20-40	C2

Ref. No	Species	Est. Height (m)	Stem Dia. (mm)	Canopy Spread (m)				Crown Clearance (m)	Physiological Condition	Age	Structural Condition	Preliminary Management Recommendations	Est. Remaining Contribution (yrs)	Cat.
				N	S	E	W							
T8	English Oak (<i>Quercus robur</i>)	15.0+	580	1.7	7.9	9.5	3.2	3.0	Fair/Good	M	Growing on bank area on woodland edge and in competition with adjacent trees. Canopy bias to SE with long lateral limbs extending towards site. Large buttress roots exposed where soil has been progressively eroded from bank. Ivy becoming established on main trunk.	Of amenity/ecological value as part of woodland group. Sever/remove Ivy to lowest 1.0m of trunk and reassess. Remove dead wood only where this represents a Health and Safety hazard. Assess stability and consider reduction of long, lateral limbs to re-balance	40+	B2
T9	English Oak (<i>Quercus robur</i>)	15.0+	460	1.0	2.8	6.7	6.2	3.0	Fair	M	Growing on bank area on woodland edge and in competition with adjacent trees. Canopy bias to SE. Ivy becoming established on main trunk. Deadwood visible within canopy. Redundant barbed wire running past base of trunk	Of amenity/ecological value as part of woodland group. Sever/remove Ivy to lowest 1.0m of trunk and reassess. Remove dead wood only where this represents a Health and Safety hazard.	40+	B2
T10	English Oak (<i>Quercus robur</i>)	15.0+	900	4.7	6.4	7.1	8.6	4.0	Fair	M	Growing on bank area on woodland edge and in competition with adjacent trees. Canopy slightly bias to SE due to competition with adjacent trees. Deadwood within canopy. Large buttress roots/flaring at base	Of amenity/ecological value as part of woodland group. Sever/remove Ivy to lowest 1.0m of trunk and reassess. Remove dead wood only where this represents a Health and Safety hazard	40+	B2
G1	Under-storey with occasional larger English Oak (<i>Quercus robur</i>) inset - not surveyed, including; Rose (<i>Rosa sp.</i>), Barberry (<i>Berberis sp.</i>), Cotoneaster, Ivy (<i>Hedera helix</i>), Gorse (<i>Ulex europaeus</i>), Hawthorn (<i>Crataegus monogyna</i>), Hazel (<i>Corylus avellana</i>) and Buddlejia.										Oak to approx 15.0m Ht. Under-storey to 4.0m Ht. (Max). Generally dense and unmanaged			
G2	Woodland belt including; Mature English Oak, (<i>Quercus robur</i>), Semi-mature Sycamore (<i>Acer pseudoplatanus</i>), Wild Cherry (<i>Prunus avium</i>), Common Ash (<i>Fraxinus excelsior</i>). Understorey comprising of Hawthorn, (<i>Crataegus monogyna</i>), Blackthorn (<i>Prunus spinosa</i>), Elderberry (<i>Sambucus nigra</i>), Cotoneaster, Wild Privet (<i>Ligustrum vulgar</i>), Hazel (<i>Corylus avellana</i>)										Oaks to approx 15m+ Ht. Semi-mature trees to approx 10.0m+ Ht. Under-storey to 4.0m Ht. (Max) Locally dense with limited access to bank areas. Occasional former coppice stools visible but generally unmanaged.			

- 1) All trees and hedgerows subject to full arboricultural inspection for safety, with respect of both existing and proposed site uses/users.
- 2) Any management recommendations in this report subject to TPO status of trees and LPA approval.
- 3) Any management recommendations in this report subject to presence of nesting birds or protected species (e.g. Bats)
- 4) Survey information subject to seasonal/access constraints.

This schedule should be read in conjunction with Scott Wilson Tree Survey drawing Nos. D119294-T5 and T6

N/A - Measurement not accessible. Dimension estimated (Est.) or based upon average or remaining measurements.

* - Indicates estimated position of tree (not indicated on topographical survey).

