

Wylfa Newydd Project A5025 On-line Highway Improvements

Design Approach and Landscape Strategy



APPLICATION November 2017

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1 Introduction

1.1 Document purpose

- 1.1.1 This design approach and landscape strategy forms part of the documentation submitted as part of the planning application for the A5025 On-line Highway Improvements (the Proposed Development).
- 1.1.2 The purpose of this design approach and landscape strategy landscape strategy (subsequently referred to as the Strategy) is to describe how the landscape design of the Proposed Development has been influenced by the surrounding landscape character, in particular the proposed types and species mixes of planting, the seeding areas and the types of boundary features such as stone walls. In addition, it provides an outline specification for the implementation of planting and seeding areas, such as preparation for planting. It also provides details of outline landscape maintenance which set out how these areas would be maintained, for example grass cutting or pruning of vegetation. This document has also been used to inform some of the measures and strategies outlined in the Code of Construction Practice (CoCP).
- 1.1.3 The intended functions (termed Environmental Functions) of proposed planting and seeding areas, together with maintenance objectives, are set out in section 3.5. The Environmental Functions describe the environmental objectives for the planting and seeding areas such as the provision of species diversity. The maintenance objectives describe the maintenance and management measures required to achieve the Environmental Functions. This is in line with guidance presented in Design Manual for Roads and Bridges (DMRB) Volume 10, Section 0, Part 2 [RD1].
- 1.1.4 This Strategy does not contain the level of detail required for implementation and maintenance of the planting and seeding areas by a contractor, but provides the parameters for subsequent detailed design and implementation and maintenance specification. The detailed design and implementation and maintenance specification would make up part of the contract documents used in the appointment of a contractor. The contractor would be responsible for implementation of the planting and seeding works and early maintenance.
- 1.1.5 Once the contract maintenance period ends, the Isle of Anglesey County Council (IACC) would then be responsible for long-term maintenance and management. The information in section 3.5 would be used by the IACC on handover of maintenance responsibilities, to ensure the long-term maintenance and management regime fulfils the Environmental Functions and maintenance objectives.

1.2 Background

- 1.2.1 Land adjacent to the Existing Power Station at Wylfa Head, west of Cemaes on the north coast of the Isle of Anglesey, is considered by the UK Government to be suitable for the construction of a new Nuclear Power Station. Horizon Nuclear Power Wylfa Limited (Horizon) proposes to construct and operate a new nuclear power station, known as Wylfa Newydd, on this land. This power

station would deliver approximately 2,700 megawatts of electricity, enough power for around five million homes.

1.3 Horizon Nuclear Power Wylfa Limited

1.3.1 Horizon is a UK energy company developing a new generation nuclear power station to help meet the country's need for stable and sustainable low carbon energy. Horizon's ultimate parent company is Hitachi Ltd., a Japanese corporation and the parent company of the multi-national Hitachi group of companies.

1.4 The Wylfa Newydd Project

1.4.1 Horizon is proposing to construct and operate the Wylfa Newydd Project, which comprises the Wylfa Newydd DCO Project, the Licensable Marine Activities and the Enabling Works. Each of these elements is described further below. The Licensable Marine Activities will be consented under a Marine Licence and the Wylfa Newydd DCO Project under a DCO, however there is some overlap between the two; the Marine Works (see below) will be consented under both.

Wylfa Newydd DCO Project

1.4.2 The Wylfa Newydd DCO Project comprises those parts of the Wylfa Newydd Project which are to be consented by a DCO, namely:

- **Power Station:** the proposed new nuclear power station, including two UK Advanced Boiling Water Reactors (UK ABWRs) to be supplied by Hitachi-GE Nuclear Energy Ltd., supporting facilities, buildings, plant and structures, and radioactive waste, spent fuel storage buildings and apparatus to transfer electrical energy to the National Grid high voltage electricity transmission network;
- **Other on-site development:** including landscape works and planting, drainage, surface water management systems, public access works including temporary and permanent closures and diversions of public rights of way, new Power Station Access Road and internal site roads, car parking, construction works and activities including construction compounds and temporary parking areas, laydown areas, working areas and temporary works and structures, temporary construction viewing area, diversion of utilities, perimeter and construction fencing;
- **Marine Works** comprising:
 - Permanent Marine Works: the Cooling Water System Marine Off-Loading Facility (MOLF), breakwater structures, shore protection works, surface water drainage outfalls, fish recovery and return system, fish deterrent system, navigation aids and Dredging;
 - Temporary Marine Works: temporary cofferdams, a temporary access ramp, temporary navigation aids, temporary outfalls and a temporary barge berth;

- **Off-Site Power Station Facilities:** comprising the Alternative Emergency Control Centre (AECC), Environmental Survey Laboratory (ESL) and a Mobile Emergency Equipment Garage (MEEG); and
 - **Associated Development:** the Site Campus within the Wylfa Newydd Development Area; temporary Park and Ride facility at Dalar Hir for construction workers (Park and Ride); temporary Logistics Centre at Parc Cybi (Logistics Centre); and the A5025 Off-line Highway Improvements.
- 1.4.3 The following terms are used when describing the geographical areas related to the Wylfa Newydd DCO Project and the Licensable Marine Activities:
- **Power Station Site** - the indicative area of land and sea within which the majority of the permanent Power Station buildings, plant and structures would be located. This includes the two nuclear reactors, steam turbines, the Cooling Water System, breakwaters and the MOLF.
 - **Wylfa Newydd Development Area** - the indicative areas of land and sea including the Power Station Site, and the surrounding areas that would be used for construction and operation of the Power Station, Marine Works and other on-site development. It would also include the Site Campus. This area is representative of the maximum area that would be physically affected by construction activities related to the Power Station and used to form the setting and landscaping features of the operational Power Station.

Licensable Marine Activities

- 1.4.4 The Licensable Marine Activities comprise the Permanent Marine Works, the Temporary Marine Works, the disposal of dredged material at the Disposal Site, the drainage of surface water into the sea. During construction phase this includes the construction of a waste water treatment effluent outfall, and the drainage of treated sewage into the sea.

Enabling Works

- 1.4.5 The Enabling Works comprise the Site Preparation and Clearance Proposals (SPC Proposals) and the A5025 On-line Highway Improvements.
- 1.4.6 Horizon has submitted applications for planning permission for the Enabling Works under the Town and Country Planning Act 1990 to the Isle of Anglesey County Council (IACC).
- 1.4.7 In order to maintain flexibility in the consenting process for the Wylfa Newydd DCO Project, the SPC Proposals have also been included in the application for development consent. The A5025 On-line Highway Improvements are not part of the application for development consent.

