

CHAPTER 6 FLORA AND FAUNA

- **Appendix 6.4 Intervening Hedgerow Impact**



Intervening Hedgerow Assessment

Trimming Impact under Proposed 400kV Transmission Line

September 2012

TOBIN CONSULTING ENGINEERS



REPORT

PROJECT:

**North South 400kV Interconnection
Development**

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1 INTRODUCTION

As with any transmission line, the construction of the new North South 400kV Interconnection Development will necessitate cutting (of the main tree structure) or extensive trimming (large branches) of larger mature trees. There will be a requirement for possible trimming of lower hedgerows underneath and in the vicinity of the transmission line. There will also be a requirement for continuous maintenance of those hedgerows for the lifespan of the transmission line to prevent vegetation impacting the successful transmission of electricity.

In order to examine and quantify the impact of the proposed development on hedgerows, TOBIN Consulting Engineers (hereafter referred to as TOBIN) undertook a desk and field based study during summer 2012, examining areas likely to be impacted by the construction of the proposed 400kV transmission line. This exercise will inform the impact section of the ecology chapter of the Environmental Impact Statement (EIS) which will be submitted for the project.

Advice on approach and review of report was conducted by Dr Pat Crushell from Wetland Surveys Ireland.

1.1 PURPOSE OF THIS STUDY

This study was undertaken with the aim of providing information for the assessment of impacts section of the ecology chapter of the EIS for the project. The study is warranted as, in addition to habitat loss at the sites of tower locations, there is potential for permanent impacts - height reduction to hedgerows/ treelines, due to clearance requirements associated with conductors sagging between supporting structures. The clearance may require significant cutting/ trimming of vegetation along intervening hedgerows including the cutting of large mature trees. Larger mature veteran trees are defined by Woodland trust¹ as generally in mature stage of its life with habitat features which improve its biodiversity value. These features may include hollowing, decay, holes dead branches, abundant epiphytic growth (e.g. mosses/ lichens and fungus) abundant ivy etc. Hence for the purposes of the ecological assessment it is important to define these areas potentially impacted and detail appropriate mitigation.

This assessment aims to quantify this impact, providing a relatively accurate quantitative impact assessment i.e. lengths of hedgerow that are likely to be impacted.

The key specific aims of this exercise are to:

- Quantify maximum lengths of all hedgerow types defined which will be crossed by the line;
- Define areas where individual hedgerows with mature standard trees² will require cutting;
- Identify well structured treelines dominated by very mature standard / veteran trees which will require cutting; and
- Identify other hedgerows (managed and unmanaged) where trimming may arise but impacts will be minimal/ non-existent.

