

Arboricultural Impact Assessment

Llyn Tegid (Bala Lake) Reservoir Safety Project

Prepared for:

Black & Veatch Ltd

Our Ref: 19/AIA/SNP/10

November 2019

Note:

This Arboricultural Impact Assessment details the impact on trees following a tree survey and desk-based review of the current design proposal. Prior to the submission of the planning application for the Llyn Tegid (Bala Lake) Reservoir Safety Project the designs will be developed further, and site visits will be undertaken to update and finalise the findings of the Arboricultural Impact Assessment. If design changes present opportunities to safely retain trees these will be taken.

Tree Solutions Ltd

T: 01244 389114

E: info@tree-solutions.co.uk

W: www.tree-solutions.co.uk

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1.0 INSTRUCTION

- 1.1 We have been instructed by Black & Veatch Ltd on behalf of Natural Resources Wales (NRW) to carry out an Arboricultural Impact Assessment (AIA) in order to assess the development proposal in relation to trees in accordance with the principles of British Standard 5837 'Trees in Relation to Design, Demolition & Construction - Recommendations' 2012.
- 1.2 We are instructed to prepare a report in order to provide information to assist all parties involved in the planning process to make balanced judgements with regard to arboricultural features in relation to the proposed modifications to the impounding structures at Llyn Tegid Reservoir, Bala. As such, all trees both on and adjoining the site have been surveyed and are listed within a Tree Survey Schedule (**Appendix 1**) and plotted on all accompanying plans.
- 1.3 The tree survey was carried out on 26 March 2019 and updated in September and November 2019 by Alistair Henderson, principal consultant to Tree Solutions Ltd. Our appraisal of the mechanical integrity of trees on the site is sufficient only to inform the current project. The assessment of trees is carried out from ground level without invasive investigation and the disclosure of hidden defects cannot therefore be expected. Whilst the survey is not specifically commissioned to report on matters of tree safety, we report obvious defects that are significant in relation to the existing and proposed land use. We do not carry out detailed safety inspections unless specifically instructed to do so in writing and have not carried out such inspections of trees on the proposal site.
- 1.4 Ninety-eight individual trees (T1–T98) and twenty-six groups (G1–G26) were surveyed and mapped on a Preliminary Tree Constraints Plan and Impact Assessment Plan Ref: 19/AIA/SNP/10, Drawing No's. 1&2 at **Appendix 2/3**. All arboricultural information recorded during the survey is presented within a schedule at **Appendix 1**.

2.0 STATUTORY CONTROLS

- 2.1 According to a search on Snowdonia National Park Authority's interactive map, the survey area does not fall within a designated Conservation Area and there are no TPOs within the boundary of the proposed works (refer to the Environmental Constraints and Opportunities Record (ECOR) for further details).



Plate 1 – Extract from SNP interactive map indicating that the site falls outside Bala Conservation Area which is marked in green

2.2 Protected Species

- 2.2.1 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 5 of the Wildlife and Countryside Act 1981 (as amended). Bats are also protected under The Conservation of Habitats and Species Regulations 2010 (as amended). Refer to the Environmental Constraints and Opportunities Record for further details.

2.3 Wildlife Habitats

- 2.3.1 Trees and hedgerows of most species provide valuable nesting sites for a wide range of birds and it is likely that nesting birds will be present on the site during the period March to September.

3.0 THE SITE

- 3.1 Llyn Tegid is a natural lake with approximately 2,950m of embankment at its northern end. The outflow is controlled by Bala Sluices, which is a gated water control structure that controls the combined outflow from Llyn Tegid and the Afon Tryweryn. This allows Llyn Tegid to be used for flood control (as a reservoir), and to regulate the River Dee downstream.

4.0 DEVELOPMENT PROPOSAL

- 4.1 Llyn Tegid is registered as a Category A Large Raised Reservoir under the Reservoirs Act 1975. As such there are additional legal duties on Natural Resources Wales (NRW) which include formal inspection by an Inspecting Engineer (IE) from a Reservoir Panel (registered with DEFRA) and compliance with recommendations made by the IE within their report (known as a Section 10 report). Proposed modifications to the existing water impounding structures comprise of reinforcement of landward / downstream embankment faces with buried 3D geotextile mat (Enkamat or similar) and upgrading of existing rip rap upstream slope protection on the lake embankment with additional imported stone material.
- 4.2 Following a Section 10 report in November 2014, modifications to the impounding structures at Llyn Tegid are required to satisfy Measures in the Interest of Safety (MIOS), which comprise of works to safely accommodate the design storm and the associated still water flood surcharge and wave surcharge, and a seepage/ stability analysis of the embankments to try to predict how the embankments will behave in the design flood.
- 4.3 The proposed modifications to the existing water impounding structures comprise of reinforcement of landward/downstream embankment faces with buried 3D geotextile mat (Enkamat or similar) and upgrading of existing rip rap upstream slope protection on the lake embankment with additional imported stone material.

5.0 GENERAL CONSTRAINTS DATA - CONSTRUCTION EXCLUSION ZONES (CEZ's)

5.1 GENERAL

- 5.1.1 During the development process for retention of trees, there may be three or even four constraints to consider: Construction Exclusion Zone (CEZ's):
- CEZ 1: Root Protection Area (see 5.2)
 - CEZ 2: Tree Crown Protection (see 5.3)
 - CEZ 3: Tree Dominance (see 5.4)
 - CEZ 4: New Tree Planting Zone (see 5.5)

5.2 CEZ 1: ROOT PROTECTION AREA (RPA)

- 5.2.1 The RPA, calculated in m², should be protected before and during any demolition/construction works. This ensures the effective retention of trees by safeguarding a reliable quantum of functioning tree roots. The RPA is based on a radial measure from the centre of the tree stem, which is calculated by multiplying the stem diameter by a factor of twelve or by the (mean stem diameter squared) x number of stems for multi-stemmed trees. With the AIA Phase 1, the RPA is only shown indicatively on the preliminary TCP, as its shape may be subject to amendment as the design progresses.
- 5.2.2 During the AIA Phase 2, the derived radial measure is converted by the arboriculturalist into the actual area to be protected, having due regard to prevailing site conditions and how these may have affected the tree(s), particularly in relation to factors affecting their likely rooting disposition. The RPA for each tree should initially be plotted as a circle centred on the base of the stem. Where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area should be produced. Modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution.

- 5.2.3 The means of protecting the RPA will include the installation of tree protective fencing prior to the start of any demolition or construction work on site. The prohibition of various activities within the RPA must be adhered to (e.g. mechanical excavation, soil stripping, fire lighting, material storage, lowering levels and creating excessive sealed surfacing) and may include the use of temporary ground protection and/or special engineering solutions where construction is proposed near to retained trees or within the RPA.

5.3 CEZ 2: TREE CROWN PROTECTION ZONE

- 5.3.1 This is the area above ground occupied by the crown (branches) of the tree, along with allowances for working space (safe working area) and if appropriate, for future growth. The extent of CEZ 2 is determined by considering the existing and future crown spread of the tree(s), bearing in mind the possibility of this being modified by an acceptable quantum of pruning.

5.4 CEZ 3: TREE DOMINANCE ZONE

- 5.4.1 This considers the height and spread of a tree relative to a proposed building, as no buildings are proposed as part of this project there will be no perceived overdominance issues.

5.5 CEZ 4: NEW PLANTING ZONE

- 5.5.1 In some cases, it may be appropriate to identify and protect areas intended for new landscape planting, which can fail to establish if the soil has been heavily compacted or contaminated during the demolition/construction process. The means of protecting CEZ 4 will either be by fencing it off prior to the start of works on site, or by soil remediation once construction has finished (and prior to the start of planting). Topsoil protection in areas destined for new planting is frequently an economy measure, saving on plant replacement and soil structure remediation.

6.0 SURVEY METHODOLOGY

- 6.1 The method used in the preparation of this report is based on the principles of BS 5837: 2012.

1. Tree heights were surveyed to the nearest 1m.
2. Trunk diameters were measured by use of forestry girth tape
3. The category assessment (Table 1) on which the trees is based include current and long-term arboricultural, landscape, cultural and conservation values (BS5837: 2012). This table can be found at **Appendix 1**
4. For clarity, the grading system is summarised from **Table 2** of the BS as follows:

U grade – trees for removal, effective for less than 10 years

A grade – trees of high quality and value, effective for more than 40 years

B grade – trees of moderate quality and value, effective for more than 20 years

C grade – trees of low quality and value, effective for 10 years

Note: We have indicated colour coding on the drawing and therefore a monochrome copy should not be relied on.

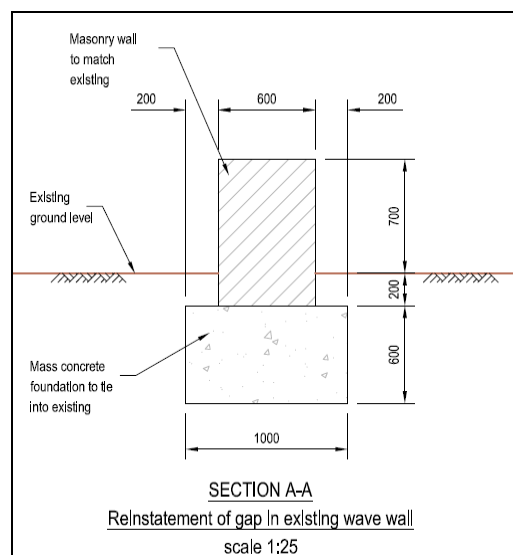
7.0 JUXTAPOSITION OF TREES AND STRUCTURES

7.1 Below ground constraints

- 7.1.1 The below ground constraints are generally summarised as the root protection area (RPA). The shape of the RPA and its exact location will depend upon arboricultural considerations including likely tolerance of the tree to root disturbance; morphology and disposition of the roots when known influenced by past or existing site conditions; soil type and structure; and topography and drainage.
- 7.1.2 The purpose of the RPA is to prevent physical damage to tree roots and to prevent damage to the soil structure. Tree roots are damaged by soil compaction, changes in soil levels or soil contamination which could reduce tree health and/or stability.
- 7.1.3 Root patterns are affected by topography and characteristics of the soil or substrate. Where trees are located within close proximity to existing hard standing or underground physical barriers, they are unlikely to have an even distribution of lateral roots due to restrictions in root growth created by compacted sub-grades beneath. The RPA of trees adjacent to underground structures or that run along the river edge have been modified accordingly. Where no underground barriers are present to prevent good radial root spread, RPA's have been plotted unmodified.

