

Trees and Construction

BS5837:2012 Tree Survey, Arboricultural Implications Assessment & Method Statement

Site: Bersham Hall, Wrexham, LL14 4HS

Ref: 20102/A1_AIA

Client: QEWL Ltd



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- February 2020 -

TABLE OF CONTENTS

Chapter	Title	Page
1	Introduction	3
2	Site & Application Information	4
3	Findings & Recommendations	5 - 7
4	Scheme / Impact Assessment	8
5	Method Statement 'Considerations'	9 - 10

Appendices

Caveat	I
Terms and Definitions	II
Tree data table, Tree Constraints Plan & Tree Protection Plan	III

Revision	Description	Date
/	/	/

1. INTRODUCTION

- 1.1 **Instruction:** This advice has been prepared for QEWL Ltd (hereafter; client) and is in respect of the tree related planning considerations at Bersham Hall, Wrexham, LL14 4HS (hereafter; site).

As the proposal relates to development works at site, the advice herein is produced in accordance with the British Standard 5837 : 2012 '*Trees in Relation to Design, Demolition and Construction - Recommendations*' (hereafter; BS5837).

- 1.2 **BS5837:** The scope of BS5837 is to provide guidance on how trees and other vegetation can be integrated into construction and development design schemes. The overall aim is to ensure the protection of amenity by trees which are appropriate for retention.
- 1.3 **Scope of this advice:** This advice has been produced in accordance with BS5837 and is secondary to arboricultural guidance by email. The objective of this report is to assess and provide recommendations regarding the proposal's potential impact on trees and vice versa.
- 1.4 Following instruction the consultant surveyed the site on the 5th February 2020 where a site walkover and BS5837 tree survey were carried out; all trees on site and around the application boundary were surveyed from ground level and plotted as either an individual or a tree group.
- 1.5 This advice is subject to caveat at Appendix I, outlines relevant terms and definitions at Appendix II and constitutes the findings of the preliminary site assessment and associated arboricultural recommendations.
- 1.6 The survey data and site observations use the supplied topographical survey to illustrate the surveyed trees in plan format as a 'Tree Constraints Plan' (hereafter; TCP).

The TCP has an overlay of the proposed scheme to enable review. The TCP informs this assessment and is used as a base layer for the appended 'Tree Protection Plan' (hereafter; TPP); the TCP, tree survey data table and TPP are at Appendix III.

2. SITE INFORMATION & TREE ASSESSMENT

- 2.1 The wider site consists of Bersham Hall with associated structures, access and amenity areas. The surveyed site section consists of a single storey garage building associated to Bersham Hall.
- 2.2 **Proposal:** It is understood that a proposed scheme involves the refurbishment and repair of the existing garage building including roof work.
- 2.3 The site requires consideration from an arboricultural perspective due to the presence of trees on and around the site; these trees are deemed to be within impacting distance of the existing building and potential construction area.
- 2.4 The trees -
- 2.4.1 The tree survey and assessment resulted in the BS5837 quality/retention categories of 'B - moderate' and 'C - low' being attributed to trees.
- 2.4.2 The BS5837 tree survey is a means of objective assessment and reflects the trees' condition, quality contribution, remaining life expectancy and spatial considerations (stem, crown and roots). On this basis and in order to consider the trees' accurate constraints, the survey data has the crown extents for north, south, east west, the stem diameter measurement, and the calculated root protection areas (hereafter; RPAs). Hereafter, the trees are therefore reviewed and considered on their own merits and in line with the guidance of BS5837.

3. FINDINGS & RECOMMENDATIONS

- 3.1 The following information, as with the prior contents of this report, should be read with the appended tree data table and tree constraints plan (20102/TCP/01).

NOTE: This information as s.3 for the '*tree survey assessment*' was provided as an informative of the arboricultural considerations and constraints to site as the tree report. It is included herein for reference and context and is supplemented with a review of the scheme as the AIA (section 4) and the AMS 'considerations' (section 5).

3.2 General Considerations for Tree Retention / Removal

- 3.2.1 The 'C' category trees T1 and T2 are self-seeded and growing very close to the existing structures (garage and boundary wall) with anticipated future conflicts with structures and/or displacement of structures.

