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GUIDE TO THE TVERC BIODIVERSITY IMPACT ASSESSMENT CALCULATOR

VERSION 2.1.1

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FOR ECOLOGICAL CONSULTANTS AND LOCAL PLANNING AUTHORITIES

THIS CALCULATOR AND GUIDANCE WAS DEVELOPED FOR AND IS FOR USE WITHIN OXFORDSHIRE AND BERKSHIRE – PLEASE CONTACT THE RELEVANT AUTHORITY BEFORE USE IN OTHER AREAS.

Thames Valley Environmental Records Centre

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BIODIVERSITY IMPACT ASSESSMENT

Biodiversity Impact Assessment Calculators, BIACs, are used to determine the potential ecological costs of a development and the effect potential offsetting methods may have in limiting this biodiversity loss. Offsetting is defined by the Business and Biodiversity Offsets Programme as:

> *"Measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development and persisting after appropriate prevention and mitigation measures have been implemented".*

This calculator uses the DEFRA metric, which is based on habitats (DEFRA, 2012). The size, distinctiveness and condition of a habitat will lead to the calculation of the "Biodiversity Units" that the habitat provides. These units will be calculated for before and after the development, with multipliers accounting for risk of failed restoration/created and for time taken to target condition, and the net loss/gain will be determined. This will allow for the planning of biodiversity offsetting methods that mitigate the potential change in biodiversity throughout the site.

HABITAT DISTINCTIVENESS

Each habitat is assigned to a band based on its distinctiveness, which in turn is based on factors such as its biodiversity, rarity and species richness (the full list of designations can be found in Appendix 1). A score is then given based on that habitat classification, which will be used during the BIA calculation.

Table 1. The habitat bands based on distinctiveness.

Distinctiveness	Type of offset	Calculator Score
High	Same band type, ideally like for like.	6
High-Medium	Same band type, ideally like for like	5
Medium	Within band type or trade up.	4
Medium-Low	Within band type or trade up.	3
Low	Trade up.	1
None	Trade up.	0

HABITAT CONDITION

The second factor used to calculate biodiversity units is habitat condition. There is no set universal method for assessing habitat condition, DEFRA suggests avoiding Common Standards Monitoring as it is designed for assessing high quality habitat, particularly Sites of Special Scientific Interest, and so is not suited for evaluating all habitats. DEFRA suggests using the High Level Agri-Environment Scheme (HLS) condition assessment tool. This tool allows for the classification of a habitat into one of three categories, and guidelines

can be found in the HLS Farm Environment Plan handbook. Each of these categories has an associated score for use in the calcuator, shown below in Table 2.

Table 2. Habitat condition and the associated BIAC score.

Habitat Condition	Score
Good	3
Moderate	2
Poor	1

These two factors are then multiplied together, along with the size of the habitat in hectares, giving the biodiversity unit score for that habitat. The biodiversity score for the site is created through the sum of the units for each habitats throughout the site. An example is shown below using Semi natural broadleaved woodland (A1.1.1) and scattered scrub (A2.2).

Table 3. An example of a biodiversity unit calclation.

Habitat code	Size (ha)	Distinciveness	Condition	Score
A1.1.1	3.21	6	2	38.52
A2.2	1.99	5	2	19.9
			Total	58.42

RISK AND TIME MULTIPLIERS

There are three possiblibilities for future habitat:

Retained - the habitat stays in the same condition.

Restored – the habitat remains but the condition is improved.

Created – new habitat is created, this includes the expansion of existing habtiats.

The liklihood of successful restoration/creation depends on the habitat in question, and as some habitats are more difficult to restore/create than others. A multiplier is applied to account for the risk of failure (see Appendix 1 for a full list of habitats and their restoration/creation difficulty multiplier). A

second multiplier is applied to represent a delay in the expected time the restored/created habitat will take to reach it's target condition. For example a semi natural deciduous woodland will take 75 years from creation to a good condition (see Appendix 1 for the Time to Target for each habtiat and the associated multiplier).

HEDGEROWS

Hedgerows are features particualrly important to biodiversity, due to their role in connectivity, and therefore requires a slightly different calculation. All hedgerows are treated, as a high distinctiveness habitat, requiring like for like offsetting. Their condition is determined through different factors such as height and gappiness, outlined in Appendix 2. And the associated multiplier will be applied were there to be a loss of hedgerow habitat.