8.0 DEVELOPMENT IMPACT TO TREES

- 8.1 Tree Solutions carried out a phase one preliminary tree survey in March 2019 and provided a report in which all existing trees and their respective Root Protection Areas (RPA) were identified and plotted on a Tree Constraints Plan. Tree loss is inevitable to facilitate these essential works, however in order to retain key trees considered to have landscape and amenity value, or ecological value the engineering design was amended. This involved altering the earthworks and the erosion protection design in a manner which will ensure these trees are well integrated within the works. While a solution for the retention of certain trees has been developed this cannot be applied more broadly to a greater number of trees without undermining the effectiveness of the design. As the designs develop further the impact on trees will continue to be re-evaluated and where design changes present opportunities to retain trees these will be taken. It is therefore considered that the proposed design has taken the long-term future of the most visually prominent trees into account and is in accordance with Snowdonia National Park Planning Policies and recommendations contained with BS5837: 2012.
- 8.2 In order to undertake the proposed modifications to the impounding structures at Llyn Tegid approximately 271 trees will be removed, comprising of mostly category B and category C trees. In order to facilitate the proposed works a site compound will be required, there are no tree losses required for the compound area.
- 8.3 The principal impact will be the removal of tree groups 1 and 4-8 that form linear closed canopy groups on the embankment to the south of the footpath around Llyn Tegid reservoir. These trees have naturally colonised this embankment due to lack of any past formal site management and they should be considered for removal as appropriate management of the existing embankment. A significant number of these trees display evidence of Ash Dieback (*Hymenoscyphus fraxineus*) that will lead to their inevitable early demise. All have seen significant crown reductions/topping leaving an unnatural appearance and poor structural forms with potential to fail due to the adventitious secondary crowns having a weak attachment to the parent stem. These trees have exploited the small gaps between boulders that make up the embankment and most have now outgrown their confined rooting environment and exhibit multiple physiological and morphological disorders as a result. As such, remedial tree management works are required irrespective of the proposed works.
- 8.4 Landscape and visual, and ecological effects of the removal of these trees is discussed in the ECOR. Environmental enhancements, including the planting of trees and hedgerow, are being developed. As a minimum all trees removed to facilitate the proposed works will be replaced as part of these environmental enhancements.
- 8.5 The public footpath that runs between tree numbers 96 and 97 is to be moved to a new location to the east and the gap in the existing wave wall in this location is to be filled to match the wall either side. This will involve lifting the existing tarmac surface dressing within the RPA of the trees and excavating within the gap in the wall to install the necessary block foundation for the inlay wall section as detailed on Black & Veatch Drawing Ref: 122918-BVL-Z0-00-DR-C-100007 (Rev P03) and in the engineer's cross section drawing below. All excavation works within the RPA of trees will be undertaken by hand and under the direct on-site supervision of the project Arboricultural Consultant – see Arboricultural Method Statement.



8.6 Enkamat erosion control matting and concrete Armorloc blocks are to be laid within the RPA of tree numbers 1-5, 17, 35, 36 & 38 – refer to Black & Veatch Drawing Ref: 1229-18-BVL-Z0-00-DR-Z-00004 (Rev P01). Whilst this is an incursion within the RPA of these trees, any adverse impact on their future health and vigour has been discussed at the design stage with Tree Solutions with the following being considered as the least disruptive.

1. Armorloc blocks are to be laid below turf layer (≤50mm) and above existing topsoil ground level around the base of trees. In order to allow for annual incremental growth of the stem and buttress roots, blocks around the base of the stem will be removed following observations through routine annual inspections by the supervising engineer.
2. Enkamat will be held in place within the RPA of trees by use of Gripple ground anchors (see Plate 2 below) removing the need for trenching.

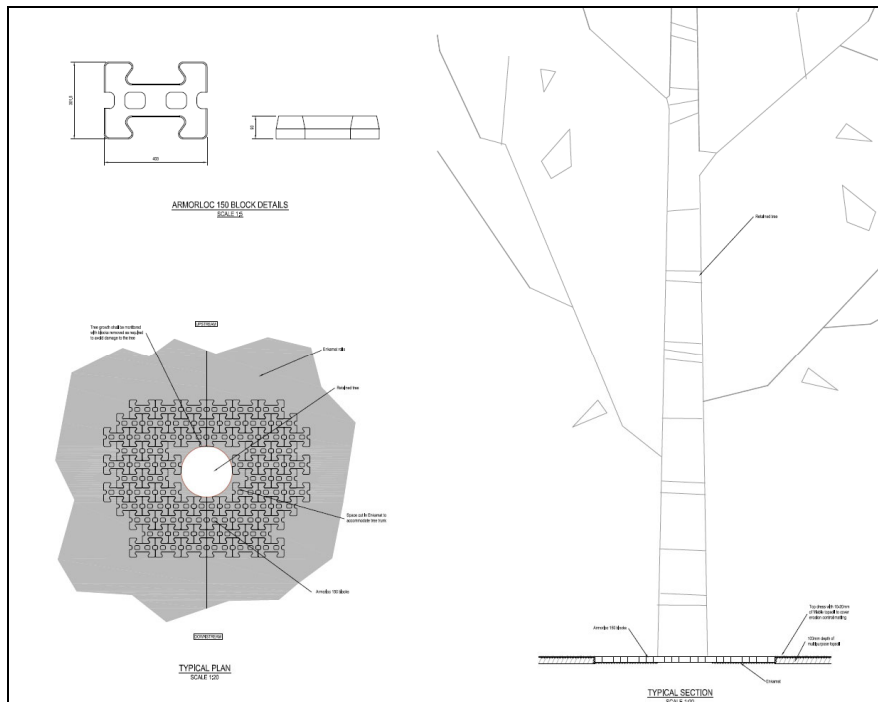


Plate 1 – Extract from B&V Drawing Ref: 1229-18-BVL-Z0-00-DR-Z-00004 (Rev P01)

Installation

Drive:
Insert Drive Tool through the anchor and place against surface.

Use GPD to install the anchor at the required depth.

Lock:
Use JackJaw to remove Drive Tool and load lock system.

Salix Terra-Lock System - Turf & earth Reinforcement Mat Solution
Salix Terra-Lock TeRM ("Turf & earth Reinforcement Mat") combine Salix's high performance TRM's with Gripple earth anchors to provide the highest possible erosion control performance of any reinforced grass solutions available.

Plate 2/3 – Instalation of Gripple earth anchors for Enkamat

8.6 Details relating to all other trees proposed for removal are listed with the tree survey schedule at Appendix 1.



**P1 – Gap in existing wave wall to be filled and tarmac footpath lifted within RPA
Of tree numbers 96 & 97**



**P2 – Group 1 viewed from footpath west of Leisure Centre. Note all trees have
been topped out at 9m resulting in weak secondary crown above**



**P3 – Base of trees in G1 growing out between gaps in existing embankment.
Many boulders have become embedded in stems & there is insufficient space for
further establishment without potential fractures**



P4 – Embedded rocks/boulders and physiological disorders to base of stems in G2. Trees have limited long-term potential irrespective of proposed works



P5 – Embedded rocks/boulders at base of stems on group 4. These cause potential fracture points when trees are loaded or during inclement weather



P6 – Rhizomorphs of Honey Fungus at base of T9



P7 – T25-T29 to be removed



P8 – G12 & G13, small unmanaged ivy clad trees to be removed



P9 – T35-T37, semi-mature/early mature small diameter trees



P10 – T41-T49 forming small linear copse of Ivy clad trees



P11 – Group 14, linear group screening industrial area beyond



P12 – Group 17, Ivy clad unmanaged trees



P13 – Tree numbers 38 & 39 mature landscape features

9.0 PROPOSED REVISIONS TO THE SCHEME

- 9.1 As the designs develop further the impact on trees will continue to be re-evaluated and prior to the submission of the planning application this report will be revised and if design changes present opportunities to retain trees these will be taken. This revised report will also detail the impact on trees from the construction site compound once the location for this is confirmed.

10.0 CONCLUSIONS

- 10.1 BS 5837: 2012 contains clear and current recommendations for a best practice approach to the assessment, retention and protection of trees on development sites. The proposed development has followed this guidance by:

- Respecting the constraints posed to development of the site by high or moderate quality trees
- Acting upon arboricultural advice throughout the design process in order to obtain the best development proposal whilst considering the current and future tree requirements
- As a minimum all trees removed will be replaced as part of the environmental enhancement proposals
- All retained trees within proximity to construction work will be protected in accordance with the provisions of BS5837: 2012.
- Removal of many trees highlighted are required as part of appropriate management of the embankment irrespective of the proposed new works
- Tree protective measures are detailed within an Arboricultural Method Statement and Tree Protection Plan.

11.0 LIMITING CONDITIONS

Unless stated otherwise:

Information contained in this report covers only those trees that were examined and reflects the condition of those trees at the time of the inspection.

The inspection is limited to visual examination of the subject trees from ground level only and without dissection, excavation, probing or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

This report has been prepared for the sole use and benefit of the client. Any liability of Tree Solutions shall not be extended to any third party.