1.5 The A5025 Highway Improvements

- 1.5.1 Construction of the Power Station would require very substantial transport needs for materials, large components and staff. Studies undertaken by Horizon in 2010–2011 identified that the stretch of the A5025 between Valley

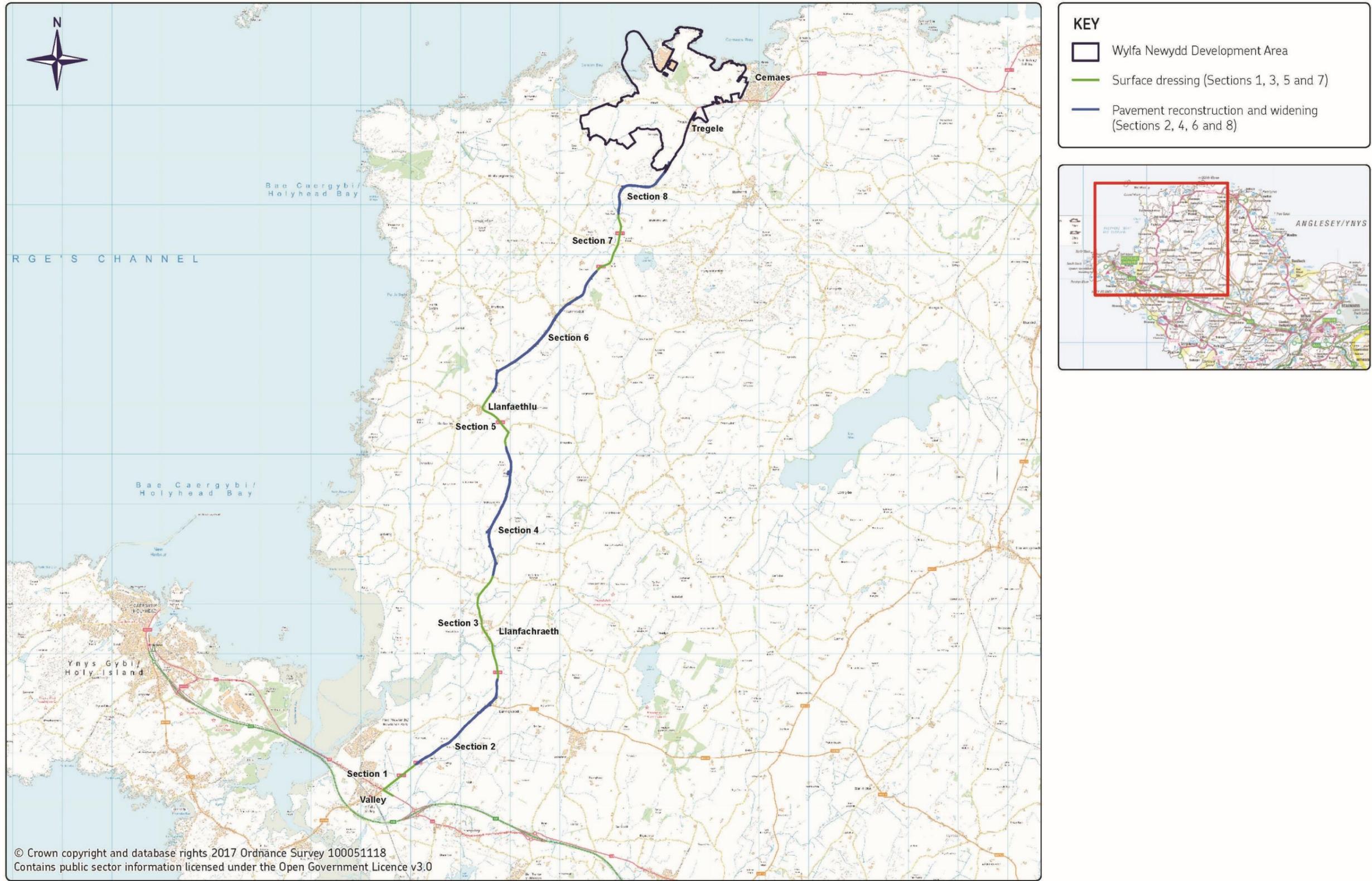
and the proposed Power Station Access Road Junction has physical and operational constraints in relation to its width, alignment, overtaking opportunities and surfacing condition.

- 1.5.2 As a result of these studies Horizon has committed to improve this section of the A5025 in order to mitigate the predicted impacts of increased traffic associated with construction activities that would be undertaken at the Wylfa Newydd Development Area, and from operational Power Station traffic, that would travel along this part of the highway network.
- 1.5.3 Horizon therefore intends to deliver a series of on-line and off-line improvements (collectively termed the A5025 Highway Improvements) between Valley and the proposed Power Station Access Road Junction as part of its wider transport strategy for the Project, the objectives being to:
- upgrade the route, both in terms of standard of construction and road geometry, such that it can support increased levels of traffic, and improve safety and accessibility;
 - ensure that all relevant abnormal loads can pass along the full length of the A5025;
 - reduce any potential increase in road accident risk;
 - reduce any adverse impacts on local communities;
 - reduce any adverse impacts on the environment; and
 - seek opportunities, where possible, to achieve improvements for local communities and the environment through road design measures.
- 1.5.4 The 16.19km stretch of the A5025 identified for on-line improvement has been divided into eight sections (see figure 1-1).
- Section 1 – A5 east of Valley junction to north of Valley Junction (A5/A5025) – a length of 1.06km;
 - Section 2 – north of Valley Junction (A5/A5025) to north of Llanynghenedl – a length of 2.46km;
 - Section 3 – north of Llanynghenedl to north of Llanfachraeth) – a length of 2.28km;
 - Section 4 – north of Llanfachraeth to south of Llanfaethlu – a length of 2.7km;
 - Section 5 – south of Llanfaethlu to north of Llanfaethlu) – a length of 1.43km;
 - Section 6 – north of Llanfaethlu to north of Llanrhuddlad – a length of 3.36km;
 - Section 7 – north of Llanrhuddlad to north of Cefn Coch) – a length of 1.3km; and
 - Section 8 – north of Cefn Coch to the proposed Power Station Access Road Junction – a length of 1.6km.

- 1.5.5 The Proposed Development involves the implementation of on-line improvements largely within the existing highway boundary of the A5025. In summary, these comprise:
- improvement of the existing pavement through the application of a surface dressing through Sections 1, 3, 5 and 7;
 - reconstruction and localised widening of the existing pavement through Sections 2, 4, 6 and 8
 - modifications and improvements to existing signage and road markings through Sections 1–8; and
 - the construction of a Temporary Construction Compound (incorporating a temporary pavement recycling facility) within Section 7, immediately adjacent to the A5025.
- 1.5.6 The ‘pavement’ referenced above relates to the surface of the road within the highway boundary, defined as materials comprising the sub-base, base course and surface course placed on a sub-grade to support the traffic load.
- 1.5.7 The A5025 Off-line Highway Improvements would involve the construction of bypasses to reduce the effects of future traffic on existing communities, the formation of new junction arrangements, and localised improvements to existing bends.
- 1.5.8 The A5025 Off-line Highway Improvements form an integral component of the Wylfa Newydd DCO Project application, and do not form part of the planning application for the Proposed Development.
- 1.5.9 Further information regarding the Proposed Development is provided in the A5025 On-line Highway Improvements Environmental Report, which presents the findings of the environmental assessment process.
- 1.5.10 The following describes the design approach and landscape strategy for the Proposed Development, including details of the proposals for planting and seeding, new boundary features and an outline specification for their implementation and management.

