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Screening for Appropriate Assessment

Ballymullen to Ballyseedy Wood Amenity Trail

14135

October 2013

Job number	Revision	Prepared by	Checked by	Status	Date
14135-6002	Rev A	PR	KF	Final	October 2013



MWP ENVIRONMENT AND PLANNING

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1 Introduction

1.1 Background

Member States are required to designate Special Areas of Conservation (SACs) and Special Protected Areas (SPAs) under the EU Habitats and Birds Directives, respectively. SACs and SPAs are collectively known as Natura 2000 sites. An 'Appropriate Assessment' (AA) is a required assessment to determine the likelihood of significant impacts, based on best scientific knowledge, of any plans or projects on Natura 2000 sites. A screening for AA determines whether a plan or project, either alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site in view of its conservation objectives.

This AA screening has been undertaken to determine the potential for significant impacts of a proposal to construct an amenity trail incorporating a walking path and cycleway, referred to herein after as the amenity walkway, along a section of the bank of the River Lee on the eastern outskirts of Tralee, County Kerry, on nearby Sites with European conservation designations (i.e. Natura 2000 Sites). The purpose of this assessment is to determine, the appropriateness, or otherwise, of the proposed project in the context of the conservation objectives of such sites.

This Appropriate Assessment Screening has been undertaken by ecologists with Malachy Walsh and Partners.

Assessment of potential impacts on other species of national and community interest does not fall within the scope of this report.

1.2 Legislative Context

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and of wild fauna and flora by the designation of SACs and the Birds Directive (79/409/EEC) seeks to protect birds of special importance by the designation of SPAs. It is the responsibility of each member state to designate SPAs and cSACs, both of which will form part of Natura 2000, a network of protected sites throughout the European Community.

An Appropriate Assessment is required under Article 6 of the Habitats Directive where a project or plan may give rise to significant effects upon a Natura 2000 Site, and paragraphs 3 and 4 state that:

6(3) *Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.*

6(4) *If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall*

take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.

The current assessment was conducted within this legislative framework and also the recent DoEHLG (2009) guidelines. As outlined in these, it is the responsibility of the proponent of the project, in this case the Local Authority, to provide a comprehensive and objective screening for Appropriate Assessment, which can then be used by the competent authority in order to conduct the Appropriate Assessment (DoEHLG, 2009).

1.3 Stages of AA

A screening for Appropriate Assessment (AA) has been prepared by Malachy Walsh and Partners, to determine the likelihood of significant impacts, if any, of the proposal to construct an amenity walkway adjacent to a section of the River Lee in the eastern outskirts of Tralee, County Kerry, on nearby sites with European conservation designations (i.e. Natura 2000 sites).

The AA process is a four-stage process to complete the AA, with issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required. This proposal has proceeded as far as Stage 1 only.

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The first stage of the AA process and that undertaken to determine the likelihood of significant impacts of this proposal is:

- Stage 1: *Screening*.

The second stage of the AA process, not required for this proposal, assesses the impact of the proposal (either alone or in combination with other projects or plans) on the integrity of the Natura 2000 site with respect to the conservation objectives of the site and its ecological structure and function. A Natura Impact Statement containing a professional scientific examination of the proposal is required and includes any mitigation measure to avoid, reduce or offset negative impacts:

- Stage 2: *Natura Impact Statement (NIS)*.

If the outcome of Stage 2 is negative i.e. adverse impacts to the sites cannot be scientifically ruled out, despite mitigation, the plan or project should proceed to Stage 3 or be abandoned. This stage examines alternative solutions to the proposal:

- Stage 3: *Assessment of alternative solutions*.

The final stage is the main derogation process examining whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project to adversely affect a Natura 2000 site where no less damaging solution exists:

- Stage 4: *Assessment where no alternative solutions exist and where adverse impacts remain.*

In summary, the purpose of the screening stage is to determine the necessity or otherwise for a NIS. Screening for AA examines the likely effects of a project or plan, alone and in combination with other projects or plans, upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant. If it is determined during screening that the proposal may have a significant effect on a Natura 2000 site then a NIS will need to be prepared. A screening exercise has been undertaken and concluded that a NIS was not required. The screening is outlined in section 2 below.

1.4 Screening Steps

This Screening for AA, or Stage 1 of AA, has been undertaken in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (EC, 2001) and the European Commission Guidance 'Managing Natura 2000 sites' (EC, 2000).