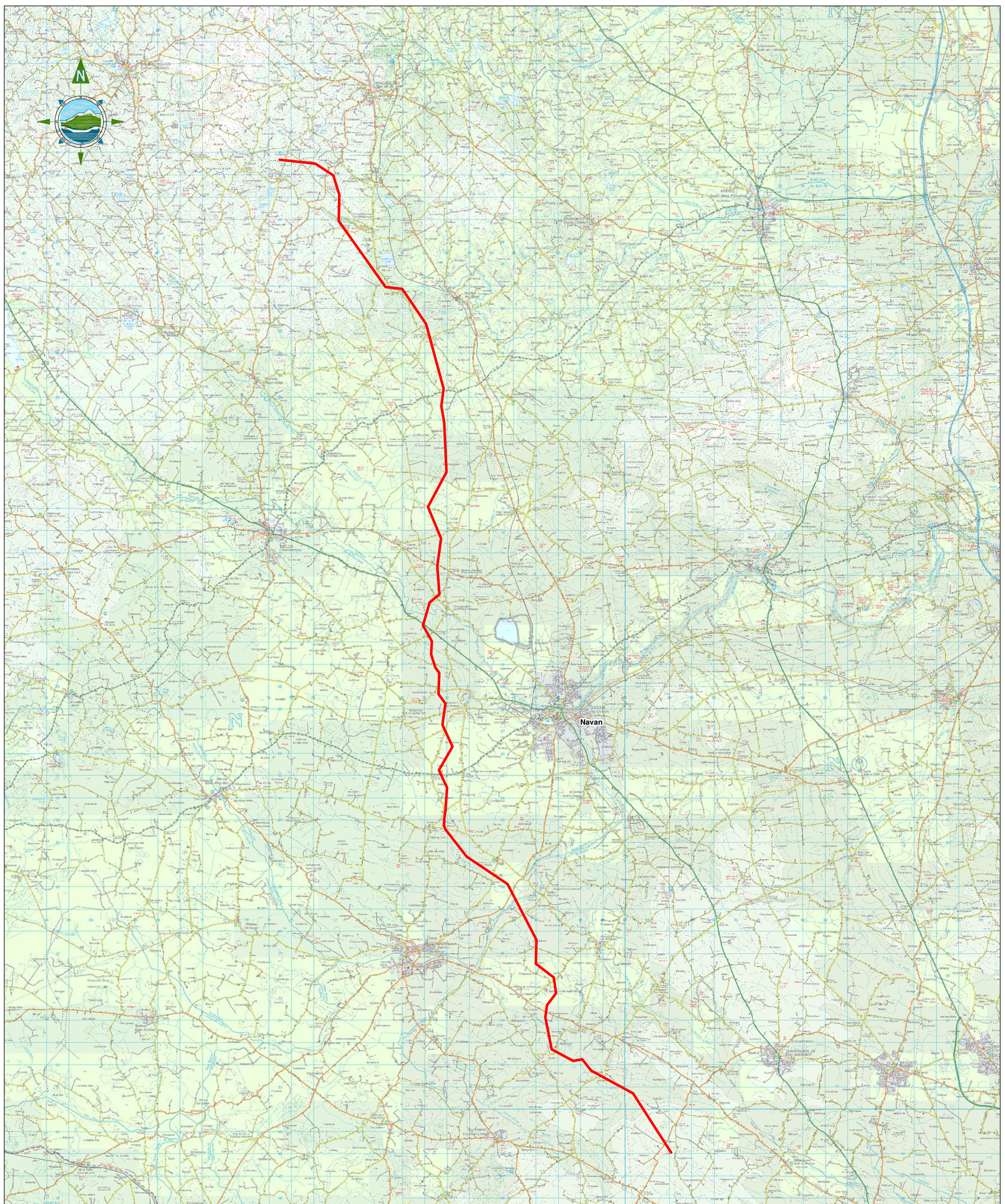
¹ Veteran trees <http://www.woodlandtrust.org.uk/en/why-woods-matter/what-are-they/types/veteran/Pages/veteran.aspx>

² For the purposes of description mature trees and older are generally defined as "Mature tree: over 30 cm diameter, reproductive years begin. In the case of the study area these are large (typically > 15m high) predominantly native (and naturalised) tree species e.g. beech, ash, oak, Scots pine. Source: <http://www.gardenplansireland.com/forum/about163.html>

This information will also provide site specific detail which will inform mitigation by reduction approaches detailed in the final EIS

1.2 STUDY AREA DESCRIPTION

This study was conducted at all locations where the proposed transmission line crosses (and runs close by and parallel to) hedgerows in Counties Meath, Cavan and Monaghan. A map detailing the route of the transmission line can be found in Figures 1 and 2 overleaf.



Legend
 Line Route – hedgerow study area

Scale @ A3: 1:160,000

Issue	Date	Description	By	Chkd.
A	14-09-12	Issued	G.F.	M.H.