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Figure 1-1 Overview of the A5025 On-line Highway Improvements



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2 Design approach and landscape strategy

- 2.1.1 National and local planning policy requires that new development should be sustainable, demonstrate high quality design, take into account the local context and minimise adverse effects on the natural environment. In addition, the Anglesey Area of Outstanding Natural Beauty (AONB) Management Plan Review 2015–2020 [RD2] requires that development within 2km of the AONB adopts the highest standard of design and ensures the special qualities of the AONB are enhanced. It also requires that new highway improvements take into account the rural setting of the road. Further information on landscape related policy is provided within chapter 12 of the A5025 On-line Highway Improvements Environmental Report.
- 2.1.2 Implementation of the Strategy would contribute to furthering a number of Anglesey's Biodiversity Action Plan [RD3] objectives for the following habitats and species: ancient hedgerows (including cloddiau/stone-faced earth banks), ponds, flower rich road verges, water vole, otter and great crested newt. Chapter 11 of the A5025 On-line Highway Improvements Environmental Report provides further information on these objectives.
- 2.1.3 Local landscape character, including within the AONB, has been taken into account in the design-development process. The aim has been to embed mitigation measures into the design of the Proposed Development to improve integration into the receiving landscape and address adverse effects on the natural environment. Special qualities of the AONB, which are of relevance to the Proposed Development, include 'expansive views', 'peace and tranquillity', 'rural agricultural communities', 'the Public Rights of Way network', 'accessible land', 'species rich roadside verges', the 'built environment including Conservation Areas and Listed Buildings' and 'archaeology, and Ancient Monuments/Historic Landscapes, Parks and Gardens'. The effect upon these special qualities has been considered as part of the mitigation, in order to maintain the current conditions, with a single carriageway in a rural landscape, with hedge, tree, cloddiau, stone and fence boundaries to the adjacent agricultural fields. The locations of key views and visual receptors have also been taken into account to help mitigate visual effects. Further information on landscape character and views is presented within chapter 12 of the A5025 On-line Highway Improvements Environmental Report, and within the landscape baseline and visual assessment tables presented in appendix 12.1 within volume 3 of the A5025 On-line Highway Improvements Environmental Report.
- 2.1.4 As part of the widening works for the Proposed Development, site clearance would be required involving the removal of boundary features such as cloddiau, stone walls, hedgerows and fences, and the loss of grass verges and small areas of other vegetation. A primary aim of the Strategy is to retain existing boundary features wherever possible, or mitigate their loss by replacing them, like for like, with new features of the same type. Horizon has consulted the landowners regarding the reinstatement of boundary features, who have confirmed that the like-for-like replacement of boundary features would be the preferred approach. Such features are considered important character-forming landscape elements, recognised as such in local planning

policy and the AONB Management Plan Review 2015–2020 [RD2]. In addition, such features also provide habitat for protected and notable species. Figure 2-1 and figure 2-2 show stone walls and hedgerows along the existing A5025.

Figure 2-1 Typical stone wall



Figure 2-2 Typical hedgerow



- 2.1.5 The Strategy also aims to retain trees and hedgerows in line with BS5837:2012 Trees in relation to design, demolition and construction – Recommendations [RD4] and to retain grass verges where possible. If vegetation and grass verges require removal, then mitigation would be provided. Like-for-like vegetation replacement at a particular location may not always be possible due to highway visibility splay requirements, which for safety reasons provide drivers with unobstructed views. Replacement vegetation would therefore be provided as close as possible to the original vegetation location. Where possible, existing hedgerows marked for removal would be translocated to a new position at the site clearance stage within the dormant season (November to March).
- 2.1.6 The process would involve:
- the preparation of the new hedgerow location site, through the digging of a trench to an appropriate width and depth;
 - hedgerow trimming prior to translocation;
 - hedgerow removal using suitable excavator machinery and/or hand tools to cut the roots;
 - moving the hedge, whilst maintaining as much of the root ball as possible, and placing this immediately into the trench; and
 - backfilling of the trench with topsoil, ideally sourced from the original hedgerow location.
- 2.1.7 Translocated hedgerows are likely to require infill planting with native hedgerow species. This planting would be undertaken in line with the species mixes and specification outlined in the sections below. Where required, hazel hurdles or similar would be provided to maintain connectivity of the hedgerows for bats.
- 2.1.8 Grass verges would be re-seeded with a typical highway verge seed mix to create open grassland.
- 2.1.9 Important hedgerows that would be lost or partially lost as part of the Proposed Development are listed below.
- One hedgerow is considered important from an ecological perspective as it meets ecological criteria within the *Hedgerows Regulations 1997* [RD5]. This hedgerow is shown in ecology figure 11-2b within volume 2 of the A5025 On-line Highway Improvements Environmental Report. To assist with mitigating this loss, it is proposed to improve the overall species diversity of replacement hedgerows, which would improve species diversity in the long term.
 - Nineteen hedgerows are considered important from a heritage perspective as they meet heritage criteria within the *Hedgerows Regulations 1997* [RD5]. The hedgerows are dispersed along the A5025 corridor at Sections 2, 4, 6 and 8, with one hedgerow likely to be affected at Section 7. To assist with mitigating this loss, it is proposed to replant hedgerows as close to the original line of the existing hedgerow as

possible, as many of the hedgerows are important due to the boundary line they demarcate.

- 2.1.10 Two attenuation ponds would be constructed north of Valley as part of Section 2 of the Proposed Development. Native planting of regional provenance (obtained from approved source(s) with soil and climatic conditions similar to the prevailing site) would be provided, in conjunction with the attenuation ponds, in order to help integrate them into the landscape and filter views towards them. The type of planting would be in keeping with local landscape character.

2.2 Planting and seeding mixes

- 2.2.1 DMRB Volume 10, Section 0, Parts 3 and 4 [RD6, RD7] describe planting and seeding used to mitigate adverse impacts of a highway as 'Landscape Elements' and features relevant to achieving the non-landscape environmental objectives as 'Environmental Elements'. The Landscape and Environmental Elements associated with the Proposed Development are illustrated on the Environmental Masterplan (see figures 2-24 to 2-31 within volume 2 of the A5025 On-line Highway Improvements Environmental Report).