These 'C' category trees should not constrain nor significantly guide a scheme, and it is recommended that T1 and T2 be removed as part of health and safety tree risk management and/or as a preventative measure to avoid damage to structures.

- 3.2.2 The moderate quality 'B' category trees (T3 & T4) are noted as such due to their fair future potential and/or fair current amenity contribution. These should be retained and protected where possible as part of the site's development.

3.3 Tree Protection

- 3.3.1 The design and layout of the site is to incorporate the essential components of retained trees (crown and rooting area) and provide a suitable level of clearance to allow for their long term safe retention, i.e. RPA protection and crown clearance as well as for any new tree(s) being planted.

- 3.3.2 Depending on the level of tree retention/removal, the protection methods for the retained trees is likely to vary. However, it is likely that a combination of construction restrictions be used with protective barrier fencing (to protect RPAs).

The process of site operations will be an important aspect to confirm by way of a construction layout plan, i.e. showing storage areas, parking, delivery area, access routes etc., all outside of RPAs or with a provision for ground protection. As a basis for tree protection the following points will need to be considered:

- Removal of all agreed trees and any agreed pruning works prior to works commencing by a suitably qualified arboricultural contractor;
- Induction of construction personnel regarding the exclusion of works (including access and storage) from the retained trees' RPAs;

- Secure temporary barrier fencing around the site to exclude the retained tree's crowns and RPAs from the working site;
- The storage of materials clear of all retained trees and conditions to ensure no contamination/run-off into soils in proximity to trees or on higher ground; and
- For the removal of existing structures and/or hard surfaces from RPAs the works to be undertaken separate to construction, manually and sensitively.

3.4 General Overview

- 3.4.1 The considerations for trees which are to be retained as part of the proposal need to be addressed in order to ensure their protection. This is to account for the potential impact on retained trees and their growing environment from the proposed development and vice versa (these follow).

Tree Works

Any trees which are to be removed should be well indicated to ensure that the retained trees are suitably protected. Hence, all trees which are to be removed are to be marked by a suitably qualified person [spraying the stems with a cross] prior to tree works.

Tree Crowns

Consideration is required for both existing and newly planted trees whereby the proposed construction should take account of trees reaching their full growth potential. It is always prudent to provide adequate clearance from a tree's current crown for future growth, i.e. to allow a tree adequate space to reach maturity without conflicts with new structures.

Root Protection Areas (RPA)

As a minimum it would be suitable to consider the outer extents of retained trees' RPAs as construction exclusion zones and be protected.

As above, it is *sometimes* possible to undertake construction activities within the rooting areas of retained trees which requires greater attention to tree protection, foundation designs, phasing of works etc. If it is proposed to undertake works within these areas, more specific advice should be sought from a qualified arboriculturalist with a view to assessing the feasibility of said proposal and forming a suitable method statement.

Demolition/Excavation Works

Any removal of existing built structures (including stairways, small outbuildings, retaining walls etc.) or hard surfacing will need to be undertaken with great care where this occurs within or near to the anticipated rooting areas of retained trees.

Said works should adhere to the RPA restrictions, be undertaken manually with hand held non mechanical tools and ensure that existing ground levels are retained.

Hard Landscape Works

As with previously mentioned arboricultural restrictions to demolition/construction, the proposed works should avoid retained trees' RPAs. However, where ground works are proposed within RPAs, construction methods [for hard surfacing, walls etc.] should retain the existing ground levels, be undertaken sensitively and using a no dig design.

Conversion of soft surfaced areas within RPAs to hard surfaced walkways, parking areas etc., will need to utilise a no-dig product to ensure no negative impact on the tree roots and/or growing conditions.

- 3.4.2 Further to the above information, the proposed scheme (see; TCP) is reviewed hereafter at s.4 as an Arboricultural Implications Assessment (hereafter; AIA).