4 Key to Abbreviations Used in the Survey

Ref No	Corresponding number on plan – T=Tree/H=Hedge/G=Group
Species	Common name followed by botanical name shown in <i>italics</i>
Stem Diameter	Diameter measured in centimetres at 1.5 m above ground level. (MS = Multi-stem tree with diameter measured at base/above root flare)
Spread	Measured on the four compass points
Crown clearance	The height to the lowest branch attachments
Category	1=Arboricultural value 2=Landscape value 3=Cultural value
	A=High quality/value 40yrs+ B=Moderate quality/value 20yrs+ C=Low quality/value min 10yrs/stem dia less than 150mm R=Remove
Age	Young (Y) Semi-Mature (SM) Mature (M) Over Mature (OM) Veteran (V) Classification is given in relation to the life expectancy of the specific species.
Physiological condition	Good/Fair/Poor/Dead

5 Arboricultural Recommendations

5.1 General Principles

The Root Protection Area (RPA) defines the approximate area occupied by the tree roots based on a calculation relating to the girth of the tree and point above ground at which the trunk begins to branch out. See BS5837(2005), Table 2 below:

Table 2 — Calculating the RPA

Number of stems	Calculation
Single stem tree	$RPA(m^2) = \left(\frac{\text{stem diameter (mm) @ 1.5 m} \times 12}{1\,000} \right)^2 \times 3.142$
Tree with more than one stem arising below 1.5 m above ground level	$RPA(m^2) = \left(\frac{\text{Basal diameter (measured immediately above root flare (mm))} \times 10}{1\,000} \right)^2 \times 3.142$
NOTE The 12× multiplier is based on NJUG 10 [9] and published work by Matheny and Clark [10].	

5.2.3 The calculated RPA should be capped to 707 m², e.g. which is equivalent to a circle with a radius of 15 m or a square with approximately 26 m sides.

The RPA of existing tree stock is an important material consideration when considering site constraints and planning development activities.

Construction operations, materials storage or changes in level should generally be avoided within the RPA of a tree to be retained on a developed site. This is because these operations have the potential to damage or kill the tree, the safe retention of which may be a condition of Planning Approval. This is significant when considering construction in close proximity to off site/third party. Special construction techniques, i.e. no-dig construction/permeable surfacing may be considered for light loadings i.e. pedestrian footpaths etc. within the RPA.

It should be noted that the RPA often varies in size to the physical area occupied by the canopy spread, (due to particular tree species or management practices to artificially alter the canopy size). This is of particular importance when integrating new development in close proximity of existing trees. Similarly, the canopy heights (as identified in the Schedule of Existing Trees) should be considered as the usable space below a low branching tree will be severely restricted without specific arboricultural works to raise the canopy (which may not always be appropriate).

5.2 Site Observations

The survey area comprised an informal belt of woodland which forms part of what is known as Blackies Wood. Residential properties are located to the north-west with the Naval Base and security fencing to the south-east. The survey area is then dissected by a disused railway siding forming a level plateau part way up the embankment. This area is largely free of woody vegetation.

Within the survey area, the stock of English Oak, (*Quercus robur*) appear to be the oldest trees around which a range of semi-mature trees and shrubs have subsequently developed in recent years. All of the trees bounding the Naval Base to the south-east and surveyed in detail were English Oak (*Quercus robur*). The majority of surveyed trees attracted a higher category than would normally be the case due to their collective amenity/shelter/ecological value as part of the wider woodland group. The area appears to be generally unmanaged with locally dense and inaccessible areas due to the density of vegetation and steepness of slopes. However, there was evidence of Hazel (*Corylus avellana*) coppicing having historically been practiced.

Erosion of topsoil was evident on some bank areas and in particular around the buttress roots of trees, which could lead to longer term instability of trees, especially those leaning to the south-east. Exposed bedrock was visible in several locations and it is possible that topsoil depths may vary considerably through the area. As a result, the stated root protection areas around each tree are likely to be distorted according to the depth/availability of suitable growing medium. This may also compound the above stability issues.

The area has appears to have been used for the localised dumping of materials and domestic refuse and has historically been accessed by persons for informal meeting/recreational purposes. This latter point and site owners duty of care to visitors, (whether invited or not) will need to be considered as part of the wider woodland management.