- 2.2.2 The following Landscape and Environmental Elements are proposed.

- **LE1.3 Species-rich grassland:** grassland with herb species to provide biodiversity interest.
- **LE1.6 Open grassland:** highway verge grass provided to replace areas of existing verge grass.
- **LE2.6 Shrubs:** blocks of native shrubs to provide filtering of views towards the attenuation ponds and a foraging, nesting and shelter resource for a range of native fauna.
- **LE4.2 Native hedgerow:** linear shrub belts to provide habitat connectivity, and boundaries in keeping with local landscape character and for livestock control. Clipped to promote thickening of the hedgerow and to maximise ecological benefit.
- **LE4.4 Native hedgerow with trees:** linear shrub belts to provide habitat connectivity, and boundaries in keeping with local landscape character and for livestock control. Clipped to promote thickening of the hedgerow and to maximise ecological benefit. Individual trees provided where appropriate to introduce additional height.
- **LE5.1 Individual trees:** isolated individual trees provided, where appropriate, to integrate the highway into the local landscape character, provide visual interest and enhance nature conservation value.
- **LE6.4 Marshy grassland around attenuation ponds:** grassland with herb species to provide biodiversity interest, capable of withstanding intermittent wetter conditions.

- **E2.1 Water pollution control measures:** marginal planting provided on attenuation pond shelves (to be included at detailed design) to integrate these features into the landscape and provide biodiversity interest.

2.2.3 The following tables present the planting and seeding mixes associated with the Landscape and Environmental Elements. The mixes have been informed by Phase 1 habitat surveys carried out along the existing A5025, which identified native species local to the area. Ecological information, including details of Phase 1 habitat surveys, is presented within chapter 11 of the A5025 On-line Highway Improvements Environmental Report.

Table 2-1 Species-rich grassland

LE1.3 Species-rich grassland mix, to be sown on existing topsoil
Definition:
Grass Species (100%)
10% <i>Agrostis capillaris</i> (brown top bent)
5% <i>Anthoxanthum odoratum</i> (sweet vernal grass)
5% <i>Briza media</i> (quaking grass)
30% <i>Cynosurus cristatus</i> (crested dogstail)
15% <i>Festuca ovina</i> (sheep's fescue)
20% <i>Festuca rubra</i> (creeping red fescue)
10% <i>Phleum bertolonii</i> (smaller cat's-tail)
5% <i>Trisetum flavescens</i> (yellow oat-grass)
Wildflower Species (100%)
2.5% <i>Achillea millefolium</i> (yarrow)
20% <i>Centaurea nigra</i> (common knapweed)
5% <i>Daucus carota</i> (wild carrot)
15% <i>Galium verum</i> (lady's bedstraw)
5% <i>Leucanthemum vulgare</i> (oxeye daisy)
15% <i>Prunella vulgaris</i> (selfheal)
22.5% <i>Ranunculus acris</i> (meadow buttercup)
5% <i>Rhinanthus minor</i> (yellow rattle)
2.5% <i>Rumex acetosa</i> (common sorrel)
7.5% <i>Silene dioica</i> (red campion)

Table 2-2 LE1.6 Open grassland mix

LE1.6 Open grassland mix
Seeding rate: 30g/m²
10% <i>Agrostis capillaris</i> (brown top bent)
30% <i>Festuca longifolia</i> (hard fescue)
20% <i>Festuca rubra</i> (creeping red fescue)
25% <i>Lolium perenne</i> (perennial rye grass)
10% <i>Poa pratensis</i> (smooth stalked meadow grass)
5% <i>Trifolium repens</i> (white clover)

Table 2-3 LE2.6 Native shrubs

Species	Form/size	Planting rate in centres (c/s)	% mix
<i>Crataegus monogyna</i> (hawthorn)	Bare root transplant, 60-80cm height	1no./m ²	25
<i>Ilex aquifolium</i> (holly)	3 Litre container, 60-80cm height	1no./m ²	15
<i>Prunus spinosa</i> (blackthorn)	Bare root transplant, 60-80cm height	1no./m ²	5
<i>Rosa canina</i> (dog rose)	Bare root transplant, 60-80cm height	1no./m ²	15
<i>Rubus fruticosus</i> (bramble)	Bare root transplant, 30-40cm height	1no./m ²	10
<i>Salix caprea</i> (goat willow)	Bare root transplant, 60-80cm height	1no./m ²	15
<i>Sambucus nigra</i> (elder)	Bare root transplant, 60-80cm height	1no./m ²	15
Planting Notes:			
Plant in random species groups of 5, 10 and 15.			

Table 2-4 LE4.2 Native hedgerow

Species	Form/size	Planting rate in centres (c/s)	% mix
<i>Corylus avellana</i> (hazel)	Bare root transplant, 60-80cm height	0.45m c/s	25

Species	Form/size	Planting rate in centres (c/s)	% mix
<i>Crataegus monogyna</i> (hawthorn)	Bare root transplant, 60-80cm height	0.45m c/s	35
<i>Ilex aquifolium</i> (holly)	3 Litre container, 60-80cm height	0.45m c/s	10
<i>Prunus spinosa</i> (blackthorn)	Bare root transplant, 60-80cm height	0.45m c/s	5
<i>Rosa canina</i> (dog rose)	Bare root transplant, 60-80cm height	0.45m c/s	10
<i>Salix caprea</i> (goat willow)	Bare root transplant, 60-80cm height	0.45m c/s	5
<i>Sambucus nigra</i> (elder)	Bare root transplant, 60-80cm height	0.45m c/s	10
Planting Notes:			
Planted at 0.45m centres in a double staggered row with 0.3m between rows.			
Plant in random species groups of 5, 10 and 15.			

Table 2-5 LE4.4 Native hedgerow with trees

Species	Form/size	Planting rate in centres (c/s)	% mix
<i>Alnus glutinosa</i> (alder)	Bare root standard tree, 8-10cm girth and 250-300cm height	-	-
<i>Betula pendula</i> (silver birch)	Root-balled selected standard tree, 10-12cm girth and 300-350cm height	-	-
<i>Corylus avellana</i> (hazel)	Bare root transplant, 60-80cm height	0.45m c/s	25
<i>Crataegus monogyna</i> (hawthorn)	Bare root transplant, 60-80cm height	0.45m c/s	35
<i>Ilex aquifolium</i> (holly)	3 Litre container, 60-80cm height	0.45m c/s	10
<i>Prunus spinosa</i> (blackthorn)	Bare root transplant, 60-80cm height	0.45m c/s	10
<i>Quercus petraea</i> (sessile oak)	Root-balled standard tree, 8-10cm girth and 250-300cm height	-	-

Species	Form/size	Planting rate in centres (c/s)	% mix
<i>Rosa canina</i> (dog rose)	Bare root transplant, 60-80cm height	0.45m c/s	5
<i>Salix caprea</i> (goat willow)	Bare root transplant, 60-80cm height	0.45m c/s	5
<i>Sambucus nigra</i> (elder)	Bare root transplant, 60-80cm height	0.45m c/s	10
<i>Sorbus aucuparia</i> (rowan)	Bare root standard tree, 8-10cm girth and 250-300cm height	-	-

Planting Notes:
Planted at 0.45m centres in a double staggered row with 0.3m between rows.
Standard trees to be positioned in hedgerow prior to hedgerow planting.
Plant transplants in random species groups of 5, 10 and 15.

