APPENDIX X - ALLUVIAL WOODLAND CONDITION ASSESSMENT AND FUTURE PROSPECTS

1.1   Condition assessment criteria

Criteria are assessed at different levels: within an individual 20m x 20m plot (1-plot level assessment) or overall several plots (4-plot level assessment).
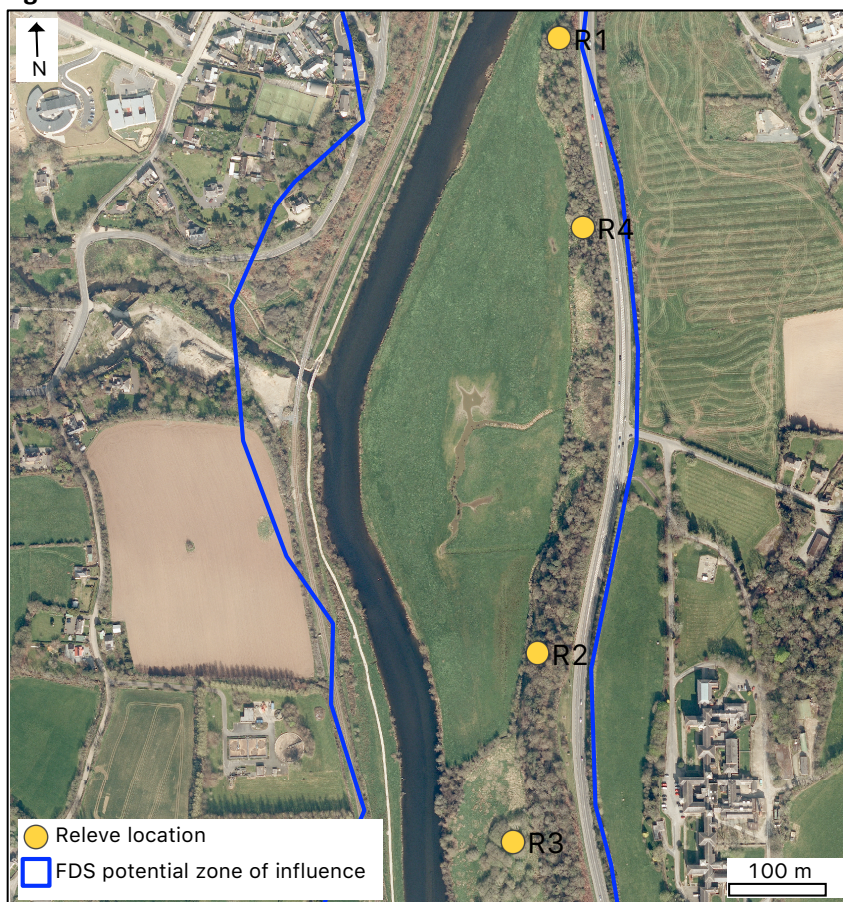
- Assessment at the 1-plot level: for each individual plot there are 10 criteria. A plot must pass at least 8 to pass (O'Neill et al., 2013).
- Assessment at the 4-plot level: there are three additional criteria related to regeneration and size of target species and dead wood that are assessed per 4 plots. At least 3 of these criteria must be passed (there is a target per 4 plots) (O'Neill et al., 2013).

The results of the passes of individual plots and the four-plot assessment are then combined to give an overall condition for the polygon/ site (O'Neill et al., 2013, Table 1.1). For example, for the site to have Green condition status, all 4 x 1-plots and the 4-plot summary must be passed (Table 1.1).

Table 1.1: Overall polygon (site) assessment (O'Neill et al., 2013)

No. of 1-plot passes	4-plot result	Polygon Structure and Functions assessment result
4	Pass	Green
3	Pass	Amber
4	Fail	Amber
<3	Pass	Red
<4	Fail	Red

Figure 1.1. Location of wet woodland relevés

1.2 Overall site condition assessment - current

1.2.1 Site-specific condition assessment criteria

R1 and R3 would fail the condition assessment on cover of native shrubs and bryophytes (in the ground layer). There was no obvious reason for this (i.e. no obvious negative pressures).