Screening for AA involves the following:

- Establish whether the plan is necessary for the management of a Natura 2000 site;
- Description of the Plan;
- Identification of Natura 2000 sites potentially affected;
- Identification and description of individual and cumulative impacts likely to result from the plan;
- Assessment of the significance of the impacts identified above on site integrity; and
- Exclusion of sites where it can be objectively concluded that there will be no significant effects.

Stage 1, Screening, examines whether or not likely effects upon a Natura 2000 site will be significant and determines whether the AA process for the proposed amenity walkway needs to proceed to Stage 2.

1.5 Assessment Methodologies

1.5.1 Consultation

Extensive consultation was undertaken by the proponent with both Inland Fisheries Ireland and the National Parks and Wildlife Service with regard to the design and route of the amenity walkway. (Boyle, K. 2013, pers. comm. [phone] June 7th).

1.5.2 Desk Study

A desk study was carried out to collate available information on the location's natural environment. This comprised a review of the following publications and datasets:

- An Ecological Impact Assessment of River Lee Riverwalk Ballymullen to Ballyseedy Wood: A report prepared for Kerry County Council by Malachy Walsh and Partners, Tralee;
- Ballyseedy Wood: A 50-Year Management Plan: A report submitted to Kerry County Council by Botanical, Environmental & Conservation Consultants Ltd;
- OSI Aerial photography and 1:50000 mapping;
- National Parks and Wildlife Service (NPWS);
- BirdWatch Ireland;
- Teagasc soil area maps (NBDC website);
- Geological Survey Ireland (GSI) area maps;
- Environmental Protection Agency (EPA) water quality data;
- Shannon River Basin District (ShRBD) datasets (Water Framework Directive); and
- National Biodiversity Centre (on-line map-viewer).

Once the potential impacts that may arise from the proposal are identified the significance of these is assessed through the use of key indicators:

- Habitat loss;
- Habitat alteration;
- Habitat or species fragmentation;
- Disturbance and/or displacement of species; and
- Water quality and resource.

In line with the EPA Guidelines (EPA, 2002), the following terms are defined when quantifying duration:

- Temporary: up to 1 year;
- Short-term: from 1-7 years;
- Medium-term: 7-15 years;
- Long-term: 15-60 years; and
- Permanent: over 60 years.

The impact significance criteria follow EPA guidance (EPA, 2002).

Table 1. Significance of impact (EPA, 2002)

Significance of Impacts	Definition
<i>Imperceptible Impact</i>	An impact capable of measurement but without noticeable consequences.
<i>Slight Impact</i>	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.
<i>Moderate Impact</i>	An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends.
<i>Significant Impact</i>	An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
<i>Profound Impact</i>	An impact which obliterates sensitive characteristics.

1.5.3 Site Survey

A site survey was conducted on January 9th 2013. The data taken was supplemented by information and habitat mapping completed during surveys previously completed along the route corridor.

2 Stage 1 Screening

2.1 Management of Natura 2000 Site

The proposal is not connected with or necessary to the conservation management of a Natura 2000 site.

2.2 Description of Project

2.2.1 Brief Project Description

It is proposed to construct a combined cycle lane and walkway, along a route adjacent to a section of the River Lee, on the eastern outskirts of Tralee, County Kerry. The new amenity walkway will connect with the existing 'River Lee Nature Walk and Cycleway' at a location to the east of the bridge at Ballymullen and adjacent to the entrance to the Hunters Wood housing estate.

When completed, the combination of existing and proposed walkways will provide an extensive amenity walkway, with multiple points for pedestrian access which, when completed, will provide an integrated public amenity linking Tralee town to the diverse natural river bank and woodland habitats along the proposed route and within the Ballyseedy Wood area. This wood, which is part of a Special Area of Conservation designated under the Habitats Directive¹, contains a natural habitat of European importance. The integrated walkway will augment the range of health promoting and quality of life enhancing activities available to locals and visitors alike. It is proposed that the new amenity walkway will be comprised of a combination of timber boardwalk and bitumen sections as determined by the differing ground conditions along the route.

The walk will comprise 3m wide bitumen path and boardwalk sections with a cycle lane provision described in detail in section 2.2.5 below, in addition to a 3m buffer strip between the walk and the river bank, and a further 3m buffer strip between the riverwalk and the respective landowners. The buffers will be open and not fenced from the path. A fence will be erected between the respective landowners and the buffer strip. Much of the river bank is currently wire fenced and a new wire fence will be erected along stretches where fencing is absent.

The proposed river Lee Amenity Trail follows the general route along the River Lee from Ballymullen to the eastern end of Ballyseedy Woods (see Figure 1, map).

Route description from West to East.

The amenity trail route shall follow from the new linear park at Ballymullen Bridge, through the Hunters Wood Development before crossing to the Northern Bank at crossing point 1.