5.3 Development Proposals

The proposals involve the development of the neighbouring site to the South East as an EfW CHP facility. This comprises a large built structure to the north-eastern portion of the site and areas of hard standing to the south-west. A soft landscaped margin is indicated along the majority of the boundary with the survey area. Reference has been made to the emerging proposals for the EfW CHP facility and the Landscape Masterplan, both shown on Drawing 009-02-D123356-001 (provided separately).

5.3.1 Site Construction

Site construction will involve the removal of T1, T2 and G1 in order to form a new built structure and adjacent parking provision. The retention of T3 within the new 'break-

out' area should be possible assuming the existing levels can be maintained within the RPA and the tree will offer amenity value in this context.

The existing boundary line appears to be maintained for the portion of development site bounding the woodland, however the RPA of T4, T5 and T10 appear to encroach into the site, (notwithstanding the unknown factor shallow bedrock and topsoil may have on root distribution). However, since these areas fall within proposed soft landscaped areas, if the existing ground levels can be maintained and minimal ground disturbance occurs it should be possible to protect the RPA of these trees.

T5 and T8 appear to have canopy spreads which extend over the current site boundary to the south-east and into the site. Depending upon the nature of site operations or boundary/security fencing requirements, it may be necessary to locally reduce the canopy spread of these trees on the south-east side to prevent mechanical damage. Additionally, further assessment of the stability of the surveyed trees bounding the site, (as recommended) may require the canopy reduction of further trees which should help to minimise the instance of premature failure.

Removal and placement of the existing boundary fence could potentially be more detrimental to the existing trees bounding the development site involving the excavation for new foundations/post holes which may (depending upon design) encroach into the RPA of the existing boundary trees. In this instance, the accompanying best practice notes for ground protection and works within RPA's should be adopted to minimise damage.

5.3.2 Mitigation

The loss of T1 and T2 is not significant in the context of the wider woodland area. The opportunity exists for the provision of woodland edge planting along the development site boundary along with new tree planting where space permits. In this context the emphasis should be upon habitat creation using native species, informed by those growing and thriving in the woodland survey area.

The wider woodland area would benefit from a structured management programme which should be further refined according to the over-riding purpose e.g. amenity/ecology/shelter etc. This could include, (but is not limited to):

- 1) The thinning out and removal of weaker/non-native semi-mature trees to allow the development of better and longer lived specimens
- 2) The encouragement of natural regeneration of suitable native woodland tree species by selective removal of competing weeds/under-storey shrubs
- 3) The resumption of Hazel Coppicing practices
- 4) The creation of windrows or log piles from arisings which will be of wildlife benefit

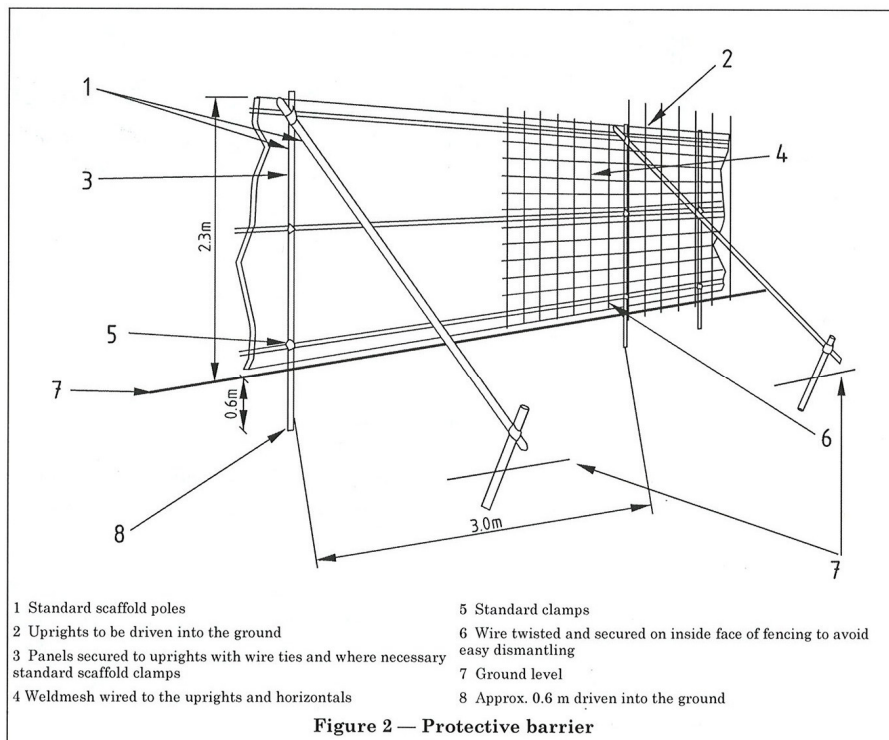
5.3.3 Construction Work Within Root Protection Area