For both woodland vegetation types at the site (2h and 3c), bryophyte cover is described as 'sparse' or 'typically low' (Perrin et al., 2008). Some of the areas of woodland (northern area, R1 and southern area, R3) are very wet for a large part of the year and this may negatively affect bryophyte cover. In addition to the direct impacts of high winter water levels, these areas have a field layer dominated by tall herbs that can shade smaller bryophytes in the ground layer. The drier areas of woodland (central area, R2 and R4) passed the condition assessment for bryophyte cover in the ground layer. There are no management differences between these areas (such as grazing or disturbance). In the areas where bryophyte was low in the ground layer (R1 and R3), there was good epiphytic cover and diversity of bryophytes (R3 had the highest diversity of all 4 relevés). This suggests that factors such as air pollution are not influencing the bryophyte cover. It is most likely that prolonged high water levels are the reason for the low bryophyte ground cover in the northern and southern section of woodland.

Native shrub cover was also low in the wetter woodland areas (R1 and R3) and it may be that high water levels have reduced shrub cover. There is no obvious grazing in any of the woodland and the woodland areas are all separated from the adjacent grazed floodplain by fencing and large water-filled ditches. The drier areas of woodland (R2 and R4) had higher shrub cover than the wetter areas. These areas were also in a narrow strip of woodland that may receive more light than the larger areas to the north and south. As there are no signs of overgrazing or disturbance, it is likely that the low shrub cover is due to a combination of natural factors such as high water levels, slightly lower light levels and the development phase which these areas of woodland are currently in.

O'Neill et al. (2013) state that in some cases discretion can be used as to whether or not a condition assessment criteria passes or fail, if it is clear that it is not due to any negative external or internal impact. Therefore it is considered that all relevés should pass the bryophyte and native shrub cover criteria. Site-specific target values have therefore been used for these criteria and the amended condition assessments are included in Table 1.2, below.

1.2.2 Site condition assessment summary

Table 3.1 shows a summary of the results of the 1-plot and 4-plot level assessments for the 91E0 Alluvial woodland on this site (north of floodplain). The bryophyte cover and native shrub cover criteria have been amended with site-specific target values considered more relevant to the woodland type on this site. There are no signs of any negative external or internal impacts causing these criteria to fail the standard target values.

At the 1-plot level, all relevés pass the species composition criteria. Although the non-native species *Impatiens glandulifera* is less than 10% cover in all four plots and passes the negative indicator species criteria, it clearly regenerates in all plots. Therefore all plots fail the negative species regeneration criteria.

At the 4-plot level the site passes on size class and target and native tree species regeneration but fails on old trees and dead wood. This may be partly due to high water levels on the site, moving dead wood downstream during winter flooding. There is also relatively low cover of old trees on the site as much of the woodland is relatively recent in origin.

Table 1.2. Summary of current 91E0 condition assessment at 1-plot and 4-plot level

Criteria	Target value	R1	R2	R3	R4
1-plot level					
1) Positive indicator species	6 species plus at least 1 target species.	PASS	PASS	PASS	PASS
2) Negative indicator species	≤10% cover of plot	PASS	PASS	PASS	PASS
3) Negative species regeneration	Absent	**FAIL**	**FAIL**	**FAIL**	**FAIL**
4) Median canopy height (m)	≥7m	PASS	PASS	PASS	PASS