- NOTES**
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 2. DISCOVERY SERIES TILES USED: OS2628, OS2828, OS3028, OS2626, OS2826, OS3026, OS2624, OS2824, OS3024
 3. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD
 4. DESIGNATED CONSERVATION AREAS DATA SOURCED FROM NPWS
 5. WHOOPIER SWANS DATA BASED ON SITE SURVEYS

Client:

Project:
**NORTH-SOUTH 400 kV
 INTERCONNECTION DEVELOPMENT**

Title:
 Intervening Hedgerow Study
 Proposed transmission
 line route in Co. Meath

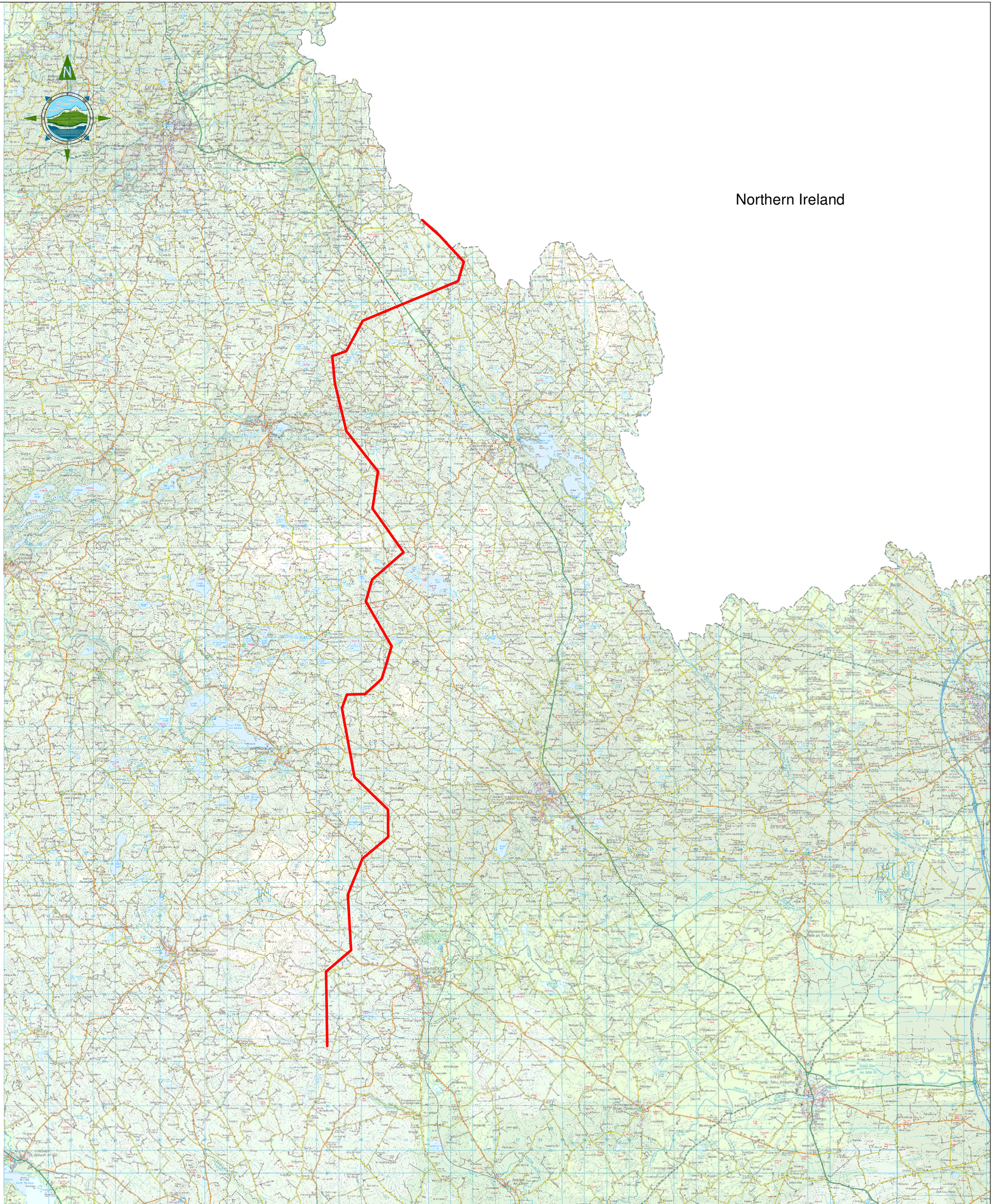
Prepared by: G.Fil
 Checked: M. Hogan
 Date: September 2012