Table 4. Condition of hedgerow lost and the associated multiplier that should be applied to the biodiversity unit loss.

Condition of hedgerow lost	Multiplier applied
Good	3
Moderate	2
Poor	1

CALCULATOR GUIDANCE

The calculator comes in the form of an excel spreadsheet (.xlsx), which has five sheets. The "Instructions" sheet gives some brief instruction and context, which is supplemented by this document. The "Existing Habitat" and "Proposed Habitat" are input sheets, and "Calculations" provides the results of the biodiversity net gain/loss calculation, as well as a summary of loss/gain for each habitat type. "Habitat list" is for reference, and shows the table also seen in Appendix 1, which includes the distinctiveness, time to target and difficulty for each habitat classification. Blue cells are input cells, all other cells are automatic.

EXISTING HABITAT

This sheet should be filled in with information for the habitats that are present on site prior to development. Information required:

- Phase 1 habitat description – select the habitat type from the drop-down menu. Habitats are grouped by broad habitat type.
- Habitat area – enter the area (in hectares) for each habitat present on site. 1 ha = 10,000m^2.
- Condition – TVERC uses the Farm Environment Plan condition assessments at three levels, Good, Moderate, Poor. Select the appropriate condition from the drop-down menu in each cell.
- Comments – add to this section any comments that help clarify the decisions you made and the scores or definitions entered.

Woodland and Scrub		Size	Quality
Phase 1 Habitat Description	*Phase 1 Habitat code*	*Habitat Area (ha)*	*Condition*
Broadleaved woodland - semi-natural	A1.1.1	3.21	Moderate
Parkland/scattered trees - broadleaved	A3.1	0.05	Moderate
Scrub - dense/continuous	A2.1	0.48	Moderate
Scrub - scattered	A2.2	1.99	Moderate

Figure 1. An example of the "Existing Habitat" sheet filled in correctly.

The total number of biodiversity units are found at the end of each row.

The hedgerow section, found between Miscellaneous and Rock, Exposure and Waste, is similar apart from the size of the habitat, which is length in meters rather than area in hectares.

PROPOSED HABITAT

Miscellaneous		Size	Quality
Phase 1 Habitat Description	*Phase 1 Habitat code*	*Habitat Area (ha)*	*Condition*
Buildings and Hardstanding	n/a	0.09	Poor
Buildings	6	0.36	Poor

This sheet should be filled in with habitat information for the proposed site. Information required:

Phase 1 habitat description – select the habitat type from the drop-down list. Habitats are grouped by broad habitat type.

Habitat area – enter the area (in hectares) for each habitat planned from the development. 1 ha = 10,000m^2.

Action – Select whether the habitat will be retained from before the development, restored (improved to a higher condition) or created (including expansion). The selection is made via a drop-down menu, if the habitat is being retained the quality of the existing habitat is to be selected. If it is being created or restored, simply select "yes".

Target condition – The intended condition for the habitat after development.

Time to target – The number of years until the habitat will reach its target condition. There is a guide to each habitats' time to target condition in the "Habitat List" sheet, but it is editable as it can vary in different circumstances.

Woodland and Scrub		Size	Action			Quality & Risk	
Phase 1 Habitat Description	*Phase 1 Habitat Code*	*Habitat Area (ha)*	*Retain*	*Create*	*Restore*	*Target condition*	*Time to target (years)*
Broadleaved woodland - semi-natural	A1.1.1	2.11			Yes	Good	10
Parkland/scattered trees - broadleaved	A3.1	0.05			Yes	od	10
Scrub - dense/continuous	A2.1	0.18	Moderate				
Scrub - scattered	A2.2	0.04	Moderate				

Miscellaneous		Size	Action			Quality & Risk	
Phase 1 Habitat Description	*Phase 1 Habitat Code*	*Habitat Area (ha)*	*Retain*	*Create*	*Restore*	*Target condition*	*Time to target (years)*
Cultivated/disturbed land - amenity grassland	J1.2	0.49		Yes		Moderate	1
Buildings and Hardstanding	n/a	2.14		Yes		Good	1
Buildings	J3.6	1.15		Yes		Good	1

Figure 2. An example of the "Proposed Habitat" sheet filled in correctly.

The total number of biodiversity units are found at the end of the row.

The hedgerow section, found between Miscellaneous and Rock, Exposure and Waste, is similar apart from the size of the habitat, which is length in meters rather than area in hectares.