Table 2-6 LE5.1 Individual trees

Species	Form/size
<i>Alnus glutinosa</i> (alder)	Bare root selected standard tree, 10-12cm girth and 300-350cm height
<i>Betula pendula</i> (silver birch)	Root-balled selected standard tree, 10-12cm girth and 300-350cm height
<i>Quercus petraea</i> (sessile oak)	Root-balled selected standard tree, 10-12cm girth and 300-350cm height
<i>Sorbus aucuparia</i> (rowan)	Bare root selected standard tree, 10-12cm girth and 300-350cm height

Table 2-7 LE6.4 Marshy grassland around attenuation ponds

LE6.4 Marshy grassland mix, to be sown on low nutrient soil Seeding rate: 10g/m ²
Grass Species (80%)
12.5% <i>Agrostis capillaris</i> (brown top bent)
5% <i>Alopecurus pratensis</i> (meadow foxtail)
1.25% <i>Anthoxanthum odoratum</i> (sweet vernal grass)
1.25% <i>Briza media</i> (quaking grass)

LE6.4 Marshy grassland mix, to be sown on low nutrient soil**Seeding rate: 10g/m²**40% *Cynosurus cristatus* (crested dogstail)1.25% *Deschampsia caespitosa* (tufted hair-grass)30% *Festuca rubra* (creeping red fescue)1.25% *Hordeum secalinum* (meadow barley)7.5% *Schedonorus pratensis* (meadow fescue)**Wildflower Species (20%)**0.5% *Achillea millefolium* (yarrow)0.2% *Achillea ptarmica* (sneezewort)1% *Betonica officinalis* (betony)2.5% *Centaurea nigra* (common knapweed)2% *Filipendula ulmaria* (meadowsweet)1.5% *Galium verum* (lady's bedstraw)0.4% *Geum rivale* (water avens)0.6% *Leucanthemum vulgare* (oxeye daisy)0.8% *Lotus pedunculatus* (greater birdsfoot trefoil)1% *Plantago lanceolata* (ribwort plantain)0.2% *Primula veris* (cowslip)1.5% *Prunella vulgaris* (selfheal)2.5% *Ranunculus acris* (meadow buttercup)1.5% *Rhinanthus minor* (yellow rattle)1.5% *Rumex acetosa* (common sorrel)1% *Sanguisorba officinalis* (great burnet)0.2% *Silene flos-cuculi* (ragged robin)0.6% *Succisa pratensis* (devil's-bit scabious)0.5% *Vicia cracca* (tufted vetch)

Table 2-8 E2.1 Water pollution control measures

Species to include (mix to be finalised during detailed design)
<i>Butomus umbellatus</i> (flowering rush)
<i>Carex rostrate</i> (bottle sedge)
<i>Carex pseudocyperus</i> (cyperus sedge)
<i>Menyanthes trifoliata</i> (bogbean)
Marginal plants to be planted in low nutrient soil with aquatic compost on the attenuation pond shelves (shelves to be included at detailed design)

2.3 Boundary features

2.3.1 Replacement stone walls and cloddiau would be constructed to match existing boundary features, like for like, using original materials where possible. Stones would be replaced in a similar orientation to replicate the microhabitat (small-scale environment) for lichens, mosses and liverworts. Figure 2-3 and figure 2-4 below present illustrative sketches of replacement stone walls. Detailed information of a cloddiau/stone faced earth bank can be found on drawing WN02.05-ACM-S0-03-DRG-001. Landscape Element codes for these elements are as follows.

- **LE7.1 Stone wall:** replacement mortared stone wall in keeping with local landscape character.
- **LE7.2 Cloddiau:** replacement cloddiau in keeping with local landscape character. Where appropriate, and in keeping with local landscape character, cloddiau would be planted with a hedgerow as specified above for LE4.2. This would be determined during detailed design.

Figure 2-3 Sketch of proposed stone wall cross section

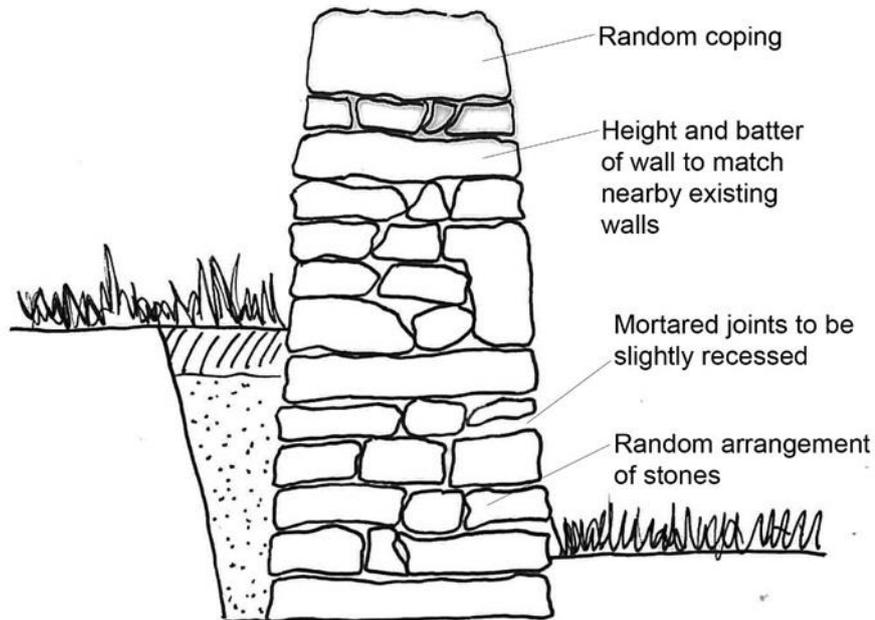
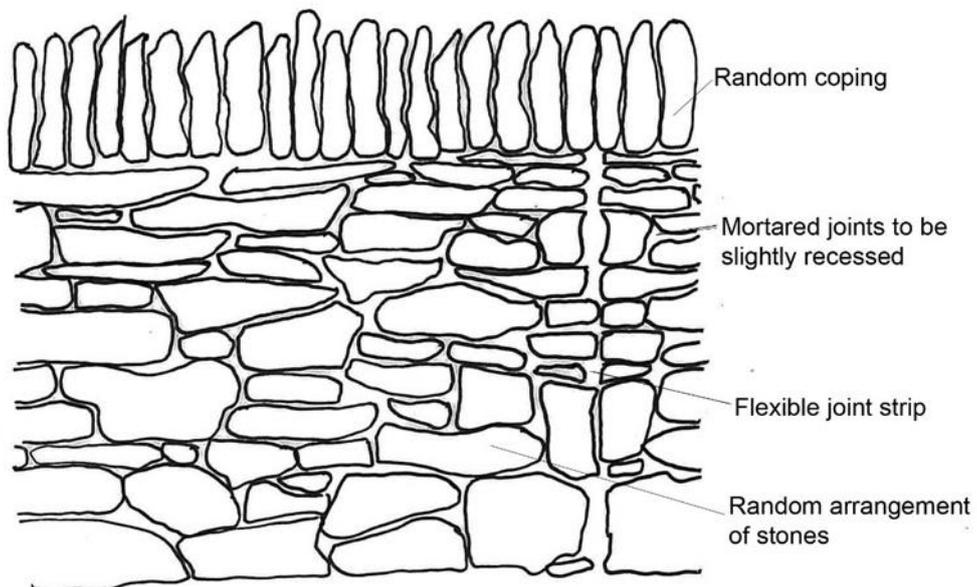