Wherever possible, construction work within the RPA should be avoided. However, the following guidance should be employed for any construction works within the Root Protection Area if this is otherwise unavoidable;

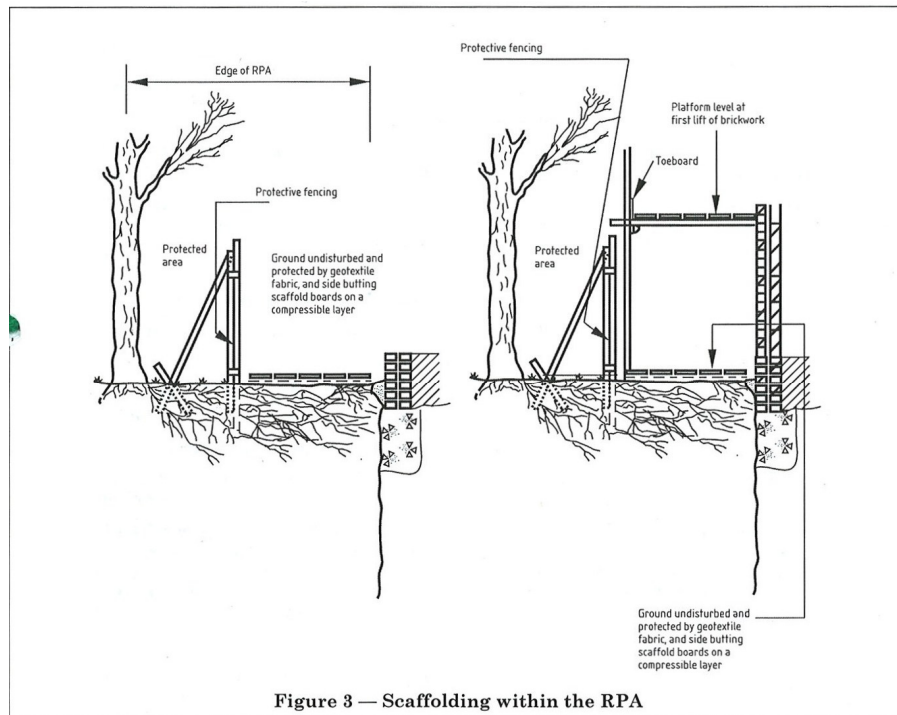
- 1) A minimal working area is established with protective fencing erected as per Figure 2 and additional protective measures employed as per Figure 3.
- 2) All excavation within the RPA should be undertaken by hand.
- 3) Any root material encountered below 50mm diameter should be cut with a single, sharp saw cut, (to minimise the potential for infection).
- 4) Any exposed roots should be covered with damp straw/hessian until backfilling can be completed
- 5) If roots exceeding 50mm diameter are encountered, cover with damp straw/hessian and seek immediate advice from a qualified arboricultural professional.

5.4 Best Practice Guidance

Prior to the commencement of any construction operations on site, tree protection measures should be employed to protect all existing trees identified as being retained on site. Within this area no construction activities should take place without protection. Trees should be protected to the extent of the RPA or canopy spread, whichever is the greater (since mechanical damage to the canopy can occur). Protective fencing using scaffold pole construction should be employed as shown in Figure 2 below:



Similarly, where a working area is required within the RPA, suitable protection should be employed to prevent undue root compaction/mechanical damage as identified in BS5837(2005) and Figure 3 below:



3.4 Additional precautions outside the exclusion zone

Appendix 6.1 – Tree Survey

THIS DRAWING SHOULD BE READ
IN CONJUNCTION WITH SCOTT
WILSON TREE SURVEY REPORT

TOPOGRAPHIC SITE SURVEY ORIGINATES
FROM MERRETT SURVEY PARTNERSHIP -
D127470 DEVONPORT DOCKYARD
DRAWING No. SW1660/00 REV B