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Figure 1 (MSA) A



Northern Ireland

Legend

— Line Route

Scale @ A3: 1:160,000



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Figure 2 (CMSA) A

2 METHODOLOGY

2.1 APPROACH

The approach to this study was determined following discussions between experienced ecologists at TOBIN and Dr Pat Crushell (Wetland Surveys Ireland) with input from other project personnel including experienced Overhead Line Designers and Engineers.

A zone of likely impact at hedgerow crossings was agreed in consultation with experienced ESBI personnel. This zone of impact refers to the length of hedgerow which would require trimming to a minimum of 3m in height (though in reality probably c.a. 5 to 6m) to allow for the crossing of the overhead transmission line.

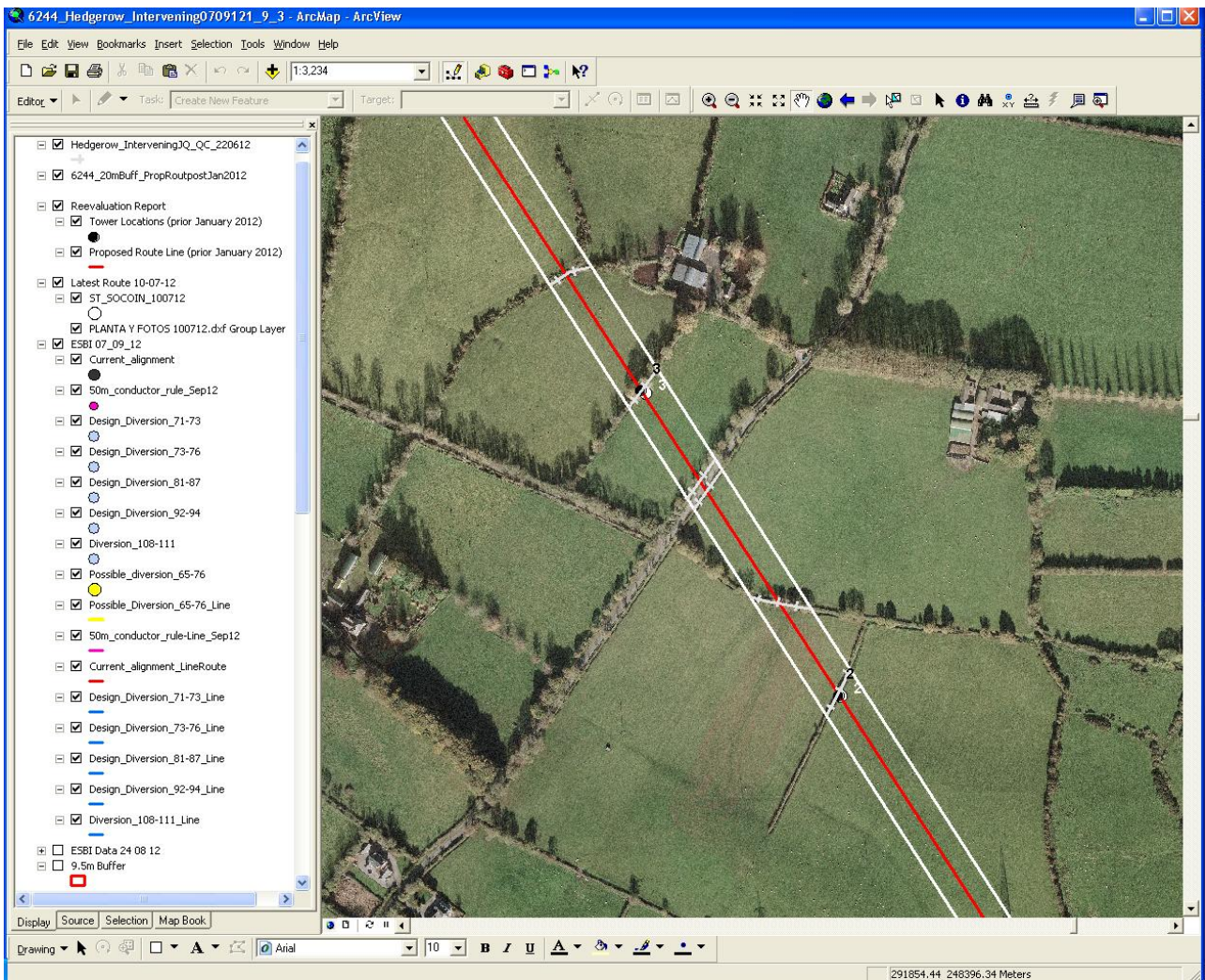
It was agreed that the zone of impact should be 40m, allowing 19m for the 'wingspan' of a 400kV tower, plus an additional 10m buffer on each side. The lengths agreed on are considered a worst case scenario as it is not possible to be exact on the extent of clearing that would be required at each crossing.