Figure 2-4 Sketch of proposed stone wall elevation



3 Outline specification

3.1 Introduction

- 3.1.1 The following specification provides a framework for the implementation of the planting and seeding mixes and describes operations for preparing the ground effectively, for the transport and handling of plant material and for carrying out the planting and seeding.
- 3.1.2 A detailed specification would form part of the contract documents, to be prepared upon receipt of planning consent to enable the appointment of a contractor for implementation of the landscape design.

3.2 Biosecurity

- 3.2.1 Biosecurity measures would be implemented to prevent the spread of harmful organisms.
- 3.2.2 Natural Resources Wales [RD8] provides guidance on biosecurity, and this would be consulted during the preparation of the contract documentation and prior to the commencement of planting and seeding works. Further guidance is contained in the following documents:
- Forest Industry Standard Practice, Biosecurity [RD9];
 - Biosecurity Guidance [RD9]; and
 - Protecting Plant Health, A Plant Biosecurity Strategy for Great Britain [RD11].

3.3 Ground preparation

- 3.3.1 Ground preparation would include spraying with herbicide, soil ripping and cultivation prior to planting and seeding operations.
- 3.3.2 Compost and fertiliser would be provided for plants.
- 3.3.3 Topsoil and subsoil characteristics and their transportation, handling, spreading and storage would be in accordance with the following guidance, and the measures presented within the A5025 On-line Highway Improvements Code of Construction Practice:
- BS3882:2015 Specification for topsoil [RD12];
 - BS8601:2013 Specification for subsoil [RD13]; and
 - Construction Code of Practice for the Sustainable Use of Soils on Construction Sites [RD14].

3.4 General planting, seeding, storage and handling

- 3.4.1 Grass seed and plant material would comply with the documents listed below, which also cover the required methods for planting and seeding and the storage and handling of materials, including planting stock.
- BS 4428:1989 Code of practice for general landscape operations [RD15];

- BS 3936 Nursery stock [RD16];
 - BS 8545:2014 Trees: from nursery to independence in the landscape – Recommendations [RD17];
 - BS5837:2012 Trees in relation to design, demolition and construction – Recommendations [RD4]; and
 - National Plant Specification, Handling and Establishing Landscape Plants [RD18].
- 3.4.2 Grass seed and plant material would be of regional provenance (obtained from approved source(s) with soil and climatic conditions similar to the prevailing site).
- 3.4.3 The grass and wildflower sowing season shall be from 1 March to 31 May or 1 September to 31 October. Planting of bare-rooted or rootballed trees and shrubs shall be 1st November to 31 March. Container grown trees and shrubs can be planted at any time apart from periods of drought or frost. No planting or preparatory operations shall take place when the ground is frost bound, covered by snow, excessively wet or waterlogged or in excessively dry or windy conditions.

Seeding

- 3.4.4 Following final cultivation to create a fine tilth, seeding would be carried out by evenly distributing the seed at the rates described in the tables above. Sowing would be immediately followed by lightly raking the surface of the soil to cover the seeds. The seeding would be repeated as necessary until an evenly distributed dense sward is established over the seeded area.

Planting

- 3.4.5 Pits would be 1000x1000x600mm for selected standard and standard trees, and 300x300x300mm for transplants (those moved at the nursery prior to supply to encourage a compact, fibrous root system) and container shrubs, with horizontal bases and vertical sides. In hedgerows, pits would be dug into a 600mm wide hedgerow trench. Pit bottoms would be broken up and pit sides scarified. Positive drainage and/or gravel drainage layers would be considered in areas where tree pits may become waterlogged due to soils having a high clay content. Finely broken backfill material would be packed around the roots to a finished level equivalent to the nursery soil mark. Soil would only be compacted as much as necessary to support the trees to ensure drainage is not impeded. Immediately after planting, the soil surface would be evenly graded and then watered.
- 3.4.6 All new tree transplants would be provided with a 90mm diameter, 750mm high round green or black tree shelter, and shrubs with a 170-200mm diameter, 750mm high round green shrub shelter fitted with small stakes. These would be provided to transplants and container shrubs to help protect from mammal grazing. Selected standard trees would be provided with single stakes to provide support during early growth, positioned off centre to the prevailing windward side of the tree using the shortest possible stake. Rubber tree spacers would be used to fix the stakes to the trees. Hedgerow trees

would be provided with a coloured tag or tape to distinguish them from the rest of the hedgerow in order to make them more visible during maintenance operations and avoid them being flailed in future with other hedgerow plants.

- 3.4.7 Marginal aquatic plants would be planted on attenuation pond shelves (shelves to be included at detailed design) in low nutrient soil and aquatic compost, broken up to a depth of 100mm.

3.5 Outline details of landscape maintenance

Objectives

- 3.5.1 This section sets out the intended approach for the maintenance and management of proposed planting and seeding areas. A detailed maintenance specification would be prepared upon receipt of planning consent to form part of the contract documents, which would be used in the appointment of a contractor. The contractor would be responsible for the first three years maintenance of seeded areas, the aftercare of trees and shrubs, and general maintenance operations, as informed by the Manual of Contract Documents for Highways Works (MCHW).
- 3.5.2 This section also sets out the intended approach for longer term maintenance and management to be undertaken by the IACC after the initial three year contract maintenance period. The IACC would use this information for preparation of a long-term detailed landscape maintenance and management plan.
- 3.5.3 The purpose of this section is to ensure the successful establishment of all Landscape and Environmental Elements, in particular ensuring they achieve their environmental objectives. DMRB Volume 10, Section 0, Part 2 [RD1] describes these objectives as Environmental Functions and these are illustrated on the Environmental Masterplan (figures 2-24 to 2-31) within volume 2 of the A5025 On-line Highway Improvements Environmental Report, and described below.