LEGEND

A - CATEGORY TREES

B - CATEGORY TREES

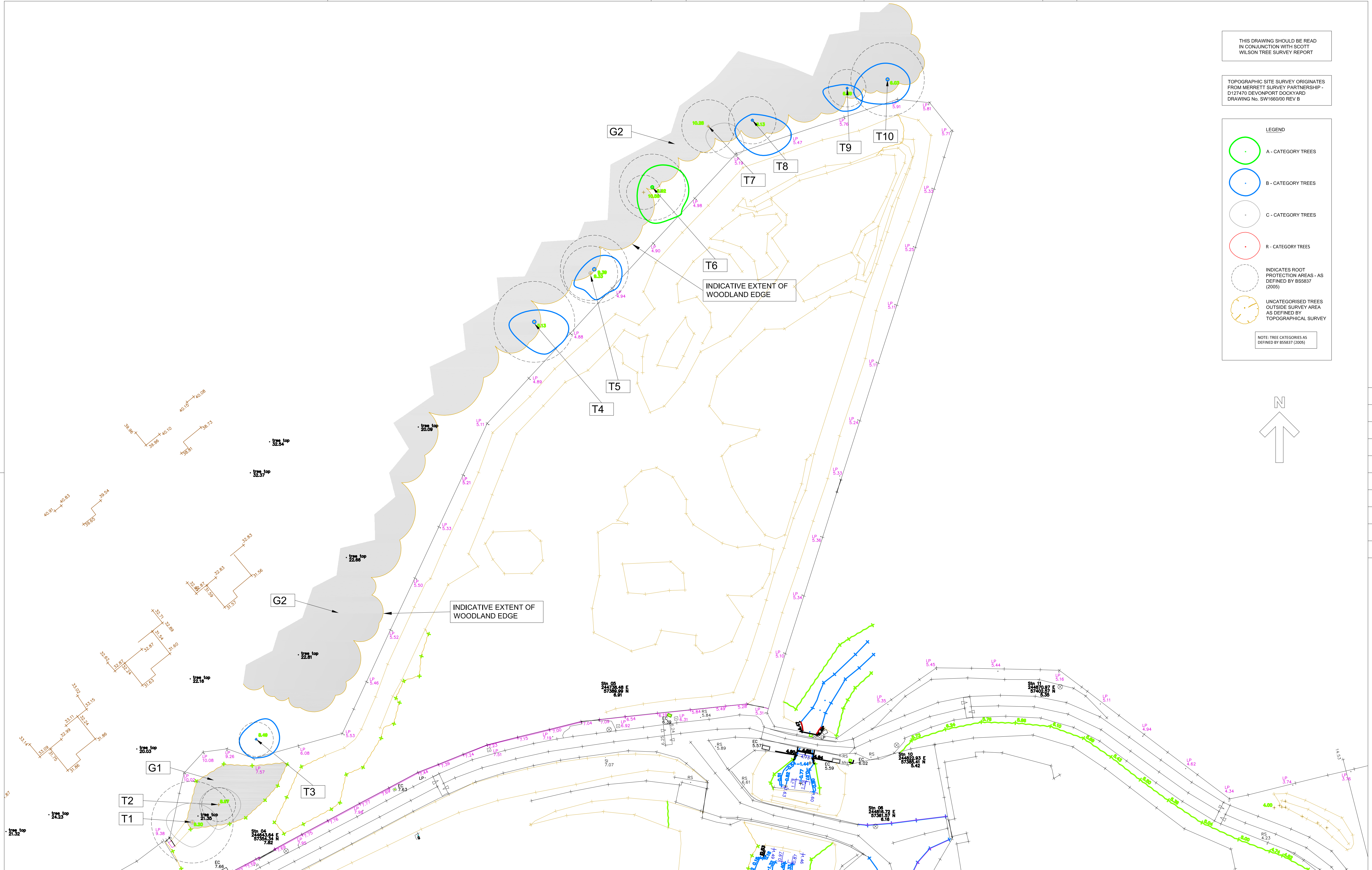
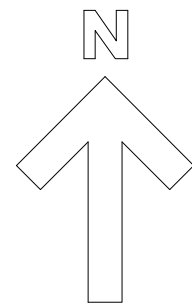
C - CATEGORY TREES