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Appendix One
Tree Survey Schedule

TREE SURVEY SCHEDULE (BS5837: 2012)

SITE:	LLYN TEGID RESERVOIR, BALA
CLIENT:	BLACK & VEATCH LTD
BRIEF:	ARBORICULTURAL IMPACT ASSESSMENT

SURVEYOR:	A HENDERSON
ASSESSMENT DATE:	26/03/2019 & 25/09/2019
VIEWING CONDITIONS:	CLEAR
JOB REFERENCE:	19/AIA/SNP/10 (REV E)

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TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m²)
				N	S	E	W						
T1	Ash	M	13 4N	4	2	5	4.5	350	M/G	<ul style="list-style-type: none"> Entirely ivy clad impeding inspection Paved area over primary roots to east and west Tree appears to good health & vigour E.R.C 20 	<ul style="list-style-type: none"> Retain & protect; possible to work around & retain due to location at margin of Enkamat 	B2	4.2m 55m²
T2	Lime	M	11 1.5S	5	4	4.5	4.5	480	G	<ul style="list-style-type: none"> Cavity at base to north E.R.C 20 	<ul style="list-style-type: none"> Retain & protect; possible to work around & retain due to location at margin of Enkamat 	B2	5.7m 104m²
T3	Lime	M	16 2S	5.5	3.5	5.5	5.5	550	G	<ul style="list-style-type: none"> No significant defects Mass epicormic growth around base impeding inspection Prominent tree to locale E.R.C 40 	<ul style="list-style-type: none"> Retain & protect; possible to work around & retain due to location at margin of Enkamat 	A2	6.6m 137m²
T4	Ash	M	16 5S	8	4.5	4	7	820	M	<ul style="list-style-type: none"> Prominent mature tree to locale Dead wood & crown dieback Multiple cavities E.R.C 20 	<ul style="list-style-type: none"> Remove all dead wood Retain & protect; possible to work around & retain due to location at margin of Enkamat & crown clean 	A2	9.8m 304m²

HEADINGS & ABBREVIATIONS

TREE NO.
SPECIES:
AGE RANGE/LIFE STAGE:
HEIGHT:
CROWN SPREAD:
CROWN CLEARANCE & DIRECTION OF GROWTH:
STEM DIA/MULTI-STEM DIA:
VITALITY:
E.R.C. = ESTIMATED REMAINING CONTRIBUTION:
BS 5837 CATEGORY & SUB-CATEGORY GRADING:
BS 5837 RADIUS & BS 5837 RPA:

REFERENCE NUMBER. REFER TO PLAN OR NUMBERED TAGS WHERE APPLICABLE (T = TREE, G = GROUP, H = HEDGE)
COMMON NAME (LATIN NAMES AVAILABLE ON REQUEST)
Y = YOUNG, SM = SEMI MATURE, EM = EARLY MATURE, M = MATURE, PM = POST MATURE
ESTIMATED AND RECORDED IN METRES. APPROXIMATELY 1 IN 10 TREES ARE MEASURED USING A CLINOMETER AND THE REMAINDER ESTIMATED AGAINST THE MEASURED TREES
MAXIMUM CROWN RADIUS MEASURED TO THE FOUR CARDINAL COMPASS POINTS FOR SINGLE SPECIMENS ONLY (MEASUREMENT FOR TREE GROUPS - MAXIMUM RADIUS OF THE GROUP)
HEIGHT IN METERS OF CROWN CLEARANCE ABOVE ADJACENT GROUND LEVEL (TO INFORM ON GROUND CLEARANCE, CROWN/STEM RATIO AND SHADING)
STEM DIAMETER - MEASURED AT APPROXIMATELY 1.5 METRES ABOVE GROUND LEVEL OR A COMBINATION OF STEMS FOR MULTI-STEMMED TREES
A MEASURE OF PHYSIOLOGICAL CONDITION. D = DEAD, MD = MORIBUND, P = POOR, M = MODERATE, G = GOOD
RELATIVE USEFUL LIFE EXPECTANCY (YEARS)
A = HIGH QUALITY AND VALUE, B = MODERATE QUALITY AND VALUE, C = LOW QUALITY AND VALUE, U = UNSUITABLE FOR RETENTION (SUB-CATEGORY REFERS TO ARBORICULTURAL, LANDSCAPE AND CULTURAL/CONSERVATION VALUES)
PROTECTIVE DISTANCE - RADIUS FROM THE CENTRE OF THE STEM TO THE LINE OF TREE PROTECTION (CONSTRUCTION EXCLUSION ZONE - CEZ) AND PROTECTIVE BARRIER ROOT PROTECTION AREA - BS 5837 (2012) ANNEX D (THE RECOMMENDATIONS STATE THAT THE RPA SHOULD BE CAPPED AT 707 M²) NOTE - ALL CALCULATIONS ROUNDED TO NEAREST DECIMAL

TREE SURVEY SCHEDULE (BS5837: 2012)

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				N	S	E	W						
T5	Ash	EM	15 1.5S	7	5	7	5	470	G	<ul style="list-style-type: none"> No visual defects E.R.C 20 	<ul style="list-style-type: none"> Retain & protect; possible to work around & retain due to location at margin of Enkamat 	B2	5.6m 100m ²
T6	Sycamore	M	13 4S	5	4	6	5	640	G	<ul style="list-style-type: none"> Minor dead wood in crown E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	7.7m 185m ²
T7	Ash	M	16 5S	9.5	4.5	7	5	740	G	<ul style="list-style-type: none"> Abuts footpath and roots are displacing surface causing trip hazard Ash Dieback evident in crown E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	8.9m 248m ²
T8	Ash	FM	17 4.5S	9	6.5	9	7	1190	G	<ul style="list-style-type: none"> Fully mature tree located on embankment – roots displacing footpath causing trip hazard Large diameter dead wood and Ash Dieback evident in crown Multiple cavities at point of past limb removal/failures E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	14.3M 641m ²
T9	Horse Chestnut	EM	10 2W	4.5	3	5	3	560	P	<ul style="list-style-type: none"> Horse Chestnut Bleeding Canker present on stem Honey Fungus evident at base Tree is in decline E.R.C 0 	<ul style="list-style-type: none"> Remove for H&S 	C1	6.7m 142m ²
T10	Horse Chestnut	EM	9	4	4	4	5	470	M	<ul style="list-style-type: none"> Horse Chestnut Bleeding Canker present on stem Appears stressed & in decline E.R.C 0 	<ul style="list-style-type: none"> Remove 	C1	5.6m 100m ²

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				N	S	E	W						
T11	Oak	EM	6 2S	4.5	2.5	2	3	340	G	<ul style="list-style-type: none"> Asymmetric crown form due to overcrowding E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	4m 52m ²
T12	Sycamore	EM	10 4S	5	3.5	5	5	340	G	<ul style="list-style-type: none"> No visual defects E.R.C 10+ 	<ul style="list-style-type: none"> Remove for proposed works 	C2	4m 52m ²
T13	Ash	EM	12 3N	5	1	4	2	390	G	<ul style="list-style-type: none"> No visual defects Asymmetric crown form E.R.C 10+ 	<ul style="list-style-type: none"> Remove for proposed works 	C2	4.7m 69m ²
T14	Ash	EM	14	5	5	6	3	520	G	<ul style="list-style-type: none"> Largest tree in group E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	6.2m 122m ²
T15	Sycamore	M	15 2W	6	3	5	4	590	G	<ul style="list-style-type: none"> Self-set tree with no visual defects E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	C2	7m 157m ²
T16	Ash	EM	13 5N	5	2.5	5	5	690	G	<ul style="list-style-type: none"> Small diameter dead wood throughout crown Ivy clad impeding inspection E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	8.3m 215m ²
T17	Sweet Chestnut	M	16 4S	7	6	7	7	730	G	<ul style="list-style-type: none"> Prominent landscape feature tree Dead wood in crown Small cavity on stem to south at 1.8m E.R.C 40 	<ul style="list-style-type: none"> Retain & protect; scheme to work around due to high quality & value 	A2	8.7m 241m ²
T18	Ash	EM	14 4S	5	5	5	5	560	G	<ul style="list-style-type: none"> No visual defects E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	6.7m 142m ²
T19	Ash	M	17 4S	4.5	7	7	8	750	G	<ul style="list-style-type: none"> Large prominent tree located within boundary fence adjacent to pedestrian access to rugby club Dead wood throughout crown Ash Dieback evident in crown E.R.C 40 	<ul style="list-style-type: none"> Remove for proposed works 	A2	9m 255m ²

TREE SURVEY SCHEDULE (BS5837: 2012)

SITE:	LLYN TEGID RESERVOIR, BALA
CLIENT:	BLACK & VEATCH LTD
BRIEF:	ARBORICULTURAL IMPACT ASSESSMENT

SURVEYOR:	A HENDERSON
ASSESSMENT DATE:	26/03/2019 & 25/09/2019
VIEWING CONDITIONS:	CLEAR
JOB REFERENCE:	19/AIA/SNP/10 (REV E)

TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB- CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m ²)
				N	S	E	W						
T20	Ash	EM	15	3.5	4	4	3	330	G	<ul style="list-style-type: none"> Twin stemmed tree located at top of embankment Ash Dieback evident in crown Self-set E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	4m 49m ²
T21	Ash	EM	14	4.5	3	7	3	490	G	<ul style="list-style-type: none"> Deadwood & crown dieback Ash Dieback evident in crown Rocks embedded in stem at base Topped in past – secondary crown formed above E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	5.9m 109m ²
T22	Ash	M	16	6	5	6	6	700	M	<ul style="list-style-type: none"> Entirely Ivy clad impeding inspection Appears to have suffered crown failure in past Ash Dieback evident in crown E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	8.4m 222m ²
T23	Ash	M	15	2.5	7.5	5	3	700	M	<ul style="list-style-type: none"> As T22 	<ul style="list-style-type: none"> Remove for proposed works 	B2	8.4m 222m ²
T24	Lime	M	15 4S	5	2.5	6	6	500	G	<ul style="list-style-type: none"> Part of linier group within boundary hedgerow adjacent to rugby club No significant defects E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	6m 113m ²
T25	Ash	EM	13 0	1	5	1.5	5	400	G	<ul style="list-style-type: none"> Self-set tree with suppressed crown form due to proximity to T22 & T23 E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	C2	4.8m 72m ²