4. SCHEME / IMPLICATIONS ASSESSMENT

- 4.1 For the purpose of this assessment, the proposed site plan is used as a basis for consideration. This takes account of anticipated tree removals, tree protection options and potential alterations to account for arboricultural features; as per section 1.6 and section 2.2 herein, the TCP shows the '*proposed site plan*' as an overlay for review.
- 4.2 As per section 3.2.1, based on the close proximity of T1 and T2 to existing structures, it is recommended that these trees be removed in conjunction with the scheme, as part of health and safety tree risk management and to avoid future conflicts with structures.
- 4.3 Following the above considerations for trees and noted tree works, the trees are clear of the active construction area. However, the installation of temporary tree protection will be required to ensure no impact on trees from construction access and material storage.
- 4.4 Further to the above, the following tree works are required prior to site works.

TREE WORK SUMMARY

NUMBER	TREE REMOVALS / PRUNING WORKS	
T1 and T2	Remove	Remove in conjunction with the proposed scheme as part of H&S tree risk management and to avoid future conflicts with structures.
Retained trees		Protection by retained hard surfaces and installation of temporary ground protection by ground boards atop of 10cm compressible e.g. 10cm layer of wood chip around the existing garage footprint.

- 4.5 Further to the above review and in consideration for the tree removals and need to protect retained trees, the following section contains said details as an Arboricultural Method Statement (Application Stage).

5. METHOD STATEMENT (Application Stage)

5.1 Arboricultural Construction Restrictions

- 5.1.1 The following restrictions are considered relevant for tree protection purposes which are illustrated on the appended Tree Protection Plan:
- a) Tree works; are to be completed prior to any and all site works: tree works not specified within the associated arboricultural method statement (or leaning against or attaching of objects to a tree) are not permitted unless agreed in writing by the council.
 - b) Ground Protection; consisting of ground boards atop of a 10cm compressible layer (e.g. woodchip) is to be installed around the existing garage for pedestrian only constriction access.
 - c) Material Handling; no chemicals / materials are to be transported / stored / used / mixed within exposed grounds on site; all chemical / cement storage, transport or use will utilise the existing hard surface areas clear of trees.
 - d) Site Management; no fires are to be lit and no machinery, plant or vehicles are to be washed down within 10m of a tree's canopy, within a RPA, and the RPA may not be breached, i.e. no mechanical digging or scraping is permitted within a RPA.
 - e) Sensitive Landscape; only following construction completion can the PBF be removed and any remaining soft landscape works be undertaken (ground levels to be retained within RPAs and works undertaken manually with non-mechanical hand tools).

5.2 Arboricultural Site Monitoring / Supervision

- 5.2.1 The site should be checked by a qualified arboriculturist throughout the construction processes to ensure the tree protection measures are adhered to, thus -
- (a) pre-commencement to confirm tree removals;
 - (b) after ground protection installation; and
 - (c) during construction to ensure adherence to this AMS.

5.3 Ground Protection

- 5.3.1 In this instance, as the proposed scheme relates to refurbishment and repair work to the existing building, the existing hard surfaces are to be retained with temporary ground protection installed around the existing footprint for pedestrian only access.
- 5.3.2 For access, around the new build and into RPAs by pedestrians, 1.5 - 20m clearance should be provided but protected from impact.

5.3.3 For pedestrian access, either a raised ground level scaffold layer will be used or a wood chip layer < 10cm deep with ply boards for RPA / ground protection.

5.4 Underground utilities

5.4.1 As the proposed scheme relates to refurbishment of the existing building with all works confined to the existing footprint, no new RPA incursions are anticipated.

5.4.2 If new underground utilities are proposed, and if RPAs cannot be avoided, the following restrictions are recommended for underground utilities within RPAs:

- Any necessary excavations to be undertaken sensitively using either a no-dig method (e.g. Air-Spade) and / or under arboricultural supervision;
- Any exposed roots shall be packed with a clean damp sand (not builders sand) and wrapped in hessian sacking to protect them;
- Small roots which are identified (those less than 25mm diameter) may be carefully pruned back with a clean sharp tree saw; and
- Larger roots which are identified (those greater than 25mm in diameter) are to be retained and protected as they may be necessary for a tree's health and stability.

5.5 Report Handling

5.5.1 This report is released to the client and architect to be distributed at their discretion and the consultant is available for queries relating to this report and / or trees.

5.5.2 This AMS and the TPP may be approved by the council in support of the application, subject to a conditioned final AMS and TPP as a means of authorised tree protection measures; all site personnel will have access to a copy and the tree work and protection details are to be inspected as per s.5.2 for '*Arboricultural Monitoring / Supervision*'.