R - CATEGORY TREES

INDICATES ROOT
PROTECTION AREAS - AS
DEFINED BY BS5837
(2005)

UNCATEGORISED TREES
OUTSIDE SURVEY AREA
AS DEFINED BY
TOPOGRAPHICAL SURVEY

NOTE: TREE CATEGORIES AS
DEFINED BY BS5837 (2005)



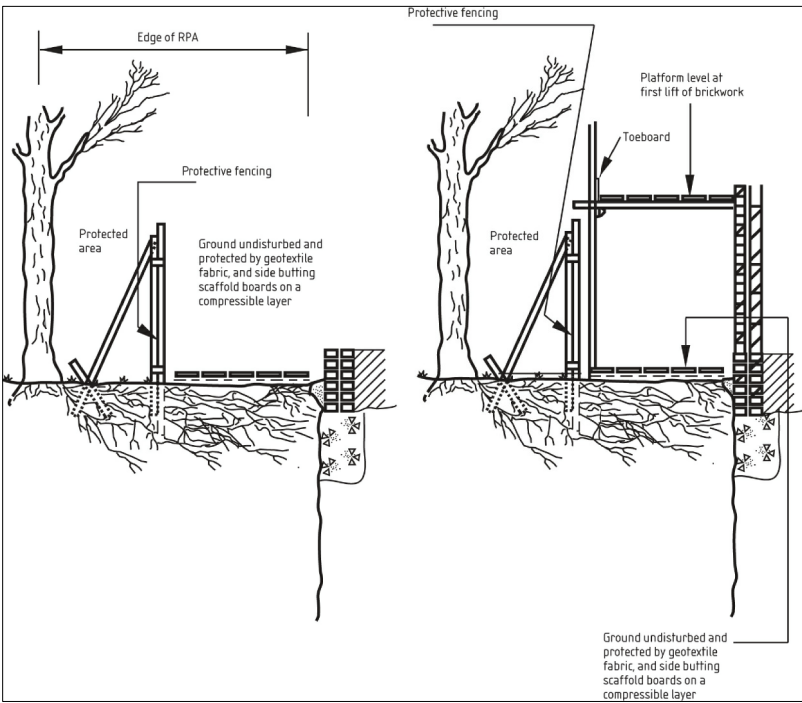
Plot Date : AutoCAD File Name :				Job Title DEVONPORT WASTE TO ENERGY DEVELOPMENT				Drawing Title TREE SURVEY				Scale at A1 1:500				Scott Wilson Mayflower House Armada Way, Plymouth Devon, PL1 1LD Telephone (01752) 676700 Fax (01752) 676701 www.scottwilson.com							
Revision Details				By Check				Date				Suffix				Approved							
Drawing Status PRELIMINARY												Stage 1 check				Stage 2 check							
												Originated PLYM-LAND				Date 19/10/10							
												THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED											
												Drawing Number D123356 - T1											
												Rev											