Comments – add to this section any comments that help clarify the decisions you made and the scores or definitions entered.

REFERENCES

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ABOUT TVERC

Thames Valley Environmental Records Centre (TVERC) is a 'not for profit' organisation covering Berkshire and Oxfordshire. We are run by a partnership and are one of a national network of local records centres. We are a member of the Association of Local Records Centres (ALERC) and the National Biodiversity Network (NBN). Our funding partners include all the local authorities in Oxfordshire & Berkshire plus the Environment Agency. We also work closely with the Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust.

WHAT WE DO

We provide our funding partners with annually updated species and sites information as GIS tables, and undertake surveys of local wildlife sites. We also carry out data analysis for the monitoring of local authority Local Plans. We provide information to parish councils, local people, conservation bodies, land-owners, students and commercial organisations such as ecological consultants and utilities companies via data searches, data licensing and data exchanges. We provide other services such as ecological surveys, data analysis & presentation and training.

OUR RECORDS

We hold around 2.4 million records of flora and fauna in Berkshire and Oxfordshire plus information about Local Wildlife and Geological Sites, NERC Act S41 Habitats of Principal Importance (previously called UK Biodiversity Action Plan (BAP) habitats) and Ecological Networks (Conservation Target Areas and Biodiversity Opportunity Areas). We collect this data from the general public, skilled volunteer /amateur recorders, professionals working for wildlife charities (BBOWT and RSPB), professionals working for government agencies (the Environment Agency & local authorities) and ecological consultants. This information is used:

- by planning authorities and developers to make informed decisions on the design and location of sustainable development
- to help farmers, land-owners and conservation organisations manage land in the best way to enhance biodiversity
- by nature partnerships to direct wildlife conservation work
- by teachers, students and scientists for education and scientific research.

For more information please visit our website: www.tverc.org

APPENDIX 1: HABITAT DISTINCTIVENESS AND RESTORATION/CREATION RISK

Table 5. Habitat list, along with the habitat code, distinctiveness, creation/restoration difficulty, time to good condition.

Phase 1 habitat	**Phase 1 code**	**Distinctiveness**		**Creation**					**Restoration**				
Woodland and Scrub				Difficulty (low, med, high)	Time to good condition	Product	Risk	Risk factor	Difficulty	Time to good condition	Product	Risk	Risk Factor
Broadleaved woodland - semi-natural	A1.1.1	High	6	1	75	75	High	0.4	1	10	10	Medium	0.6
Broadleaved woodland - plantation	A1.1.2	Medium	4	1	30	30	Medium	0.6	1	10	10	Medium	0.6
Mixed woodland - semi-natural	A1.3.1	Medium	4	1	75	75	High	0.2	1	10	10	Medium	0.6
Mixed woodland - plantation	A1.3.2	Medium	4	1	30	30	Medium	0.6	1	10	10	Medium	0.6
Scrub - dense/continuous	A2.1	Medium	4	1	5	5	Low	0.8	1	2	2	Low	0.8
Scrub - scattered	A2.2	Medium-High	5	1	2	2	Low	0.8	1	2	2	Low	0.8
Parkland/scattered trees - broadleaved	A3.1	Medium-High	5	2	20	40	High	0.4	2	10	20	Medium	0.6
Parkland/scattered trees - coniferous	A3.2	Medium	4	2	20	40	High	0.4	2	10	20	Medium	0.6
Parkland/scattered trees - mixed	A3.3	Medium	4	2	20	40	High	0.4	2	10	20	Medium	0.6
Coniferous woodland - semi-natural	A1.2.1	Medium	4	1	75	75	High	0.4	1	5	5	Low	0.8
Coniferous woodland - plantation	A1.2.2	Medium-Low	3	1	30	30	Medium	0.6	1	5	5	Low	0.8
Recently felled woodland	A4	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Recently felled woodland - broadleaved	A4.1	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Recently felled woodland - coniferous	A4.2	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Recently felled woodland - mixed	A4.3	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Recently planted woodland	n/a	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Orchard	n/a	Medium-High	5	1	30	30	Medium	0.6	1	10	10	Medium	0.6
Grassland and Marsh													
Acid grassland - unimproved	B1.1	High	6	3	6	18	Medium	0.6	3	5	15	Medium	0.6