TREE SURVEY SCHEDULE (BS5837: 2012)

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TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA.(mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m ²)
				N	S	E	W						
T26	Malus	M	6 0	1.5	2.5	2	2	≤500	P	<ul style="list-style-type: none"> Entirely Ivy clad – no crown visible E.R.C 0 	<ul style="list-style-type: none"> Remove for proposed works 	C1	6m 113m ²
T27	Ash	M	15 3S	4.5	4.5	5	5	500	G	<ul style="list-style-type: none"> Ivy clad self-set tree Appears in good health & vigour E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	6m 113m ²
T28	Sycamore	M	15 5S	5	3	6	4	600	G	<ul style="list-style-type: none"> Cavity at base to south Ivy clad E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	7.2m 163m ²
T29	Lime	EM	9 1E	6	1.5	3	3	260x4 (520)	G	<ul style="list-style-type: none"> Multi-stem from base Appears in good health & vigour E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	6.2m 122m ²
T30	Ash								MD	<ul style="list-style-type: none"> In advanced decline Significant dieback due to Nectria canker E.R.C 0 	<ul style="list-style-type: none"> Remove for H&S 	U	N/A
T31	Sycamore	EM	11	5	2	3	2	500	G	<ul style="list-style-type: none"> Self-set tree Easily replaced post works E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	C2	6m 113m ²
T32	Sycamore	EM	7	4	3	4	4	440	G	<ul style="list-style-type: none"> As T31 	<ul style="list-style-type: none"> Remove for proposed works 	C2	5.3m 88m ²
T33	Sycamore	EM	11 2N	5	4	3	2	440	G	<ul style="list-style-type: none"> Small self-set tree within confined rooting environment. Insufficient space to develop to maturity E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	C2	5.3m 88m ²

TREE SURVEY SCHEDULE (BS5837: 2012)

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SURVEYOR:	A HENDERSON
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TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m ²)
				N	S	E	W						
T34	Alder	EM	9 1S	1	2	1	2	260	G	<ul style="list-style-type: none"> No visual defects E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	C2	3.1m 31m ²
T35	Oak	EM	9	3	3	1.5	4	400	G	<ul style="list-style-type: none"> Well established tree with no visual defects E.R.C 20+ 	<ul style="list-style-type: none"> Retain & protect; possible to work around due to location at the toe of the berm 	B2	4.8m 72m ²
T36	Sycamore	M	12 2N	4	4	4	4	590	G	<ul style="list-style-type: none"> No visual defects E.R.C 20 	<ul style="list-style-type: none"> Retain & protect; possible to work around due to location at the toe of the berm 	B2	7m 157m ²
T37	Oak	SM	5 2E	2.5	3	2.5	2.5	270	G	<ul style="list-style-type: none"> Small tree E.R.C 10 	<ul style="list-style-type: none"> Retain & protect; possible to work around due to location at the toe of the berm 	C2	3.2m 33m ²
T38	Oak	M	16 5S	5	3.5	7	7	1000	G	<ul style="list-style-type: none"> Prominent tree on river promenade Dead wood in crown Small cavity on stem to south at 2m E.R.C 40 	<ul style="list-style-type: none"> Retain & protect; scheme to work around due to high quality & value 	A2	12m 452m ²
T39	Sycamore	FM	18 1.5E	8	7	9.5	8	1250+	G	<ul style="list-style-type: none"> End tree to linear group along field boundary High amenity & landscape value E.R.C 40 	<ul style="list-style-type: none"> Retain & protect – high quality & value and much of RPA outside of area of works 	A2	15m 707m ²
T40	Oak	EM	8 1N	4	1	3	4	300	G	<ul style="list-style-type: none"> Small tree forming part of linear copse planted to screen industrial buildings E.R.C 20 	<ul style="list-style-type: none"> Retain 	B2	3.6m 41m ²

TREE SURVEY SCHEDULE (BS5837: 2012)

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CLIENT:	BLACK & VEATCH LTD
BRIEF:	ARBORICULTURAL IMPACT ASSESSMENT

SURVEYOR:	A HENDERSON
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JOB REFERENCE:	19/AIA/SNP/10 (REV E)

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TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA.(7mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m ²)
				N	S	E	W						
T41	Lime	EM	12 3S	3	3	4	4	380	G	<ul style="list-style-type: none"> As T40 No visible defects E.R.C 20 	<ul style="list-style-type: none"> Remove to facilitate works. 	B2	4.5m 65m ²
T42	Hawthorn	EM	5	1.5	1.5	1.5	1.5	250	G	<ul style="list-style-type: none"> Small tree E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	C2	3m 28m ²
T43	Oak	EM	10 2N	4	4	2	3	300	G	<ul style="list-style-type: none"> Small tree forming part of linear copse planted to screen industrial buildings E.R.C 20+ 	<ul style="list-style-type: none"> Remove to facilitate works. 	B2	3.6m 41m ²
T44	Oak	EM	10 2N	2	2	2.5	0	200	G	<ul style="list-style-type: none"> As T43 	<ul style="list-style-type: none"> Remove for proposed works 	C2	2.4m 18m ²
T45	Oak	EM	9	2	2	1	1	200	G	<ul style="list-style-type: none"> As T43 	<ul style="list-style-type: none"> Retain 	C2	2.4m 18m ²
T46	Damson	M	7	4	3	3	3	310	G	<ul style="list-style-type: none"> As T43 	<ul style="list-style-type: none"> Remove for proposed works 	C2	3.7m 43m ²
T47	Damson	EM	6	2	2	2	1	200	G	<ul style="list-style-type: none"> As T43 	<ul style="list-style-type: none"> Remove for proposed works 	C2	2.4m 18m ²
T48	Oak	EM	12 2N	5	1.5	4.5	4	310x2 (438)	G	<ul style="list-style-type: none"> Edge tree to group and larger than most Entirely Ivy clad E.R.C 20 	<ul style="list-style-type: none"> Remove to facilitate works. 	B2	5.2m 87m ²

TREE SURVEY SCHEDULE (BS5837: 2012)

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SURVEYOR:	A HENDERSON
ASSESSMENT DATE:	26/03/2019 & 25/09/2019
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TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m ²)
				N	S	E	W						
T49	Oak	EM	12 4S	1	3	3	5	450	G	<ul style="list-style-type: none"> As T48 	<ul style="list-style-type: none"> Remove to facilitate works. 	B2	5.4m 92m ²
T50	Cherry	M	6 1E	3	2	4.5	2	290	M	<ul style="list-style-type: none"> Heavily cankered on upper stem Poor structural form E.R.C 10 	<ul style="list-style-type: none"> Remove & replace 	C2	3.5m 38m ²
T51	Alder	M	≤15	4.5	3	4	4	≤350	G	<ul style="list-style-type: none"> 4 stems from past coppice all entirely Ivy clad impeding inspection E.R.C 20 	<ul style="list-style-type: none"> Retain & protect – most of RPA outside area of works 	B2	4.2m 55m ²
T52	Alder	M	7 3E	2.5	3	4	4	340 320 (467)	M	<ul style="list-style-type: none"> Crown dieback to north E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	C2	5.6m 99m ²
T53	Cherry	M	6 2E	1	2	4	3	310	M	<ul style="list-style-type: none"> Hangers in crown Poor quality tree of no long-term viability E.R.C 10 	<ul style="list-style-type: none"> Remove & replace 	C2	3.7m 43m ²
T54	Cherry	M	4 2S	1.5	2	1	1.5	300	M	<ul style="list-style-type: none"> Topped out to clear overhead power lines Small tree E.R.C 10 	<ul style="list-style-type: none"> Remove & replace away from power lines 	C2	3.6m 41m ²
T55	Oak	EM	15 4N	5	2	3	5	460	G	<ul style="list-style-type: none"> Edge tree to wooded copse & largest No visual defects E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	5.5m 96m ²
T56	Oak	EM	15 3N	6	2	4	2	490	G	<ul style="list-style-type: none"> As T55 	<ul style="list-style-type: none"> Remove for proposed works 	B2	5.8m 109m ²

TREE SURVEY SCHEDULE (BS5837: 2012)