Appendix 6.2 – Tree Protection

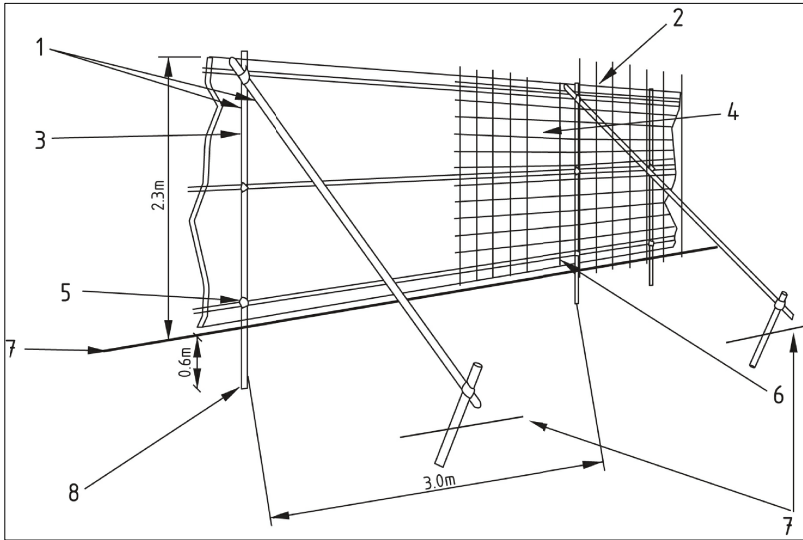
Tree Protection Fencing Specification

- i) All the trees to be retained on site are to be protected by fencing as per BS5837: 2005.
- ii) The fence shall be installed no closer than shown on this drawing.
- iii) The area beneath the tree and between the trunk of the tree and the fence will be kept clear and undisturbed at all times. No materials shall be stored within the fenced area; the levels of the land within the fenced area shall not be altered, and no seepage of oils, fuels or chemicals (including cement and cement washings) which may be harmful to trees shall be allowed onto the fenced area.
- iv) No trenches for service runs, or any other excavations shall take place within the fenced area.
- v) No soil or other surface material shall be removed from the fenced area.
- vi) No fixing made to any tree, and all possible precautions taken to prevent damage to tree roots when locating posts.

Tree Protection Fencing: Establishing a Working Area Within the Root Protection Zone



Tree Protection Fencing: Detail



- 1. Standard scaffold poles
- 2. Uprights to be driven into ground
- 3. Panels secured to uprights with wire & where necessary standard scaffold clamps
- 4. Weldmesh wired to uprights & horizontals
- 5. Standard clamps
- 6. Wire twisted & secured on inside face of fencing to avoid easy dismantling
- 7. Ground level
- 8. Approx 0.6m driven into ground

INDICATIVE EXTENT OF WOODLAND EDGE

INDICATES EXTENT OF TREE PROTECTION AREA. NOTE: EXISTING FENCING TO BE RETAINED AND USED IN LIEU OF FORMAL PROTECTION FENCING WHERE POSSIBLE

EXISTING AREA OF SCRUB TO BE REMOVED

NOTE: EXISTING GROUND LEVELS TO BE MAINTAINED WITHIN RPA OF EXISTING TREES & NEW SOFT LANDSCAPED DEVELOPMENT MARGIN

NOTE: EXISTING GROUND LEVELS TO BE MAINTAINED WITHIN RPA OF EXISTING TREES & NEW SOFT LANDSCAPED DEVELOPMENT MARGIN

INDICATES EXTENT OF TREE PROTECTION AREA. NOTE: EXISTING FENCING TO BE RETAINED AND USED IN LIEU OF FORMAL PROTECTION FENCING WHERE POSSIBLE

INDICATIVE EXTENT OF WOODLAND EDGE

EXISTING AREA OF SCRUB TO BE REMOVED

EXISTING TREES TO BE REMOVED

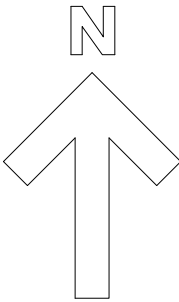
THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH SCOTT WILSON TREE SURVEY REPORT

TOPOGRAPHIC SITE SURVEY ORIGINATES FROM MERRETT SURVEY PARTNERSHIP - D127470 DEVONPORT DOCKYARD DRAWING No. SW1660/00 REV B

LEGEND

- EXISTING RETAINED TREE;
- EXISTING TREE TO BE REMOVED;
- TREE PROTECTION FENCING & AREA SHOWN GREY (SEE NOTES)

ALL TREE SURGERY WORKS TO BE UNDERTAKEN BY AN ARBORICULTURAL ASSOCIATION REGISTERED CONTRACTOR



Job Title
DEVONPORT WASTE TO ENERGY DEVELOPMENT

Drawing Title
TREE PROTECTION

Scale at A1
1:500
Drawn
TAA.
Stage 1 check
Stage 2 check
Originated
PLYM-LAND
Date
19/10/10

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Drawing Number
D123356 - T2

Rev

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Revision Details	By	Date	Suffix
Check			
Drawing Status	PRELIMINARY		