Criteria	Target value	R1	R2	R3	R4
5) Total canopy cover	≥30% of plot	PASS	PASS	PASS	PASS
6) Proportion of target species in canopy	≥50% of canopy	PASS	PASS	PASS	PASS
7) Native shrub layer cover	5*-50% (*site-specific criteria amendment)	PASS	PASS	PASS	PASS
8) Native dwarf shrub/ field layer cover	≥20% of plot, height ≥20cm	PASS	PASS	PASS	PASS
9) Bryophyte cover	≥0*% (*site-specific criteria amendment)	PASS	PASS	PASS	PASS
10) Grazing pressure	No overgrazing	PASS	PASS	PASS	PASS
No. 1-plot criteria passed	≥8/ 10	9/10	9/10	9/10	9/10
Overall 1-plot assessment		**PASS**	**PASS**	**PASS**	**PASS**
4-plot level					
Target sp. dbh	At least one of each of the three size classes present	7-19.5cm: **Yes** 20-29.5cm: **Yes** >30cm: **Yes** **PASS**			
Target sp. free regeneration	>1 sapling >2m tall*	**PASS**			
Other native tree species free regeneration	>1 sapling >2m tall in 2 or more plots*	**PASS**			
Old trees & dead wood	>3 from any category with dbh>20cm	Old/ senesced: **No** Standing dead wood: **No** Fallen dead wood: **Yes** Stumps: **No** **FAIL**			
No. 4-plot criteria passed	≥3/ 4	3/4			
Overall 4-plot assessment		**PASS**			

*Site-specific target values used for these criteria as there are no signs of any negative external or internal impacts causing this criteria to fail

1.2.3   Current overall site condition assessment

As there are four passes at the 1-plot level and the site also passes at the 4-plot level, the 91E0 woodland at the site is given a 'Green' result for Structure and Function assessment (see Table 1.1 and O'Neill et al., 2013).

1.2.4   Future prospects

1.2.4.1   Do-nothing scenario

In the absence of any development or activity, such as those related to the proposed EFDS, there is little predicted long-term change to the condition of the 91E0 alluvial woodland on the site. The woodland is on the edge of a regularly flooded floodplain and is unlikely to be suitable for general development. It is currently not grazed by livestock and this is also unlikely in the future as access by livestock would be difficult. The trees are not suitable for commercial felling. The woodland has no obvious amenity use, as it is narrow, with dense undergrowth in places, difficult access and is regularly flooded. Therefore there are no predicted long-term external negative pressures on the woodland.

The non-native species *Impatiens glandulifera* is well established in the woodland and in the general River Slaney corridor. Currently, although the species regenerates, it does not dominate the woodland as other native tall herbs (such as *Oenanthe crocata*) are abundant. In the absence of major disturbance, *Impatiens glandulifera* is likely to remain part of the general woodland flora without reducing native species diversity. It would not be possible to eradicate the species from the woodland in the long-term as it is too frequent within the woodland and would recolonise from upstream. *Fallopia japonica* is present on the site but does not extend into the alluvial woodland, presumably as

the site is too wet and shaded. It would be possible to manage this species, as it is currently very localised.

If non-native species cover were to increase in the woodland then the relevés could fail on the criteria of negative indicator species. However, all relevés would still pass 8/10 of the 1-plot criteria and would pass the condition assessment overall. Therefore it is considered highly probable that the woodland would maintain the 'Green' condition assessment status in the future.

1.2.4.2   Proposed EFDS scheme

There is a proposed bridge across the River Slaney as part of the EFDS. This will span a small area of the northern section of Annex I priority alluvial woodland at this site. There will be no direct loss of habitat, as the bridge supports will be located outside of the area of alluvial woodland and the area will be protected during construction. However, there will be indirect impacts from:

    a) shading by the bridge; and,
    b) topping of trees under the bridge to 5m.

A shading study has been undertaken (Integrated Environmental Solutions Limited, 2016) and this shows that only a small area of woodland will be affected by shading and all that areas will still receive over 2 hours of sunlight per day during the growing season (spring and summer). For the assessment below, the lower topping height of 5m has been assumed. This would be both an initial tree-topping before bridge construction, and ongoing management to ensure that tree branches do not interfere with the bridge structure.

The proposed bridge location is in the area of R1. The likely potential impact of the bridge construction and operation on the condition assessment for R1 is outlined in Table 3.2. This includes the 1-plot level for R1 and the overall site 4-plot level assessment. NOTE: This is not a formal Ecological Impact Assessment (EcIA) and does not assess impacts from the entire EFDS scheme. It is intended as guidance, which can be incorporated into the final EFDS EcIA. The EFDS scheme may have additional potential impacts such as hydrology (from channel creation to the west of the alluvial woodland) and changes to flooding regime, which will need to be assessed separately once data and the final design are available. The predicted condition assessment in Table 1.3. assumes no impact from construction (i.e. area is fenced/ suitably protected prior to construction), no loss of habitat area and no hydrology impacts.