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CLIENT:	BLACK & VEATCH LTD
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TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m ²)
				N	S	E	W						
T57	Ash	SM	9 0.5W	1	2.5	2.5	2	200	P	<ul style="list-style-type: none"> Severe Nectria canker growth throughout tree Poor quality & in decline E.R.C 0 	<ul style="list-style-type: none"> Advisory inform landowner that they should be removed for H&S 	U	N/A
T58	Ash	M	11 3W	1.5	5	2	4.5	500	P	<ul style="list-style-type: none"> In advanced decline – significant dieback and dead wood throughout crown E.R.C <10 	<ul style="list-style-type: none"> Advisory inform landowner that they should be removed for H&S 	U	N/A
T59	Ash	EM	16	1	2.5	4	4	440 320 (544)	G	<ul style="list-style-type: none"> Twin stemmed & Ivy clad E.R.C 20 	<ul style="list-style-type: none"> Retain 	B2	6.5m 134m ²
T60	Ash	FM	18 5E	10	7	7.5	7.5	1250+	G	<ul style="list-style-type: none"> Large prominent tree within linear group along field boundary Dead wood & crown dieback typical of species & age Cavity at base to west E.R.C 20+ 	<ul style="list-style-type: none"> Retain 	A2	15m 707m ²
T61	Ash	EM	15 4.5N	1.5	3	0	5	400	M	<ul style="list-style-type: none"> Poor structural crown form E.R.C 10 	<ul style="list-style-type: none"> Retain 	C2	4.8m 72m ²
T62	Ash	EM	15	2	2.5	2	4.5	370	M	<ul style="list-style-type: none"> Forms part of linear group on field boundary E.R.C 20 	<ul style="list-style-type: none"> Retain 	B2	4.4m 62m ²
T63	Ash	EM	13 3N	4	4	4	4	500	G	<ul style="list-style-type: none"> Bifurcates to 3 co-dominant stems from 1.5m Ivy clad impeding inspection E.R.C 20 	<ul style="list-style-type: none"> Retain 	B2	6m 113m ²
T64	Sycamore	M	17 4N	7	5	5	3	860	G	<ul style="list-style-type: none"> Prominent roadside tree E.R.C 40 	<ul style="list-style-type: none"> Retain 	A2	10.3m 860m ²

TREE SURVEY SCHEDULE (BS5837: 2012)

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TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m ²)
				N	S	E	W						
T65	Sycamore	SM	5	1	1	1	0	190	M	<ul style="list-style-type: none"> Small self-set tree with poor structural crown form No current or future value E.R.C 0 	<ul style="list-style-type: none"> Remove if required 	C3	2.3m 16m ²
T66	Ash	EM	9	3	3	3	1	260	M/G	<ul style="list-style-type: none"> Twin stem & fused Ash dieback evident in crown E.R.C 0 	<ul style="list-style-type: none"> Remove if required 	C3	3.1m 31m ²
T67	Alder	EM	4	1.5	1.5	1.5	1.5	≤150	G	<ul style="list-style-type: none"> Small multi-stem of no particular merit E.R.C 10 	<ul style="list-style-type: none"> Remove if required 	C3	1.8m 10m ²
T68	Sycamore	M	13 1N	6	5	4	5	810	G	<ul style="list-style-type: none"> No visual defects Forms part of linear group around foiled boundary E.R.C 40+ 	<ul style="list-style-type: none"> No works required 	A2	9.7m 297m ²
T69	Sycamore	FM	19 4S	6	6	5	4	1120	G	<ul style="list-style-type: none"> As T68 	<ul style="list-style-type: none"> N/A 	A2	13.4m 568m ²
T70	Sycamore	M	18 4S	5	6	5	5	720	G	<ul style="list-style-type: none"> As T68 	<ul style="list-style-type: none"> N/A 	A2	8.6m 235m ²
T71	Oak-3stems Sycamore-1stem	M	20 4S	5	6	5	4	≤1170	G	<ul style="list-style-type: none"> Multiple stems from past coppice – largest diameter recorded Beefsteak fungi at base Basal decay evident E.R.C 20+ 	<ul style="list-style-type: none"> 3rd party tree – recommend monitoring decay at base 	A2	14.4m 619m ²
T72	Oak	M	18 4S	5	7	4.5	4	1150	G	<ul style="list-style-type: none"> Dead wood in crown Part of linear group E.R.C 40 	<ul style="list-style-type: none"> N/A 	A2	13.8m 598m ²
T73	Aspen	M	18 1N	4	4.5	3	3	680	G	<ul style="list-style-type: none"> Dead wood & dieback in crown Decay cavity on stem to east E.R.C 20 	<ul style="list-style-type: none"> N/A 	B2	8.2m 209m ²

TREE SURVEY SCHEDULE (BS5837: 2012)

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TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m ²)
				N	S	E	W						
T74	Oak	M	13 4S	5	5	0	2.5	660	M	<ul style="list-style-type: none"> Butt decay Poor structural form Past large diameter limb failures E.R.C 20 	<ul style="list-style-type: none"> 3rd party tree – recommend monitoring decay at base 	B2	7.9m 197m ²
T75	Oak	FM	18 5S	8	8	3	4	1250+	G	<ul style="list-style-type: none"> 3 stems from past coppice Large diameter dead wood in crown E.R.C 40 	<ul style="list-style-type: none"> N/A 	A2	15m 707m ²
T76	Sycamore	FM	19 5S	7	4	7	3	940	G	<ul style="list-style-type: none"> Large stem abrasion to NE at 1m – occluded well Basal decay Bark delaminating to 8m north E.R.C 20 	<ul style="list-style-type: none"> 3rd party tree – recommend monitoring decay at base 	B2	11.3m 400m ²
T77	Oak	FM	23 5S	6	8	6	5	1230	G	<ul style="list-style-type: none"> Large prominent tree within linear group along field boundary E.R.C 40+ 	<ul style="list-style-type: none"> N/A 	A2	15m 707m ²
T78	Oak	M	19 4S	4	6	5	2	700	M/G	<ul style="list-style-type: none"> Basal decay evident E.R.C 20 	<ul style="list-style-type: none"> 3rd party tree – recommend monitoring decay at base 	B2	4.8m 72m ²
T79	Oak	FM	18 5S	9	8	6	7	1100	G	<ul style="list-style-type: none"> Forms part of linear group on field boundary Basal decay E.R.C 40 	<ul style="list-style-type: none"> 3rd party tree – recommend monitoring decay at base 	A2	8.4m 222m ²
T80	Ash	FM	22 5S	6	6	6	5	1250+	G	<ul style="list-style-type: none"> Basal decay in roots E.R.C 40 	<ul style="list-style-type: none"> As T79 	A2	15m 707m ²
T81	Ash	M	18 5S	7	4	4	4	600	G	<ul style="list-style-type: none"> Ivy clad impeding inspection Fence embedded in stem E.R.C 20 	<ul style="list-style-type: none"> N/A 	B2	7.2m 163m ²

TREE SURVEY SCHEDULE (BS5837: 2012)

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VIEWING CONDITIONS:	CLEAR
JOB REFERENCE:	19/AIA/SNP/10 (REV E)

TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m ²)
				N	S	E	W						
T82	Sycamore	FM	20 4W	7	5	6	7	800	G	<ul style="list-style-type: none"> Basal decay E.R.C 20 	<ul style="list-style-type: none"> 3rd party tree – recommend monitoring decay at base 	B2	9.6m 290m ²
T83	Ash	FM	19 4W	6	7	6	11	1250+	G	<ul style="list-style-type: none"> Veteran tree E.R.C 40 	<ul style="list-style-type: none"> N/A 	A2	15m 707m ²
T84	Ash	M	19 4W	3	5	4	6	650	G	<ul style="list-style-type: none"> Co-dominant stems from 1.5m E.R.C 20 	<ul style="list-style-type: none"> N/A 	B2	6.5m 134m ²
T85	Beech	FM	18 2N	9	5	8	2	1250+	M	<ul style="list-style-type: none"> Secondary leader to west failed leaving large tear out wound and remaining asymmetric crown E.R.C 10 	<ul style="list-style-type: none"> N/A 	B2	15m 707m ²
T86	Ash	PM	18 4W	5	9	8	7	1250+	M	<ul style="list-style-type: none"> Large diameter dead wood in crown Past crown failures Ash dieback E.R.C 20 	<ul style="list-style-type: none"> N/A 	B2	7.8m 191m ²
T87	Ash	PM							MD	<ul style="list-style-type: none"> In advanced decline/dead 	<ul style="list-style-type: none"> Retain for biodiversity 	U	N/A
T88	Ash	PM							D	<ul style="list-style-type: none"> Dead 	<ul style="list-style-type: none"> As T87 	U	N/A
T89	Oak	M	13 4N	5	8	8	5	700	G	<ul style="list-style-type: none"> Good quality field boundary tree E.R.C 40 	<ul style="list-style-type: none"> N/A 	A2	8.4m 222m ²
T90	Ash	M	16 5N	5	5	5	5	700	G	<ul style="list-style-type: none"> Good quality field boundary tree E.R.C 40 	<ul style="list-style-type: none"> N/A 	A2	8.4m 222m ²
T91	Ash	M	16	4	5	6	5	710	M	<ul style="list-style-type: none"> Dead wood & dieback in crown E.R.C 20 	<ul style="list-style-type: none"> N/A 	B2	8.5m 228m ²

TREE SURVEY SCHEDULE (BS5837: 2012)

SITE:	LLYN TEGID RESERVOIR, BALA
CLIENT:	BLACK & VEATCH LTD
BRIEF:	ARBORICULTURAL IMPACT ASSESSMENT

SURVEYOR:	A HENDERSON
ASSESSMENT DATE:	26/03/2019 & 25/09/2019
VIEWING CONDITIONS:	CLEAR
JOB REFERENCE:	19/AIA/SNP/10 (REV E)

TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m ²)
				N	S	E	W						
T92	Sycamore	FM	18	3	5	7	2	800	M	<ul style="list-style-type: none"> Northern leader failed leaving large tear out wound with decay E.R.C 10 	<ul style="list-style-type: none"> 3rd party tree but recommend pollarding 	C2	9.6m 290m ²
T93	Sycamore	M	17	3	3	2	3	500	G	<ul style="list-style-type: none"> Forms closed canopy with T92 E.R.C 20+ 	<ul style="list-style-type: none"> N/A 	B2	6m 113m ²
T94	Sycamore	EM	9	2	2	2	2.5	410	G	<ul style="list-style-type: none"> Small suppressed tree E.R.C 20 	<ul style="list-style-type: none"> N/A 	B2	4.9m 76m ²
T95	Elm	EM	5	3	4	3	2	290	G	<ul style="list-style-type: none"> Multi-stem from past coppice E.R.C 10 	<ul style="list-style-type: none"> N/A 	C2	3.5m 38m ²
T96	Horse Chestnut	FM	15 1.5N	7	6.5	6.5	5	1250+	G	<ul style="list-style-type: none"> Fully mature/post mature specimen Tip dieback evident to north Large limb failure to west at 6m leaving tear out wound Lowest limb west dead Crown reduced in past Prominent in landscape E.R.C 40 	<ul style="list-style-type: none"> Advisory – remove all dead wood throughout crown 	A2	15m 707m ²
T97	Ash	M	19 1W	7.5	4.5	5	5	950	G	<ul style="list-style-type: none"> Tall prominent tree to locale Crown reduced in past E.R.C 40 	<ul style="list-style-type: none"> N/A 	A2	11.4m 408m ²
T98	Alder	EM	10 1N	3	2	2.5	2	310	G	<ul style="list-style-type: none"> No visual defects E.R.C 10 	<ul style="list-style-type: none"> N/A 	B2	3.7m 43m ²