Environmental Functions

- 3.5.4 The descriptions of Environmental Functions set out below are taken from Design Manual for Roads and Bridges DMRB Volume 10, Section 0, Part 2. [RD1].
- EFA Visual Screening: “Mitigation against adverse visual impacts by screening views of the Highway and associated infrastructure from properties and public viewpoints, including rights of way and public open space.”
 - EFB Landscape Integration: “Integrate the Highway with the character of the surrounding landscape by maintaining the matrix of local vegetation patterns, blending with local landform and softening views of the highway, its infrastructure and its traffic.”
 - EFC Enhancing the Built Environment: “Enhance the landscape and built elements of the highway with surrounding features, to reflect the scale,

character and materials of the local townscape or community through which the highway passes. The needs and amenity of the public living/working or utilising areas within or adjacent to the highway - including pedestrians, cyclists and those using public transport and local facilities.”

- EFD Nature Conservation and Biodiversity: “Protect, manage and enhance the nature conservation value of the highway estate and integrate with and protect adjacent habitats and locations containing protected species, or other locally important species or habitats.”
- EFE Visual Amenity: “Maintain interest, variety and an acceptable visual appearance for both road users and adjacent public viewers by creating/maintaining views to the wider landscape, providing seasonal variation and creating a ‘sense of place’ via landmark features, either plant species, landform/geology, the design and materials used for structures and furniture, and the spatial arrangements.”
- EFH Water Quality: “To provide and maintain appropriate measures to mitigate the impact on areas sensitive to flooding or hydrological changes, local water courses and groundwaters from construction works, run-off from the road and spillages”.

3.6 Landscape and Environmental Element management objectives

- 3.6.1 Management objectives set out the required maintenance and management operations required for the Landscape and Environmental Elements to achieve their intended Environmental Function. These objectives describe what each Landscape and Environmental Element needs to achieve, such as diversity of species or an effective screening barrier.
- 3.6.2 The management objectives for the Landscape and Environmental Elements have been listed in table 3-1, along with an indication of how these relate to the Environmental Functions. The Landscape and Environmental Elements and Environmental Functions are also shown on the Environmental Masterplan (see figures 2-24 to 2-31 within volume 2 of the A5025 On-line Highway Improvements Environmental Report).

Table 3-1 Landscape and Environmental Element management objectives

Landscape/ Environmental Element	Management objective	Environmental Function
LE1.3 Species-rich grassland	To establish permanent areas of grass and herb species appropriate to the location with a species composition and diversity capable of being maintained by an average of one to two cuts per year, or that through appropriate management would be encouraged to naturally develop biodiversity interest	EFB, EFD

Landscape/ Environmental Element	Management objective	Environmental Function
	over time, including valuable habitat for invertebrates. Arisings would be removed following cuts.	
LE1.6 Open grassland	Cutting regime to allow full function of the highway corridor, especially highway visibility splays. Establishment of the grass sward would be managed to achieve its intended landscape integration function. Herb cover allowed within verges but scrub would be kept to a minimum to maintain visibility for road users.	EFB, EFC
LE2.6 Shrubs	To create shrub blocks that filter views of the attenuation ponds and enhance nature conservation value.	EFA, EFB, EFD, EFE
LE4.2/LE4.4 Native hedgerows/with trees	To create low maintenance, biodiversity enhancing hedgerows trimmed and shaped to promote thickening of the hedgerow and maximise foraging and breeding resources for birds, bats, great crested newts and invertebrates.	EFB, EFD/EFA, EFB, EFD, EFE
LE5.1 Individual trees	To ensure the successful establishment of trees appropriate to the location, identifiable as individual trees separate from other woody vegetation, which are visually attractive and enhance nature conservation value.	EFB, EFD
LE6.4 Marsh and wet grassland	To establish a healthy sward of edge grasses and herbs around the attenuation ponds to provide ecological diversity including valuable habitat for invertebrates. Grass and herb species to be maintained as appropriate to the location and as necessary to ensure the efficient working of the drainage regime. Arisings would be removed following cuts. Scrub control would be undertaken to ensure an area of no more than 10% scrub coverage.	EFB, EFD

3.7 Maintenance operations during the contract

- 3.7.1 For the first three years after construction, landscape maintenance would be undertaken by the contractor responsible for the implementation of the planting and seeding works. The following provides a high level summary of the likely landscape maintenance operations required for the newly planted and seeded areas during the three year period.
- 3.7.2 Monitoring by the contractor's landscape site manager would be required on a regular basis during the contract maintenance period to help ensure successful establishment of seeding and planting, and to review the need for additional maintenance operations to ensure that planting and seeding becomes established.
- 3.7.3 At the end of the three-year contract maintenance period, a handover would be carried out to the IACC which would highlight any issues with maintenance and provide adequate background to the Proposed Development.

General maintenance operations

- 3.7.4 Litter collection would be required at two-monthly intervals, and planting and seeding areas checked for the growth of injurious weeds (common ragwort, spear thistle, creeping or field thistle, broad-leaved dock and curled dock), or weeds threatening planting and/or seeding becoming established. Spot treatment of herbicide would be carried out as necessary. In addition, all planting and seeding areas would be watered as necessary to ensure their continued thriving.
- 3.7.5 All planting and seeding areas would be inspected in September each year to determine any areas not thriving, and plants replaced or re-seeding carried out during the next available planting/seeding season. Through agreement with those overseeing the contract, species may be substituted if not surviving on-site. During this inspection, the success of the landscape management operations would be discussed by the contractor and those overseeing the contract and updated as necessary for the following year, or discussed in the handover to future maintaining parties.

Maintenance of grass areas

- 3.7.6 In Year 1, all grass areas would be mown every two months during the growing season to a nominal height of 50mm and arisings removed off site.
- 3.7.7 In Years 2 and 3, LE1.6 Open grassland areas would be cut four times a year with the arisings evenly dispersed. In Years 2 and 3, LE1.3 Species-rich grassland and LE6.4 Marsh and wet grassland areas would be cut once per year with the arisings left for one to seven days to dry and shed seed and then removed. More frequent cutting may be necessary in some areas to maintain visibility splays along the highway. Removal of scrub would also be undertaken within these areas to ensure scrub coverage is no more than 10% of the area. Scrub arisings would be removed to the contractors own tip off-site using suitable transport.