This concludes our advice.

Caveat

Any and all information supplied to Indigo Surveys Ltd by/on behalf of the client is assumed to be accurate unless otherwise informed. | This advice is limited to the observations made on the date of inspection as detailed herein and any deletion, editing or alteration will result in the advice being null and void in its entirety. | This advice in its entirety may be deemed null and void if remedial works are undertaken on any area of the site, on or after the date of the survey. | No liability is assumed by the author or by Indigo Surveys Ltd for any misuse, misinterpretation or misrepresentation of this advice. | This advice is not valid in adverse or unpredictable weather conditions or for any failure due to 'force majeure' or unpredictable events. | No responsibility is assumed either by the author of this advice or by Indigo Surveys Ltd for any legal matters that may arise as a consequence. | Neither the author nor Indigo Surveys Ltd will be required to attend court or give testimony as part of this agreement. | The responsibility for any works undertaken on the basis of the recommendations of this advice does not form part of this agreement.

Appendix II

Terms and Definitions

“Arboriculturist” - person who has, through relevant education, training and experience, gained expertise in the field of trees in relation to construction.

“Competent Person” - person who has training and experience relevant to the matter being addressed and an understanding of the requirements of the particular task being approached.

“Topographical survey” - an accurately measured land survey undertaken to show all relevant existing site features. *A method of carrying out topographical surveys is given in RICS specification* Surveys of land buildings and utility services at scales of 1:500 and larger.

“BS5837 Tree survey” - should be undertaken by an arboriculturist to record information about the trees on or adjacent to a site. The results of the tree survey, including material constraints arising from existing trees that merit retention, should be used (along with any other relevant baseline data) to inform feasibility studies and design options. For this reason, the tree survey should be completed and made available to designers prior to and/or independently of any specific proposals for development.

“Tree categorisation method” - trees should be categorised in accordance with the BS5837 cascade chart by an arboriculturist. This is to identify the quality and value (in a non-fiscal sense) of the existing tree stock, allowing informed decisions to be made concerning which trees should be removed or retained in the event of development occurring.

“Root protection area (RPA)” - layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree’s viability, and where the protection of the roots and soil structure is treated as a priority, shown as an arboricultural constraint in m². The radius is calculated using the BS5837 calculation method. An arboriculturist may change the shape of an RPA but not reduce its area.

“Arboricultural implications assessment” - a study, undertaken by an arboriculturist, to identify, evaluate and possibly mitigate the extent of direct and indirect impacts on existing trees that may arise as a result of the implementation of any site layout proposal.

“Arboricultural method statement” - methodology for the implementation of any aspect of development that is within the root protection area, or has the potential to result in loss of or damage to a tree to be retained.

“Tree protection plan” - a scale drawing, informed by descriptive text where necessary, based upon the finalised proposals, showing trees for retention and illustrating the tree and landscape protection measures.

Appendix III

Data Table:	As appended (BS5837 Tree Survey Key & Table)
Tree Constraints Plan:	As appended (20102/TCP/01)
Tree Protection Plan:	As appended (20102/TPP/01)