Phase 1 habitat	Phase 1 code	Distinctiveness		Creation					Restoration				
Acid grassland - semi-improved	B1.2	Medium	4	2	5	10	Medium	0.6	2	5	10	Medium	0.6
Neutral grassland - unimproved	B2.1	High	6	3	75	225	Very High	0.2	3	11	33	Medium	0.6
Neutral grassland - semi-improved	B2.2	Medium	4	2	10	20	Medium	0.6	2	5	10	Medium	0.6
Calcareous grassland - unimproved	B3.1	High	6	3	33	99	High	0.4	3	33	99	High	0.4
Calcareous grassland - semi-improved	B3.2	Medium	4	2	10	20	Medium	0.6	2	5	10	Medium	0.6
Improved grassland	B4	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Marsh/marshy grassland	B5	Medium-High	5	3	5	15	Medium	0.6	3	10	30	Medium	0.6
Tall Herb and Fern													
Bracken - continuous	C1.1	Medium-Low	3	1	1	1	Low	0.8	1	1	1	Low	0.8
Bracken - scattered	C1.2	Medium	4	1	1	1	Low	0.8	1	1	1	Low	0.8
Other tall herb and fern - ruderal	C3.1	Medium	4	1	1	1	Low	0.8	1	1	1	Low	0.8
Other tall herb and fern - non ruderal	C3.2	Medium	4	1	1	1	Low	0.8	1	1	1	Low	0.8
Heathland													
Dry dwarf shrub heath - acid	D1.1	High	6	3	5	15	Medium	0.6	2	5	10	Medium	0.6
Wet dwarf shrub heath	D2	High	6	3	30	90	High	0.4	2	5	10	Medium	0.6
Dry heath/acid grassland	D5	High	6	3	5	15	Medium	0.6	2	5	10	Medium	0.6
Wet heath/acid grassland	D6	High	6	3	30	90	High	0.4	2	5	10	Medium	0.6
Mire													
Fen - valley mire	E3.1	High	6	3	100	300	Very High	0.2	3	50	150	Very High	0.2
Fen - basin mire	E3.2	High	6	3	100	300	Very High	0.2	3	50	150	Very High	0.2
Fen - flood plain mire	E3.3	High	6	3	100	300	Very High	0.2	3	50	150	Very High	0.2
Swamp, Marginal and Inundation													
Swamp	F1	Medium-High	5	2	5	10	Medium	0.6	2	5	10	Medium	0.6

Phase 1 habitat	Phase 1 code	Distinctiveness		Creation					Restoration				
Marginal and inundation - marginal vegetation	F2.1	Medium-High	5	1	1	1	Low	0.8	1	1	1	Low	0.8
Marginal and inundation - inundation vegetation	F2.2	Medium-High	5	1	1	1	Low	0.8	1	1	1	Low	0.8
Ponds													
Pond	F1	Medium-High	5	1	5	5	Low	0.8	3	10	30	Medium	0.6
Open Water													
Standing water - eutrophic	G1.1	Medium	4	1	20	20	Medium	0.6	1	12	12	Medium	0.6
Standing water - mesotrophic	G1.2	Medium	4	2	20	40	High	0.4	2	12	24	Medium	0.6
Standing water - oligotrophic	G1.3	Medium-High	5	2	20	40	High	0.4	2	12	24	Medium	0.6
Running water - eutrophic	G2.1	Medium-High	5	3	20	60	High	0.4	2	12	24	Medium	0.6
Running water - mesotrophic	G2.2	Medium-High	5	3	20	60	High	0.4	2	12	24	Medium	0.6
Rock Exposure and Waste													
Quarry	I2.1	Medium	4	1	1	1	Low	0.8	1	1	1	Low	0.8
Refuse-tip	I2.4	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Spoil	I2.2	Medium	4	1	1	1	Low	0.8	1	1	1	Low	0.8
Hedgerows													
Species rich hedgerow	n/a	Medium	4	1	15	15	Low	0.8	1	2	2	Low	0.8
Species rich hegderow (with bank or ditch)	n/a	High	6	1	15	15	Medium	0.6	2	5	10	Medium	0.6
Species poor hedgerow	n/a	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Speceis poor hedgerow (with bank or ditch)	n/a	Medium	4	1	5	5	Low	0.8	1	2	2	Low	0.8
Line of trees	n/a	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Line of trees (with bank or ditch)	n/a	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Miscellaneous													
Bare ground	J4	Low	1	1	2	2	Low	0.8	1	1	1	Low	0.8
Built Environment: Buildings/harstanding	n/a	None	0	1	1	1	Low	0.8	1	1	1	Low	0.8
Built Environment: Gardens (lawn and planting)	n/a	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8