The hedgerows affected were then mapped using the following approach:

- A GIS specialist at TOBIN conducted a review of aerial photography and identified each hedgerow the transmission line would cross.
- Areas of hedgerow within the agreed zone of impact were then mapped and given an individual reference number.

An example of the hedgerow sections determined in GIS is detailed in Figure 3 overleaf.

Figure 3 GIS (ArcMap) screenshot of hedgerows traversed by proposed line (red line) and 40m zone of influence at hedgerow crossed (grey hatch).



Note: Each hedgerow crossed is categorised (into 3 types) and given a unique reference number for analysis in a database.

Having mapped the intervening hedgerows along the route of the transmission line, it was determined that in total, approximately 831 sections of hedgerows were relevant to the study (i.e. included within the zone of influence). All hedgerows were then categorised.

Following a degree of trial and error testing it was agreed that three categories of hedgerow were suitable based on structure (tree height) which is the key impact. Structure/ height is the key criteria of individual hedgerows required for consideration as a type as the impact for example, will be much greater on mature trees than on low growing or managed hedgerows.

The categories agreed were as follows:

- **Type 1:** Hedgerows typically < 9m in height, with no identified mature tree specimens and dominated by immature taller tree species (e.g. ash) or relatively lower growing tree species e.g. blackthorn, hawthorn and willow.

- **Type 2:** This type is typically dominated by non mature trees or lower growing species but includes at least one (more typically several) identified mature tree specimen (typically >15m generally >20m) which will require cutting.
- **Type 3:** This type is dominated by mature trees which form a closed canopy treeline. Typical species include beech and oak tree lines are generally clustered around or in the vicinity of demesnes in Co. Meath.

A photographic description of typical categories is detailed below.

Type 1: Relatively unmanaged hedgerow dominated by immature ash (Co Monaghan). Minor trimming required.



Type 1: Managed Hedgerow (left of picture) in Co Monaghan. No trimming required.



Type 2: Managed hedgerow and scattered mature ash tree which will require cutting within zone of impact. However given relatively scattered nature possibly only one or two trees will require cutting/ partial trimming.



Type 2: Both sides of road. Note not closed canopy i.e. scattered but relatively dense mature trees at least 1 to 2 either side of road will require cutting/ significant trimming under the line.



Type 3: category (right of picture). Very mature ash trees form a continuous treeline. At least several of these trees will require felling/ partial trimming within the zone of impact.



The next stage was to categorise all hedgerow sections into one of these three types. This was carried out by reviewing LIDAR images of each hedgerow crossing.

Once categorised, the category assignments were reviewed by a second person for Quality Control purposes. A database was then created outlining the hedgerow reference number, the agreed type (1, 2 or 3) it would be assigned to, and the GPS location coordinates of the centre point of the impact zone, which were generated in GIS.