TREE SURVEY IN ACCORDANCE WITH BRITISH STANDARD 5837:2012 'TREES IN RELATION TO DESIGN, DEMOLITION & CONSTRUCTION - RECOMMENDATIONS'																
CLIENT: QEWL Ltd				PROJECT REF: 20102/A1				SITE: Garages at Bershal Hall, Wrexham, LL14 4HS								
CONTACT: /				SURVEY DATE: 5 February 2020				ARB CONSULTANT: Andrew Turnbull FDS ArborA								
TREE REF. #	SPECIES	AGE	HEIGHT (in m)	CANOPY (in m) N - S - E - W				STEM (in mm)	RPA (in m)	CLEARANCE (in m)	1st BRANCH (in m)	VITALITY	LIFE EXPEC.	NOTES	BS CAT.	MANAGEMENT
T1	Ash; Fraxinus, Oleaceae	EM	17	3	7	0.5	9	420	5.0	4	6m - West	Fair	20 - 40	Self seeded, very close to existing garage structure, near contact with garage roof and gutter, notable crown asymmetry (possibly from previous presence of large offsite tree or tree adjacent to garage, central to T1 and T2).	C 3	Consider removal of H&S tree risk management and/or preventative action to avoid stem contact with garage.
T2	Sycamore; Acer, Aceraceae	SM	14	9	7	8	9	740	8.9	4	Union	Fair	20 - 40	3x stems union <1.5m (370mm, 400mm, 500mm *), one stem stumped, self seeded, very close to existing garage structure, near contact with garage roof and gutter, and possible contact with existing retaining boundary wall (Ivy obscured), Ivy cover into crown.	C 3	Consider removal of H&S tree risk management and/or preventative action to avoid stem contact with garage, and displacement of retaining boundary wall.
T3	Yew; Taxus, Taxodiaceae	M	15	3	5	6	5	700 *	8.4	0.5	< 1m all round	Normal	40 +	Very large Ivy established at base (> 100mm dia.) Ivy covered bole and into crown, stem at higher level to close surrounds of garage and hard standing.	B 2	Sever Ivy around tree's stem, taking care not to damage the tree's bark and remove at least 10cm Ivy stem.
T4	Sessile Oak; Quercus, Fagaceae	EM	17	8	3	3	8	390	4.7	3	5m - West	Normal	40 +	Close to garage, 2m+ clearance, slight crown asymmetry (possible same reasons as T1), major deadwood to South canopy side.	B 3	If T1 is removed, consider lateral reduction of branches to the North and West by 2-3m to encourage balanced form and allow canopy to establish to South and East.

TREE SURVEY 'KEY' - BRITISH STANDARD 5837:2012 'TREES IN RELATION TO DESIGN, DEMOLITION & CONSTRUCTION - RECOMMENDATIONS'	
TPO/CA	- On client request: presence of Tree Preservation Orders (TPO) / site location within a Conservation Area (CA) & date checked;
TREE REF. #	- Tree reference number: tag or plan number (T - individual tree, G - group of trees/shrubs, H - hedge);
SPECIES	- Genus, species and/or common name;
AGE	- Age classification (NP - new planting, Y - young, EM - Early-Mature, SM - semi mature, M - mature, LM - late mature, OM - over mature);
HEIGHT (in m)	- Approximate height of tree in metres;
CANOPY (in m) N - S - E - W	- Approximate branch spread in metres of the four principal compass points;
STEM (in mm)	- Stem diameter in millimetres: measured in accordance with s.4.6 of BS5837;
RPA (in m)	- Circle radius of the Root Protection Area: calculated using the stem diameter (single/multiple stem variant, as outlined within BS5837);
CLEARANCE (in m)	- Crown clearance in metres above the adjacent ground level;
IST BRANCH (in m)	- Clearance in metres to first significant branch and direction of growth (where relevant);
VITALITY	- Physiological condition typically gauged from canopy cover and annual extension growth (good, fair, poor, dead);
ESTIMATED REMAINING CONTRIBUTION	- Approximate number of years a tree will continue to contribute without the need for oppressive arboricultural intervention, categorised in years as <10, 10-20, 20-40 and >40;
NOTES	- Structural and physiological condition observations;
BS CAT.	- BS5837 tree quality assessment category: resulting from structural/physiological condition and remaining contribution (approximate useful life expectancy);
	- Standard retention category U : in such a condition that any existing value would be lost within 10 years;
	- Standard retention category A : high quality and value, in such a condition as to be able to make substantial contribution of 40+ years;
	- Standard retention category B : moderate quality and value, in such a condition as to make a significant contribution of 20+ years;
	- Standard retention category C : low quality and value, currently in adequate condition to remain until new planting could be established 10+ years;
MANAGEMENT	- Standard retention sub-category, mainly due to: 1- Arboricultural values, 2- Landscape values, 3- Cultural values, including conservation;
	- Preliminary management recommendations (as appropriate);
' * '	



KEY

Tree Crown Spread

Root Protection Area (RPA)

Tree Stem

T1

Tree No.