Maintenance of planting areas

- 3.7.8 Tree and shrub tubes and stakes would be inspected three times a year and adjusted or re-fixed as necessary. Any damaged items would be removed off site and replaced with new ones in line with the original specification. During the same visits, plants would be re-firmed around their bases.
- 3.7.9 Pruning would be undertaken in accordance with BS7370-4:1993 Grounds maintenance. Recommendations for maintenance of soft landscape [RD18] using secateurs and handsaws. Stems would only be removed so as to retain the natural appearance of the individual plant species. Broken and badly damaged branches would be pruned by cutting back to within 10mm of the parent branch or trunk or to a suitable bud/node. The cut would be correctly angled in accordance with BS7370-4:1993 Grounds maintenance. Recommendations for maintenance of soft landscape [RD18].
- 3.7.10 At the edges of planted areas, branches and stems would be cut back to a minimum of 300mm behind the kerbline, fence or other edge demarcation. Arisings from pruning would be removed off-site or retained on-site in log and brush piles where appropriate and safe to do so, in order to provide habitat for small mammals, reptiles, amphibians and invertebrates. This would be discussed with those overseeing the contract prior to pruning operations.
- 3.7.11 Herbicide would be sprayed to the base of individual plants and hedgerows three times a year. A radius of 500mm would be sprayed around plant bases, and a 300mm width to either side of hedgerows. The contractor would be required to ensure herbicide for use in or near water is approved for use.
- 3.7.12 Marginal planting areas would be hand-weeded at intervals throughout the growing season to aid the establishment of planting.

3.8 Longer term management operations

- 3.8.1 Following handover to the IACC after the initial three year contract maintenance period, a detailed landscape maintenance and management plan would be prepared by the IACC based on the framework below. The detailed landscape maintenance and management plan would need to ensure that the Environmental Functions and management objectives continue to be met for the Landscape and Environmental Elements.
- 3.8.2 General operations including monitoring, spot treatment with herbicide and litter collection would be required as described above. Maintenance of grass areas would also be required and the frequency of grass cutting would be discussed at the time of the handover.
- 3.8.3 The following operations would be considered for planting areas.
- Remove any remaining tree and shrub tubes and stakes off site (unless still deemed necessary for protection from species such as rabbits).
 - Hedgerow trimming, the frequency of which would be determined through liaison with landscape, ecology and highway representatives from the IACC.

- Formative pruning to BS7370-4:1993 Grounds maintenance. Recommendations for maintenance of soft landscape [RD18] in conjunction with an arboriculturalist to remove dead, diseased or dying branches and promote the natural shape of hedgerow trees. Trees adjacent to the highway would require regular hazard inspections once they are mature.
- Handweeding of marginal planting areas.

4 References

ID	Reference
RD1	Highways England (formerly Highways Agency), Scottish Executive, National Assembly for Wales, The Department for Regional Development Northern Ireland. 2001. Design Manual for Roads and Bridges, Volume 10, Section 0, Part 2, Environmental Functions. [Online]. [Accessed: September 2016]. Available from: http://www.standardsforhighways.co.uk/ha/standards/dmr/vol10/section0.htm
RD2	Isle of Anglesey County Council and Natural Resources Wales. 2015. Anglesey Area of Outstanding Natural Beauty Management Plan Review, 2015 – 2020. [Online]. [Accessed: September 2016]. Available from: http://www.anglesey.gov.uk/planning-and-waste/countryside/areas-of-outstanding-natural-beauty-aonbs/
RD3	Isle of Anglesey County Council. (2003). Working for the wealth of wildlife: Anglesey's local biodiversity action plan (LBAP) – B2 Habitat Action Plans (HAPs) and Species Action Plans (SAPs).
RD4	British Standards Institution. 2012. BS5837:2012. Trees in relation to design, demolition and construction – Recommendations. London: BSI Standards Limited.
RD5	Secretary of State for Wales. 1997. The Hedgerows Regulations. [Online]. [Accessed: September 2016]. Available from: http://www.legislation.gov.uk/ukxi/1997/1160/contents/made
RD6	Highways England (formerly Highways Agency), Scottish Executive, National Assembly for Wales, the Department for Regional Development Northern Ireland. 2001. Design Manual for Roads and Bridges, Volume 10, Section 0, Part 3, Landscape Elements. [Online]. [Accessed: September 2016]. Available from: http://www.standardsforhighways.co.uk/ha/standards/dmr/vol10/section0/ha8801.pdf
RD7	Highways England (formerly Highways Agency), Scottish Executive, National Assembly for Wales, the Department for Regional Development Northern Ireland. 2001. Design Manual for Roads and Bridges, Volume 10, Section 0, Part 4, Environmental Elements. [Online]. [Accessed: September 2016]. Available from: http://www.standardsforhighways.co.uk/ha/standards/dmr/vol10/section0/ha8901.pdf
RD8	Natural Resources Wales Website (https://naturalresources.wales/forestry/tree-health-and-biosecurity/biosecurity/?lang=en) [accessed 19/06/2017]
RD9	Forestry Commission. 2012. Forest Industry Standard Practice, Biosecurity. [Online]. [Accessed: April 2017]. Available from: https://www.forestry.gov.uk/pdf/FCMS028-guidance.pdf/\$FILE/FCMS028-vguidance.pdf
RD10	Forestry Commission. 2012. Biosecurity Guidance. [Online]. [Accessed: April 2017]. Available from: https://www.forestry.gov.uk/pdf/FC_Biosecurity_Guidance.pdf/\$file/FC_Biosecurity_Guidance.pdf

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RD11	Department for Environment, Food and Rural Affairs. 2014. Protecting Plant Health, A Plant Biosecurity Strategy for Great Britain. [Online]. [Accessed: April 2017]. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/307355/pb14168-plant-health-strategy.pdf
RD12	British Standards Institution. 2015. BS3882:2015. Specification for topsoil. London: BSI Standards Limited.
RD13	British Standards Institution. 2013. BS8601:2013. Specification for subsoil and requirements for use. London: BSI Standards Limited.
RD14	Department for Environment, Food and Rural Affairs. 2009. Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. [Online]. [Accessed: September 2016]. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69308/pb13298-code-of-practice-090910.pdf
RD15	British Standards Institution. 1989. BS 4428:1989. Code of practice for general landscape operations. London: BSI Standards Limited.
RD16	British Standards Institution. Dates various. BS 3936 Nursery stock. London: BSI Standards Limited.
RD17	British Standards Institution. 2014. BS 8545:2014. Trees: from nursery to independence in the landscape – Recommendations. London: BSI Standards Limited.
RD18	British Standards Institution. 1993. BS7370-4:1993. Grounds maintenance. Recommendations for maintenance of soft landscape. London: BSI Standards Limited.

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