The final information detailed in the database included a category for all unique hedgerows within the zone of impact and length quantified within the zone of influence including hedgerow/ treelines crossed and those running in parallel or at angles but nevertheless included within the zone of influence.

2.2 FIELD SURVEY

Following the desk based categorisation of hedgerows, a field survey was carried out in which 100 (approximately 12%) of the total number of hedgerow sites were visited and categorised in the field. This was a third level of quality control to ensure accuracy (as far as possible). This exercise allowed a determination of accuracy of the desk based approach for determining hedgerow types. The level of inaccuracy (of desk approach) was used to calculate overall hedgerow type(s) impacted. The approach to field survey work was as follows:

- Using maps produced during the desk based study the location of the line crossing was identified.

- The exact location of the crossing was confirmed using a hand held GPS unit to locate the centre point of the impact zone, the coordinates of which were determined in GIS.
- The hedgerow was then surveyed, field notes were taken including the species of vegetation present, the structure of the hedgerow (height, width, density) and the potential for bat roosts.
- A photograph was taken of each hedgerow where possible.
- Each hedgerow was categorized according to the agreed categories 1, 2 or 3.
- On returning, the categorization given in the field was compared to the original categorization given during the desk study in order to Quality Check the accuracy of the desk survey.

Of the 100 hedgerows surveyed in the field, 10 were re-categorised following the field survey, giving the desk survey an accuracy of 90%.

Of those 10 hedgerows that were re-categorised, 4 were changed from a Type 1 to a Type 2 and 6 were changed from a Type 2 to a Type 1. The main reason for re-categorising a hedgerow from a Type 1 to a Type 2 was that the maturity of tree specimens was more apparent in the field. Some aerial photography used in GIS was taken in winter months, making trees appear smaller or less mature. The main reason for re-categorising a hedgerow from a Type 2 to a Type 1 was due to trees being shorter, having a sparser crown or appearing less mature in the field than in GIS. Table 2.1 indicates the reason for re-categorising these hedgerows.

Table 2-1 Reason for re-categorisation of hedgerows following field survey

Hedgerow ID No.	Desktop Category	Field Category	Reason for re-categorisation
MSA 25	2	1	Tall but immature specimens
MSA 33	1	2	One nice mature ash tree specimen
MSA 99	1	2	Very Mature tree
MSA 117	2	1	Tall trees but thin on top
MSA 157	1	2	Trees more mature than apparent in GIS due to winter image in aerial photography
MSA 206	2	1	Difficult to determine in GIS due to shadow from adjacent mature treeline
MSA 324	2	1	Insufficient tree height, despite robust crown
CMSA 487	2	1	Short birch trees
CMSA 612	2	1	Tall but immature ash trees
CMSA 728	1	2	Mature ash trees

This margin of error (10%) was incorporated into the overall calculations for summarising hedgerow types and number of each type.

3 RESULTS/ POTENTIAL IMPACTS

A summary of all data determined is detailed in Table 3.1 below. This information was calculated from the database. Final summary calculations to determine type incorporated the 10% margin of error in the purely desk based approach determined following the field survey.

Table 3-1 Total number and length of each hedgerow type within zone of influence assigned

	Number of hedgerow (% of total)	Length of hedgerow (km)
Type 1	666 (80%)	36.4
Type 2	165 (19%)	9.1
Type 3 Mature treelines	10 (1%)	0.5
Total	831	45.5

This study calculated that 831 hedgerows (45.5km in total) will be crossed by the proposed 400kV transmission line that could be potentially impacted (i.e. included within 40m zone of influence).

Of these, 666 (80%) hedgerows were categorised as a Type 1 hedgerow, meaning they are typically less than 9m in height and did not contain obvious mature trees that would require severe cutting or removal. The length of hedgerow (36.4km) within the zone of impact will largely be traversed in most cases with minimal, if any, trimming required. In some cases taller immature or re-growth tree species such as Ash will be trimmed. Of the Type 1 hedgerows, 231 are located in the Meath Study Area (MSA) and 435 are located in the Cavan/ Monaghan Study Area (CMSA).