Table 1.3. Predicted future 91E0 condition assessment at 1-plot and 4-plot level under the proposed EFDS

Criteria	Target value	Predicted future criteria
Individual plot level (R1)		
1) Positive indicator species	6 species plus at least 1 target species	14 indicator species currently present. Topping of trees and shading will change light levels in a small area of the woodland. Only a small area of woodland will be affected by shading and all areas will still receive over 2 hours of sunlight per day during the growing season (spring and summer). This could lead to a slight local change in species composition. However, alluvial woodland will still be present, even if there was a change in woodland vegetation type. Alluvial woodland is dynamic and changeable and small changes in species composition would not cause this criterion to fail. For instance, if half of target species were lost, there would still be sufficient target species to pass. In addition, many of the positive indicator species are not woodland obligates (e.g. *Ranunculus repens, Phalaris arundinacea, Mentha aquatica, Urtica dioica*) so are unlikely to be lost, even if the woodland becomes more open. Measures must be taken during tree topping to ensure that there is minimal disturbance to the ground, field and shrub layers in the woodland. **PREDICTED LONG-TERM PASS**
2) Negative indicator species	≤10% cover of plot	Disturbance could lead to a short-term increase in the invasive field layer species *Impatiens glandulifera* and lead to invasion by *Fallopia japonica*. However increased shading could have a negative impact on these species. Measures must be taken during tree topping to ensure that there is minimal disturbance to the ground, field and shrub layers in the woodland to avoid the spread of invasive species. Monitoring and, if necessary, invasive species management should be undertaken. **PREDICTED LONG-TERM PASS**
3) Negative species regeneration	Absent	It would not be possible to prevent the regeneration of *Impatiens glandulifera* in the wet woodland as, even if were completely cleared, it will reinvade from upstream. However *Fallopia japonica* and non-native trees such as *Acer pseudoplatanus* are locally controllable if found to have a negative impact on woodland flora. **PREDICTED LONG-TERM FAIL**
4) Median canopy height (m)	≥7m	The canopy height will be reduced to 5m and this will be maintained by ongoing topping of trees. **PREDICTED LONG-TERM FAIL**

Criteria	Target value	Predicted future criteria
5) Total canopy cover	≥30% of plot	Canopy tree species will differ in their sensitivity to the regular tree topping required to maintain a lower canopy height. However, species such as the native willow *Salix cinerea* can tolerate frequent coppicing/ pollarding. This is also a naturally shorter tree than the non-native willow species in this area. So whilst there may be a long-term shift in the species composition of the canopy (see below), there is unlikely to be a significant reduction in canopy cover. Canopy cover in this location is 70% and the target is only ≥30%. There is no reason why the target would not continue to be met if topping is undertaken using a sensitive and appropriate method (time of year, avoiding disturbance, minimum cutting etc.). **PREDICTED LONG-TERM PASS**
6) Proportion of target species in canopy	≥50% of canopy	The species composition of the canopy may change in the long-term in response to shading and tree topping. However, the canopy will still be dominated by target species (*Alnus glutinosa, Fraxinus excelsior, Salix cinerea* or other *Salix* sp.), as the prolonged winter flooding does not favour other tree species. It may be that there will be a shift to dominance by the native willow *Salix cinerea*, as in the majority of the alluvial woodland at this site. This species is shorter and tolerant of frequent coppicing/ pollarding. Alluvial woodland is a dynamic system and changes in species composition occur naturally in relation to changes in woodland age, development and flooding regime etc. **PREDICTED LONG-TERM PASS**
7) Native shrub layer cover	5*-50% (*site-specific criteria amendment)	Shrub cover is currently very low in this area of the woodland, most probably from prolonged high water levels in winter. Although there will be slight shading of the woodland by the bridge, the topping of canopy trees will increase the light reaching the shrub layer. Some of the coppiced/pollarded trees will also form part of the shrub layer, increasing cover. Therefore the lower, site-specific, target for alluvial woodland at this site should therefore continue to be met and may actually be increased. **PREDICTED LONG-TERM PASS**
8) Native dwarf shrub/ field layer cover	≥20% of plot, height ≥20cm	The field layer is dominated by tall herb species. These can grow in closed or open woodland and many can also persist outside of woodland e.g. in tall-herb swamp. Therefore the cover and height of the field layer is unlikely to change in response to the tree toping and slight bridge shading. Currently the cover of the field layer is 100% in this area, with a height of c.1m, but to pass this target it is only required to be ≥20% of plot and ≥20cm. A very large change in the field layer would be required for this target to fail and there is no reason why this would occur.