TREE SURVEY SCHEDULE (BS5837: 2012)

SITE:	LLYN TEGID RESERVOIR, BALA
CLIENT:	BLACK & VEATCH LTD
BRIEF:	ARBORICULTURAL IMPACT ASSESSMENT

SURVEYOR:	A HENDERSON
ASSESSMENT DATE:	26/03/2019 & 25/09/2019
VIEWING CONDITIONS:	CLEAR
JOB REFERENCE:	19/AIA/SNP/10 (REV E)

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TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m²)
				N	S	E	W						
G1	Sycamore 70% Ash Oak x 1	SM / EM	≤12	3.5	3	2	2	≤310	M	<ul style="list-style-type: none"> Linear group of naturally regenerated trees allowed to grow on embankment wall due to lack of any ongoing management Trees now form a closed canopy copse Trees have exploited gaps between rip rap stones that make up the embankment face and have now reached their optimum girth at the base and the boulders have become embedded. There is insufficient space for the trees to develop further and the boulders will inevitably cause fracture points and wounds There is evidence of large wounds and decay in the base of many stems Evidence of Ash Dieback in crowns E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	C2	3.7m 43m²
G2	Birch	M	≤15	2	2	2	2	≤300	G	<ul style="list-style-type: none"> Attractive landscaped planting forming small closed canopy copse E.R.C 20+ 	<ul style="list-style-type: none"> Retain & protect – mostly outside of working area 	B2	3.6m 41m²
G3	Alder Birch, Ash Willow	EM	≤7					≤300	M/P	<ul style="list-style-type: none"> Alders to west are dead & in decline remainder is small diameter scrub E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	C2	3.6m 41m²

TREE SURVEY SCHEDULE (BS5837: 2012)

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CLIENT:	BLACK & VEATCH LTD
BRIEF:	ARBORICULTURAL IMPACT ASSESSMENT

SURVEYOR:	A HENDERSON
ASSESSMENT DATE:	26/03/2019 & 25/09/2019
VIEWING CONDITIONS:	CLEAR
JOB REFERENCE:	19/AIA/SNP/10 (REV E)

PAGE 15 OF 18

TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m²)
				N	S	E	W						
G4	Ash Oak x 2	EM	≤13	4	4	2	2	≤300	M	<ul style="list-style-type: none"> As G1 collectively form small linear copse that have naturally colonised between the rip rap stones. Most have boulders embedded in stems at base and have outgrown their confined location Nectria cankers on stems All topped out at 8m leaving secondary crowns above with weak attachments to the parent stem that are liable to fail when loaded or during inclement weather Evidence of Ash Dieback in crowns E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	B2	3.6m 41m²
G5	Ash	EM	≤9	2	5	3	3	≤450	M/G	<ul style="list-style-type: none"> All topped out at 8m leaving secondary crowns above with weak attachments to the parent stem that are liable to fail when loaded or during inclement weather Ivy clad impeding inspection As G4 – naturally colonised and allowed to grow due to lack of management Evidence of Ash Dieback in crowns E.R.C. 10 	<ul style="list-style-type: none"> Remove for proposed works 	B2	5.4 92m²
G6	Ash	EM	≤10	3	3	2	2	≤320	M/G	<ul style="list-style-type: none"> As G4 Evidence of Ash Dieback in crowns Crown dieback & dead wood in stems 	<ul style="list-style-type: none"> Remove for proposed works 	C2	3.8m 46m²
G7	Ash	EM	≤10	4	3	3	3	≤320	G	<ul style="list-style-type: none"> As G6 	<ul style="list-style-type: none"> Remove for proposed works 	C2	3.8m 46m²
G8	Sycamore x 2 Ash	EM	≤10	2.5	3	3	3	≤300	G	<ul style="list-style-type: none"> As G4 	<ul style="list-style-type: none"> Remove for proposed works 	B2	3.6m 41m²

TREE SURVEY SCHEDULE (BS5837: 2012)

SITE:	LLYN TEGID RESERVOIR, BALA
CLIENT:	BLACK & VEATCH LTD
BRIEF:	ARBORICULTURAL IMPACT ASSESSMENT

SURVEYOR:	A HENDERSON
ASSESSMENT DATE:	26/03/2019 & 25/09/2019
VIEWING CONDITIONS:	CLEAR
JOB REFERENCE:	19/AIA/SNP/10 (REV E)

TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m ²)
				N	S	E	W						
G9	Ash Sycamore Alder	EM	≤14					≤350	G	<ul style="list-style-type: none"> Overgrown self-set trees Coppiced in past E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	C2	4.2m 55m ²
G10	Ash	EM	≤13	4	4	5	4	≤300	G	<ul style="list-style-type: none"> Linear group of past coppice allowed to re-grow due to lack of ongoing management E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	C2	3.6m 41m ²
G11	Ash	SM	≤6					≤170	G	<ul style="list-style-type: none"> New Ash poles above coppiced stools allowed to re-grow due to lack of management E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	C2	2m 13m ²
G12	Ash	SM / EM	≤9					≤150	G	<ul style="list-style-type: none"> Linear group of trees at 0.5m centres – self set and easily replaced by new planting post works Evidence of Ash Dieback in crowns E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	C2	1.8m 10m ²
G13	Cherry Plum	M	≤12	2	2	5	2	≤200	G	<ul style="list-style-type: none"> No visual defects Easily replaced post completion of works E.R.C 10 	<ul style="list-style-type: none"> Remove for proposed works 	C2	2.4m 18m ²

TREE SURVEY SCHEDULE (BS5837: 2012)

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SURVEYOR:	A HENDERSON
ASSESSMENT DATE:	26/03/2019 & 25/09/2019
VIEWING CONDITIONS:	CLEAR
JOB REFERENCE:	19/AIA/SNP/10 (REV E)

TREE NO. <small>T - Tree G - Group H - Hedge</small>	SPECIES (COMMON NAME)	AGE	HEIGHT (m) + CROWN CLEARANCE/ DIRECTION OF GROWTH (N.S.E.W)	RADIAL CROWN SPREAD (m)				STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS	MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RADIUS (m) RPA (m ²)
				N	S	E	W						
G14	Ash Birch Pine Hazel	SM / EM	≤13					≤300	G	<ul style="list-style-type: none"> Linear group planted as a screen to light industrial units beyond No management since planting resulting in drawn crown and overcrowding Birch largest with 300mm DBH, remaining trees are small diameter ≤150mm E.R.C 20+ – if managed/thinned out 	<ul style="list-style-type: none"> Retain & protect – much of RPA outside of area of works 	B2	3.6m 41m ²
G15	Goat Willow Alder	EM	≤11					≤160	G	<ul style="list-style-type: none"> Scrub E.R.C 10 	<ul style="list-style-type: none"> Retain & protect – much of RPA outside of area of works 	C3	1.9m 12m ²
G16	Ash	EM	≤13					≤250	G	<ul style="list-style-type: none"> Small linear group forming closed canopy copse Evidence of Ash Dieback in crowns E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	3m 28m ²
G17	Goat Willow Ash Damson Oak	SM / EM	≤12					≤300	M/G	<ul style="list-style-type: none"> Unmanaged small copse E.R.C 20 	<ul style="list-style-type: none"> Remove for proposed works 	B2	3.6m 41m ²
G18	Oak x 3 Ash x1 Mountain Ash x1	EM	≤12	2	2	2	2	≤300	G	<ul style="list-style-type: none"> Unmanaged small copse E.R.C 20 	<ul style="list-style-type: none"> Retain 	B2	3.6m 41m ²

TREE SURVEY SCHEDULE (BS5837: 2012)

SITE:	LLYN TEGID RESERVOIR, BALA
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BRIEF:	ARBORICULTURAL IMPACT ASSESSMENT

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				N	S	E	W						
G19	Willow Alder	SM	≤10					≤100	G	<ul style="list-style-type: none"> Linear group planted to screen industrial units Most are drawn and suppressed due to located adjacent to more dominant tree grounds and watercourse E.R.C 10 	<ul style="list-style-type: none"> Retain & protect – much of RPA outside area of works 	C3	1.2m 5m ²
G20	Ash	EM	≤15 4.5E	2	2	3	3	≤270	G	<ul style="list-style-type: none"> Linear group of small diameter trees Evidence of Ash Dieback in crowns E.R.C 10 	<ul style="list-style-type: none"> No works 	C2	3.2m 33m ²
G21	Alder	M							MD	<ul style="list-style-type: none"> In advanced decline/dead 	<ul style="list-style-type: none"> Remove if required or leave for biodiversity 	U	N/A
G22	Ash Oak Alder Willow	EM	≤10					≤250	M/P/ MD/D	<ul style="list-style-type: none"> Small mixed copse Alders dead and in advanced decline Evidence of Ash Dieback in crowns Willow, past coppiced Oaks to eastern boundary appear in good health & vigour E.R.C 10 	<ul style="list-style-type: none"> Requires appropriate management to remove dead and dying trees & replace with Oaks 	C2 U	3m 28m ²
G23	Hazel	EM /M	≤9					≤120	G	<ul style="list-style-type: none"> Tall multi-stem trees located on roadside verge & forming attractive linear group E.R.C 20 	<ul style="list-style-type: none"> N/A 	B2	1.4m 7m ²
G24	Ash 90% Sycamore	SM / EM	≤10					≤150	M/G	<ul style="list-style-type: none"> Linear group of small diameter trees on downward sloping roadside embankment Evidence of Ash Dieback in crowns E.R.C 10 	<ul style="list-style-type: none"> Monitor Ash Dieback 	C2	1.8m 10m ²