In all, 165 (19%) hedgerows were categorised as Type 2, meaning that they were managed / unmanaged hedgerows typically containing at least 1 mature taller tree species (most commonly ash) occurring within the 40 metre length assessed. Smaller mature woody species e.g. hawthorn may also be present however impacts will be less for these. The key factor in determination of Type 2 is that they contain at least 1 large or mature tree specimen(s) that would likely require cutting/ pollarding or removal. It is important to note that while 9.1km of this hedgerow type is detailed as crossed by the line; the actual number of mature trees to be cut will be significantly lower than indicated by this statistic. In reality the number of mature trees to be cut along hedges crossed will range between 1 and 5. Hence a total range of trees likely to be cut will be between 165 and 495. Of the 165 Type 2 hedges identified, 87 were located in MSA whilst 78 were located in CMSA.

In all 10 (1%) were determined as Type 3 i.e. continuous mature treelines, in which the majority, if not all, of the length of the zone of impact (508m) will be mature tree which will require cutting. Based on an estimate of 6 to 15 trees within this zone, an approximate range of trees requiring cutting is 60 – 150. Of the ten treelines that have been identified, nine are located in MSA with just one in CMSA.

4 DISCUSSION

Potential impacts are detailed for each type of defined hedgerow in the Results/ Potential Impacts section above. This information is important for informing the Ecological Impact Assessment in the EIS and appropriate precautionary mitigation by reduction. It is important to put in context that these impacts will be in reality minimal; as the hedgerow structure will be retained and any disturbance impacts will be a temporary impact at first clearance and irregular maintenance trimming. Detailed and appropriate site specific mitigation will be informed by this report.

It is also important to note that the impacts detailed are an estimate, based on current available knowledge. Impacts detailed are a relatively accurate indication of the “worst case scenario” of the potential impact, specifically for cutting/ trimming woody vegetation in linear field boundaries in the vicinity of the transmission line. This document provides an information source for informing the overall ecological impact assessment for the proposed project. In reality the use of a site ecologist to advise tree cutting operations will significantly reduce this impact and trimming of tree limbs rather than cutting the entire tree structure will be recommended where possible rather than blanket tree cutting.

In particular indirect impacts to species like bats which actively forage and possibly roost along/ in type 2 and 3 hedgerows will be informed by this report. Other considerations regarding (indirect) impacts are loss of breeding habitat/ disturbance to tree nesting bird species. This report will be an important resource for defining areas where precautionary mitigation for bats and birds is relevant.

Mitigation informed by this report to be considered may include:

1. Cutting of mature trees will follow NRA Guidance on the removal of treelines and hedgerows prior to construction.
2. Consideration of best practise for treatment of bats specifically how to deal with removal of trees / hedgerows and impacts on bats³.
3. Possible consideration of planting mitigation woodland habitat to offset the loss of trees due to the proposed line. With the data presented in this report we will be able to accurately estimate the area of woodland planting that would be required to adequately compensate the impacts.
4. Timing constraints will be detailed in the EIS to minimise disturbance impacts to fauna e.g. bats and birds. In addition, careful tree surgery monitored by a site ecologist will ensure the maximum biodiversity is retained and the final zone of impact is minimised significantly.

It is important to highlight that while the hedgerow height may be reduced; the overall hedgerow structure and function will be retained.

³ E.g. National Roads Authority. *Guidelines for the treatment of bats during construction of national road schemes.* NRA, Dublin. *NRA Guidelines on removal of trees and hedgerows prior to the construction of National Road Schemes...*

5 CONCLUSIONS

This report details probable worst case scenario of areas of tree cutting in linear field boundary (hedgerow) habitats for the overall project and both the Meath Study Area (MSA) and Cavan/Monaghan Study Area (CMSA). It is an important information document for informing the overall ecological impacts for the proposed 400kV transmission line. It will also inform specific mitigation requirements for specific locations within the overall study area which are detailed in a separate database (which informed this report) and GIS file.



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