Tree Condition Category

A

B

C

U

Indicative

The surveyed trees are illustrated on this Constraints Plan which is prepared in accordance with British Standard BS5837: 2012 'Trees in Relation to Design, Demolition and Construction – Recommendations'

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REV.	DESCRIPTION	DWN	CHK'D	DATE		
CLIENT						
QEWL Ltd						
PROJECT						
20102/01 Bersham Hall, Wrexham, LL14 4HS						
TITLE						
Tree Constraints Plan						
DWN	DATE	CHK'D	DATE	APP'D	DATE	SCALE
AT	11/02/2020	RB	12/02/2020			1:100

Indigo

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Drawing Number

A3

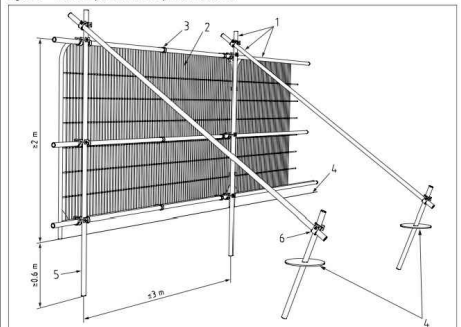
20102/TCP/01

REV.
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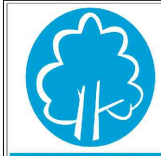
Protective Barrier Fencing – Example Design

Figure 2 Default specification for protective barrier



- Key
- Standard scaffold poles
 - Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
 - Panel secured to uprights and cross-members with wire ties
 - Ground level
 - Uprights driven into the ground until secure (minimum depth 0.6 m)
 - Standard scaffold clamps

(c) British Standards Institute (www.bsigroup.com)



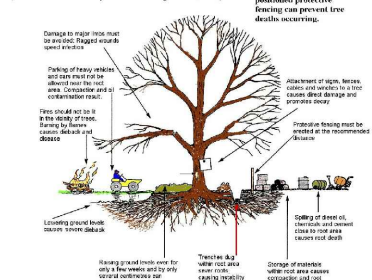
PROTECTIVE FENCING. THIS FENCING MUST BE MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND DRAWINGS FOR THIS DEVELOPMENT.



TREE PROTECTION AREA. KEEP OUT! IT IS AN OFFENCE UNDER THE PLANNING ACT 1990 TO ENTER A TREE PROTECTION AREA WITHOUT THE PERMISSION OF THE LOCAL PLANNING AUTHORITY. CONTRAVENTION OF A TREE PROTECTION ORDER MAY BE A CRIME UNDER THE PLANNING ACT 1990.

Common causes of Tree Death

(Source: Arboricultural Information Exchange website, 2005)



KEY

- Tree Crown Spread
 - Root Protection Area (RPA)
 - Tree Stem
 - T1 Tree No.
 - Tree Condition Category
 - A
 - B
 - C
 - U
- Indicative

The surveyed trees are illustrated on this Constraints Plan which is prepared in accordance with British Standard BS5837: 2012 'Trees in Relation to Design, Demolition and Construction – Recommendations'

Tree Removals – T1 and T2 to be removed in conjunction with the scheme as a preventative measure to avoid future conflicts with the garage and/or boundary wall.

Ground Protection
The existing soft surfaced surrounds are to be protected during the roof works by (where possible) 2m of ground boards surrounding the garage footprint with pedestrian only access for roof works; no material storage allowed in soft surfaced areas

Site Welfare & Material Delivery & Storage – to use the existing hard surfaces and parking areas clear of the retained trees.

Tree Roots – the higher soil level of the trees' location to existing structures, and the garages retaining walls and foundations will have influenced tree root growth; standard circular RPAs have been augmented to omit RPAs from the garage footprints, but occupy the surrounding grounds (although the offsite conditions are favorable for tree root growth, tree root growth may also be restricted by the boundary wall).

/	Uses TCP as base layer	TB	AT	18/02/20
REV.	DESCRIPTION	DWN	CHK'D	DATE

CLIENT	QEWL Ltd
PROJECT	20102/01 Bersham Hall, Wrexham, LL14 4HS
TITLE	Tree Protection Plan

DWN	DATE	CHK'D	DATE	APP'D	DATE	SCALE
AT	11/02/2020	RB	12/02/2020			1:100



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