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	<ul style="list-style-type: none"> 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 U trees (e.g. 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, or very low quality trees suppressing adjacent trees of better quality <p><i>NOTE</i> Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</p>			See Table 2
	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation	
Trees to be considered for retention				
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Appendix Two
Preliminary Tree Constraints Plan



Legend
 Root Protection Area
 Modified to Account for
 Site Features

Category A (High Quality) Category C (Low Quality)
 Category B (Moderate Quality) Category D (Dead/Dying/In Decline)

NOTE: Tree group numbers marked with an * have approximate locations

Client: Black & Veatch Ltd

Project: Llyn Tegid Reservoir, Bala

Title: Preliminary Tree Constraints Plan

Scale: 1:500@A0 Date: November 2019

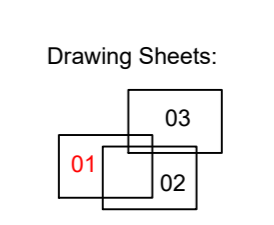
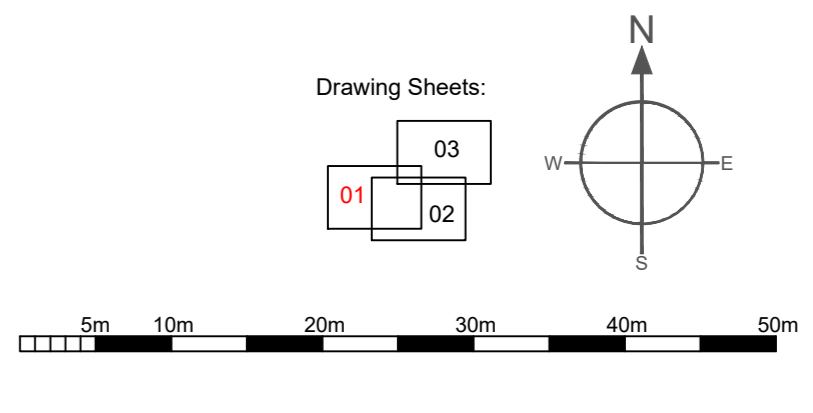
Drawn By: DB & AM Revison: SB

Job Ref: 19/AIA/SNP10 Drawing No: 01

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Legend
 Root Protection Area
 Modified to Account for
 Site Features

Crown Spread
 Tree Number
 Root Protection Area

Category A (High Quality)
 Category B (Moderate Quality)
 Category C (Low Quality)
 Category D (Dead/Dying/In Decline)

NOTE: Tree group numbers marked with an * have approximate locations

Client: Black & Veatch Ltd

Project: Llyn Tegid Reservoir, Bala

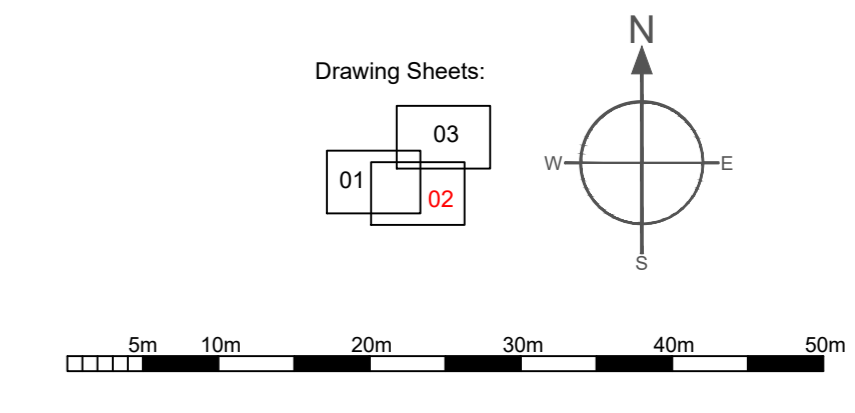
Title: Preliminary Tree Constraints Plan

Scale: 1:500@A0	Date: November 2019
Drawn By: DB & AM	Revised: SB
Job Ref: 19/AIA/SNP110	Drawing No: 01

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Legend
 Root Protection Area Modified to Account for Site Features

Category: Root Protection Area

Category A (High Quality) ●
 Category B (Moderate Quality) ●
 Category C (Low Quality) ●
 Category LI (Dead/Dying/In Decline) ●
 Category U (Unsure) ●

Canopy Spread
 Tree Number 1

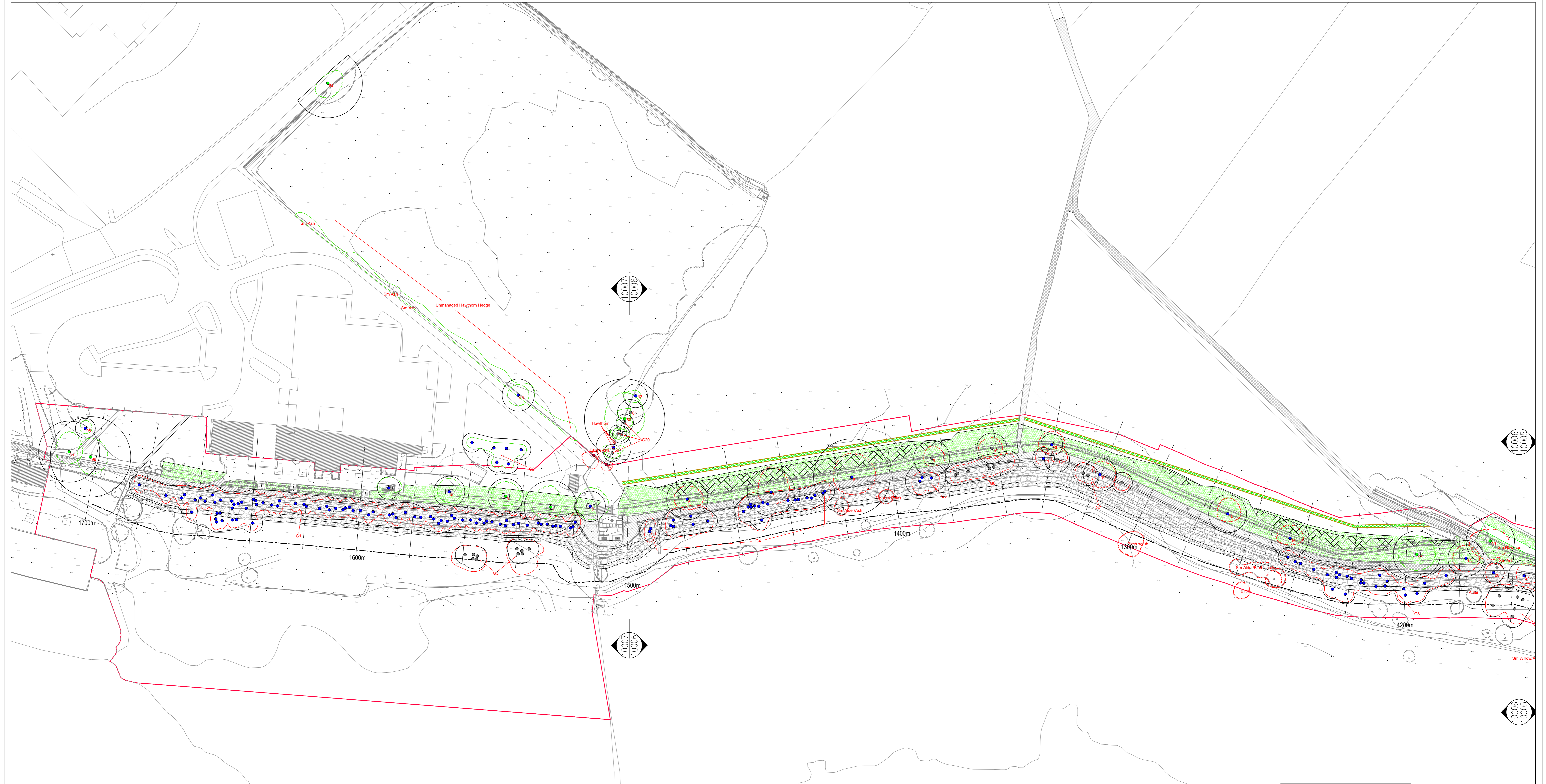
NOTE: Treegroup numbers marked with an * have approximate locations

Client: Black & Veatch Ltd
 Project: Lyn Tegid Reservoir, Bala
 Title: Preliminary Tree Constraints Plan
 Scale: 1:500@A0 Date: November 2019
 Drawn By: DB & AM Revison: SB
 Job Ref: 19/AIA/SNP10 Drawing No: 01

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Appendix Three
Impact Assessment Plan



Legend

- EXTENT OF CONSTRUCTION WORKING AREA
- EXTENT OF MAINTENANCE STRIP
- UPGRADED RIP RAP PROTECTION
- ENKAMAT
- FOOTPATH
- CREST MONITORING PIN REINSTATED
- FENCE REALIGNMENT
- HEDGEROW REALIGNMENT
- 100m CHANGE
- LAND DRAINAGE PIPEWORK (SEE NOTE 8)
- HIMALAYAN BALSAM
- JAPANESE KNOTWEED
- ARMORLOC 150 BLOCKS