		PREDICTED LONG-TERM PASS
Criteria	Target value	Predicted future criteria
9) Bryophyte cover	≥0*% (*site-specific criteria amendment)	Bryophyte cover is currently very low in the ground layer, probably mainly due to prolonged high water levels but also shading by tall herbs. This is unlikely to change. The lower, site-specific, target for alluvial woodland at this site should therefore continue to be met. **PREDICTED LONG-TERM PASS**
10) Grazing pressure	No overgrazing	There is currently no access to livestock in this area and no signs of grazing/ overgrazing. This area of the woodland should remain inaccessible to livestock either by fencing or a large water filled ditch as present currently **PREDICTED LONG-TERM PASS**
No. 1-plot criteria passed	≥8/ 10	8/10
Overall 1-plot assessment		PASS
4-plot level		
Target sp. dbh	At least one of each of the three size classes present	These targets are measured across the woodland. There were sufficient size classes of trees and regeneration in the other three plots to meet these criteria alone. Therefore, although there will still be a range of size classes and regeneration in R1 (bridge location), this is not essential for the woodland to pass the condition assessment. **PREDICTED LONG-TERM PASS**
Target sp. free regeneration	>1 sapling >2m tall*	
Other native tree species free regeneration	>1 sapling >2m tall in 2 or more plots*	
Old trees & dead wood	>3 from any category with dbh>20cm	There were insufficient old trees and dead wood in the woodland to pass this criteria overall. Much of the woodland at this site is relatively recent (less than 30 years old) which is one reason why this criterion fails overall. However, in the very long-term, the age of trees will increase. Fallen and standing dead wood could be increased by the topping activity in the area of the bridge. It is recommended that standing dead trees and dead wood are not removed from site. Branches and wood removed during topping activity could be placed in various locations within the woodland (as advised by an ecologist) to increase the dead wood present. **PREDICTED LONG-TERM FAIL** **(NB VERY LONG-TERM e.g. >40 years PASS)**
No. 4-plot criteria passed	≥3/ 4	3
Overall 4-plot assessment		PASS

1.2.1   Predicted future overall site condition assessment

As there are four predicted passes at the 1-plot level (as R2, R3 and R4 would be unaffected by the proposed bridge) and the site is also predicted to pass at the 4-plot level, the 91E0 woodland at the site would be given a 'Green' result for Structure and Function assessment (see Table 1.1 and O'Neill

et al., 2013). **There are therefore no predicted changes to the site overall condition assessment for 91E0 as a result of the proposed bridge location.**

REFERENCES

Integrated Environmental Solutions Limited (2016). *Enniscorthy FDS: Shadow Analysis & VSC Study.* Unpublished report for Mott Macdonald (15.11.16).

O'Neill, F.H. & Barron, S.J. (2013) Results of monitoring survey of old sessile oak woods and alluvial forests. Irish Wildlife Manuals, No. 71. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Perrin, P., Martin, J., Barron, S., O'Neill, F., McNutt, K. & Delaney, A. (2008). *National Survey of Native Woodlands 2003-2008.* Volume II – Woodland Classification. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.