Phase 1 habitat	Phase 1 code	Distinctiveness		Creation					Restoration				
Buildings and Hardstanding	n/a	None	0	1	1	1	Low	0.8	1	1	1	Low	0.8
Gardens	n/a	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Allotments	n/a	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Caravan site	J3.4	None	0	1	1	1	Low	0.8	1	1	1	Low	0.8
Buildings	J3.6	None	0	1	1	1	Low	0.8	1	1	1	Low	0.8
Cultivated/disturbed land - arable	J1.1	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Cultivated/disturbed land - amenity grassland	J1.2	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Cultivated/disturbed land - ephemeral/short perennial	J1.3	Medium	4	1	1	1	Low	0.8	1	1	1	Low	0.8
Introduced shrub	J1.4	Medium-Low	3	1	1	1	Low	0.8	1	1	1	Low	0.8
Other habitat	J5	Low	1	1	1	1	Low	0.8	1	1	1	Low	0.8
Dry ditch	J2.6	Medium	4	1	1	1	Low	0.8	1	1	1	Low	0.8
Boundary removed	J2.7	None	0	n/a	n/a	n/a	None	1	n/a	n/a	0	None	1
Earth bank	J2.8	Medium	4	n/a	n/a	n/a	None	1	n/a	n/a	0	None	1
Fence	J2.4	None	0	n/a	n/a	n/a	None	1	n/a	n/a	0	None	1
Wall	J2.5	None	0	n/a	n/a	n/a	None	1	n/a	n/a	0	None	1
Reedbed	n/a	High	6	1	5	5	Low	0.8	2	29	58	High	0.4
Cemetery	n/a	Medium	4	n/a	n/a	n/a	None	1	n/a	n/a	0	None	1
Green roof	n/a	Medium-Low	3	1	1	1	Low	0.8	1	1	1	Low	0.8
Green wall	n/a	Medium-Low	3	1	1	1	Low	0.8	1	1	1	Low	0.8

APPENDIX 2: HEDGEROWS

Table 6. Criteria for assessing hedgerow condition.

Groupings	Minimum Requirements for Favourable	Description
Height	>1.5 m average along length	The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees.
		Newly laid or coppiced hedgerows are indicative of good management and pass this criterion (if undertaken according to good practice)
		A newly planted hedgerow does not pass this criterion (unless it > 1.5 m height)
Width	>1.5 m average along length	The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees.
		Outgrowths (e.g. blackthorn suckers) are only included in the width estimate when they >0.5 m in height.
		Laid, coppiced and newly planted hedgerows are treated as for 'height' above.
Gap – hedge base	Gap between ground and base of canopy <0.5 m for >90% of length	This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth.
		Certain exceptions to this criterion are acceptable (see page 65, Defra 2007)
Gap - hedge canopy continuity	Gaps make up <10% of total length	This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small).
	No canopy gaps >5 m	Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate)
Undisturbed ground and perennial vegetation	>1 m width of undisturbed ground with perennial	This criterion picks up management close to the hedgerow that is likely to damage woody species (e.g. cultivation harming roots) or their associated ground flora (e.g. herbicide use).

Groupings	Minimum Requirements for Favourable	Description
Undesirable perennial vegetation	herbaceous vegetation for >90% of length	
	Measured from outer edge of hedgerow, and	Hedgerows adjacent to vegetation such as permanent grassland or woodland automatically meet this criterion.
	Is present on one side of the hedge (at least)	
	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	The indicator species used are nettles (Urtica spp.), cleavers (Galium aparine) and docks (Rumex spp.). Their presence, either singly or together, should not exceed the 20% cover threshold.
Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Neophytes are plants that have naturalised in the UK since AD 1500. For information on neophytes see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.
Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes.
		This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting)

Table 7. Assessment table for hedgerow condition.

Condition Assessment	Maximum number of attributes that can fail to meet 'favourable condition' criteria	Multiplier (score)
Good	No more than 2 failures in total and no more than 1 in any functional group.	3
Moderate	No more than 4 failures in total and fails both attributes in a maximum of one functional group.	2
	e.g. fails attribute 1 & 2, 5 &7 = moderate condition.	
Poor	Fails a total of more than 4 attributes or both attributes in more than one functional group.	1
	e.g. fails attributes 1,2,3, & 4 = poor condition	