Legend
 Root Protection Area Modified to Account for Site Features

Category A (High Quality) ● Crown Spread ○ Tree Number 1

Category B (Moderate Quality) ● Category C (Low Quality) ●

Category U (Dead/Dying/In Decline) ● Category L (Dead/Dying/In Decline) ●

NOTE: Tree group numbers marked with an * have approximate locations

○ Tree Proposed for Removal

Client: Black & Veatch Ltd	
Project: Llyn Tegid Reservoir, Bala	
Title: Arbicultural Impact Assessment	
Scale: 1:500@A0	Date: November 2019
Drawn By: DB & AM	Revision: C
Job Ref: 19/AIA/SNP10	Drawing No: 02

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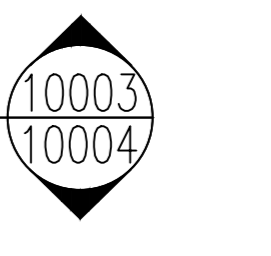
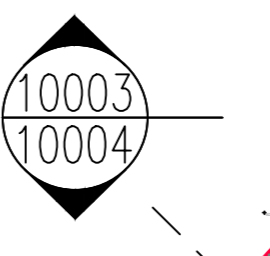
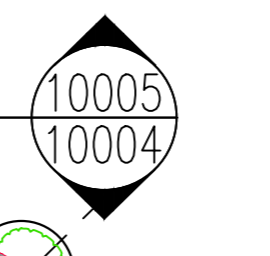
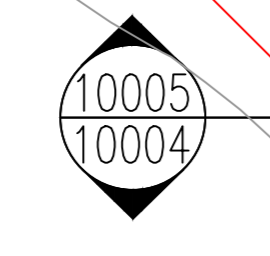
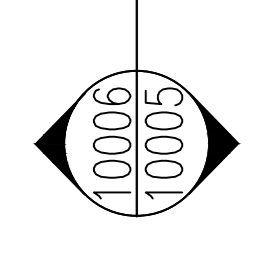
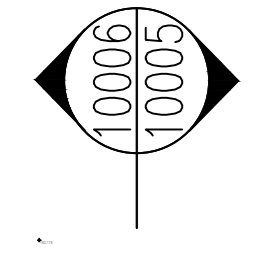
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Drawing Sheets:

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Scale: 5m 10m 20m 30m 40m 50m



Legend

- EXTENT OF CONSTRUCTION WORKING AREA
- EXTENT OF MAINTENANCE STRIP
- UPGRADED RIP RAP PROTECTION
- ENKAMAT
- FOOTPATH
- CREST MONITORING PIN REINSTATED
- FENCE REALIGNMENT
- HEDGEROW REALIGNMENT
- CHAINAGE
- LAND DRAINAGE PIPEWORK (SEE NOTE B)
- HIMALAYAN BALSAM
- JAPANESE KNOTWEED
- ARMOR/C 150 BLOCKS

Legend
 Root Protection Area Modified to Account for Site Features

Category	Crown Spread	Tree Number
Category A (High Quality)	Green circle	Green circle
Category B (Moderate Quality)	Blue circle	Blue circle
Category C (Low Quality)	Grey circle	Grey circle
Category U (Dead/Dying/In Decline)	Red circle	Red circle

NOTE: Tree group numbers marked with an * have approximate locations

Tree Proposed for Removal

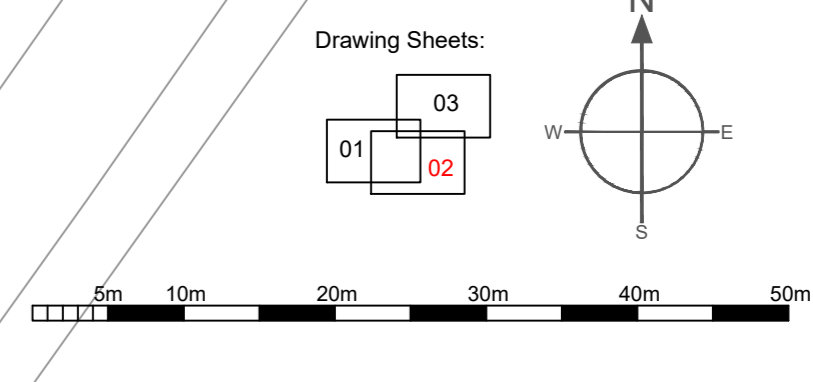
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Project:	Llyn Tegid Reservoir, Bala
Title:	Arboreal Impact Assessment
Scale:	1:500@A0
Date:	November 2019
Drawn By:	DB & AM
Revision:	C
Job Ref:	19/AIA/SNP110
Drawing No:	G2

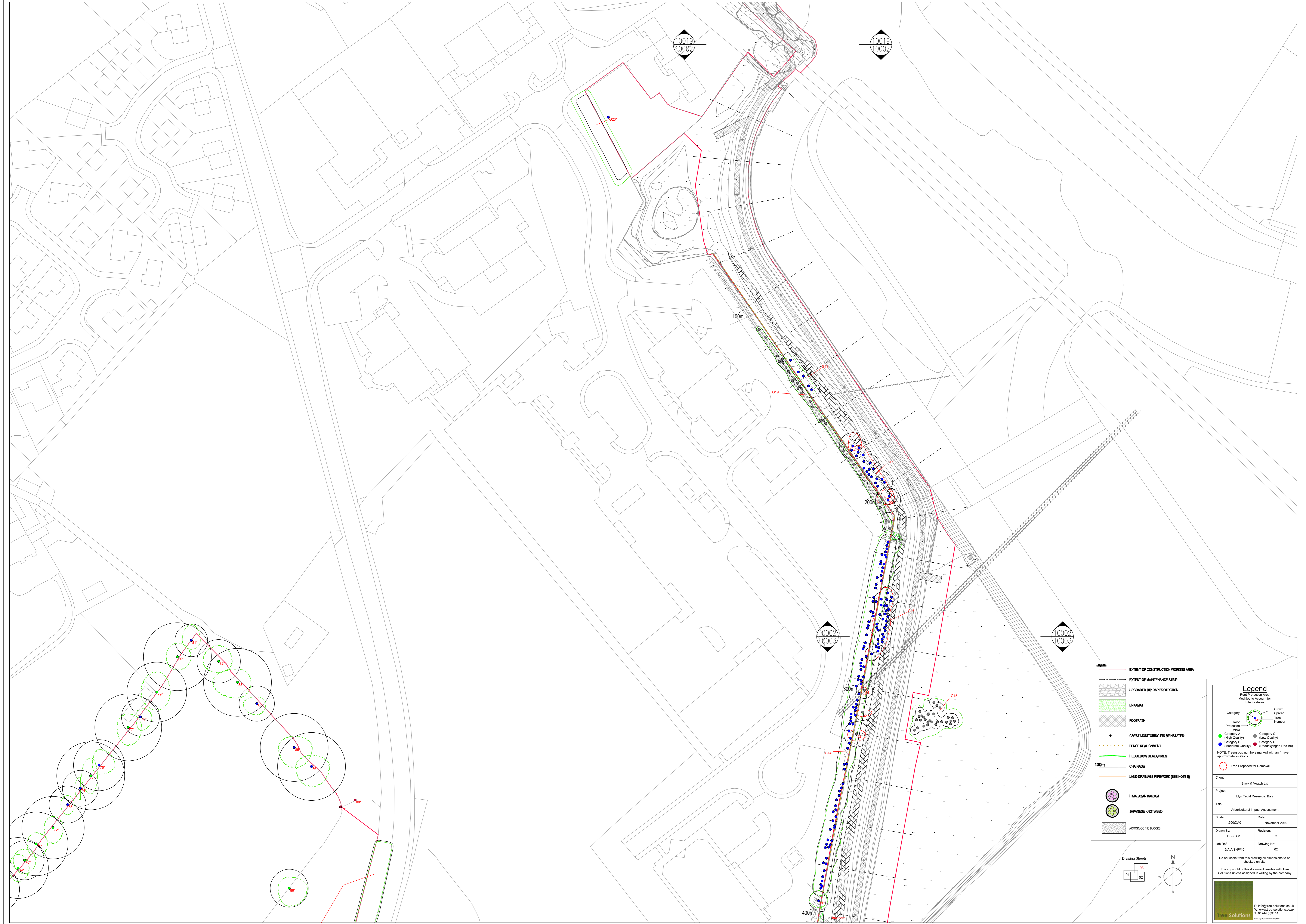
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Legend

- EXTENT OF CONSTRUCTION WORKING AREA
- EXTENT OF MAINTENANCE STRIP
- UPGRADED RP RAP PROTECTION
- ENKAMAT
- FOOTPATH
- CREST MONITORING PIN REINSTATED
- FENCE REALIGNMENT
- HEDGEROW REALIGNMENT
- CHANGE
- LAND DRAINAGE PIPEWORK (SEE NOTE 8)
- HIMALAYAN BALSAM
- JAPANESE KNOTWEED
- ARWOLD 150 BLOCKS

Legend
 Root Protection Area Modified to Account for Site Features

Crown Spread
 Tree Number

Category A (High Quality)
 Category B (Moderate Quality)
 Category C (Low Quality)
 Category LI (Dead/Dying/In Decline)

NOTE: Tree group numbers marked with an * have approximate locations

Tree Proposed for Removal

Client: Black & Veatch Ltd
 Project: Llyn Tegid Reservoir, Bala
 Title: Arboricultural Impact Assessment
 Scale: 1:500@A0
 Date: November 2019
 Drawn By: DB & AM
 Revision: C
 Job Ref: 19/AIA/SNP110
 Drawing No: 02

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Drawing Sheets:

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North Arrow