The trail shall follow the Northern Bank to crossing point 2, with it shall return to the southern bank and offer the option to link with the newly constructed Tralee By-pass walk and cycle paths. The trail

¹ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

passes under the by-pass before returning to the Northern Bank at crossing point 3. The trail stays on the Northern Bank until it terminates at the eastern end of Ballyseedy Wood. Two crossing points at 4 and 5 are to provide a loop to the existing trail within Ballyseedy Woods.

Overall the proposed Amenity Trail shall be 2.60km in length.

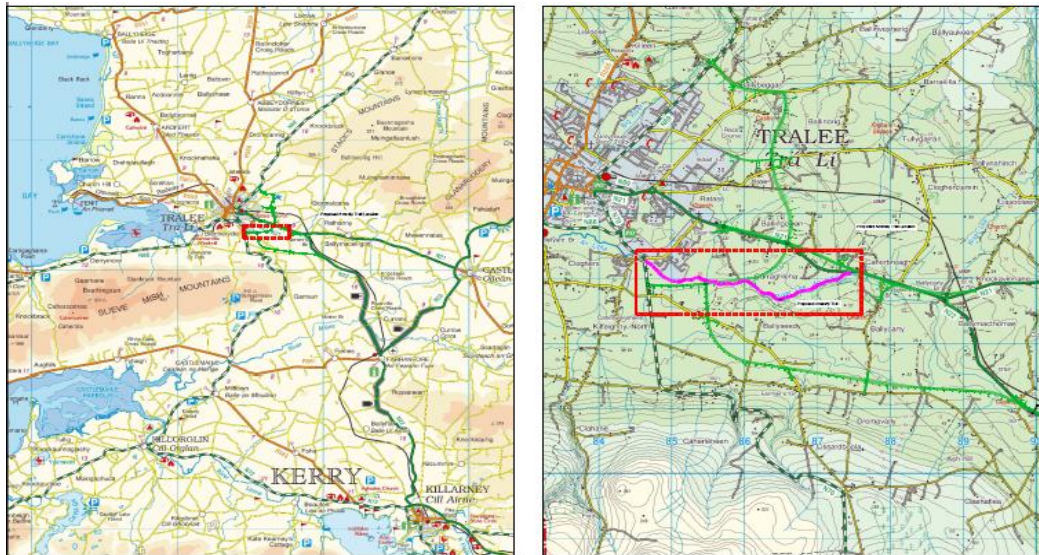


Figure 1: Proposed Amenity Trail route location map

2.2.2 Purpose of the Project Proposal

As part of 'The Tralee Lee Valley Master Plan 2000' Kerry County Council, in conjunction with Tralee Town Council, have pursued an ongoing phased development of walking and cycling routes connecting the urban fabric of the town with the natural environments both within and adjacent to the town. It is intended that the proposed project will extend this existing network and serve as a further development of that Master Plan.

2.2.3 Site Location

The proposed route of the amenity walkway is situated at the south eastern outskirts of Tralee town near the eastern end of the existing Lee River Walk and Cycleway. It traverses the townlands of Camp, Manors East and West, Curraghleha West, Ballyseedy and ends in the townland of Curraghleha East and comprises a length of some 2.9km². For the most part the proposed route follows the northern bank of the River Lee but two sections are located on the southern bank. Because the ground conditions vary along the route different construction methods and pathway designs will be used as required and these are described in detail in the sections following.

With the exception of two clear span footbridges which do encroach slightly into the cSAC area, the footprint of the proposed route does not traverse through or intersect with the *Ballyseedy Wood* cSAC (002112) site. The footbridges will span the Lee and their encroachment into the cSAC will be restricted to the footprint required to support the southern end of each foot bridge's deck. As a consequence, no significant landtake from within any Natura 2000 site is proposed.

² Distances measured using 'Draw' tool at National Parks and Wildlife Services on line 'Map Viewer' (Available at: <http://webgis.npws.ie/npwsviewer/> [accessed 7/09/2013])

A map outlining the proposed route and its location is included in Appendix 4.

2.2.4 Description of the Site

The route of the proposed amenity walkway begins at a location near Hunters Wood housing estate, on the eastern outskirts of the town and at a point adjacent to the north of the N70. The route follows the course of the River Lee, in an easterly direction, to Ballyseedy Woods. For the most part it is situated along the northern bank and traverses through a range of artificial, highly modified or semi natural habitats along its route. These are discussed in more detail in section 2.6 below. The study area is a long narrow corridor which consists primarily of the Lee River and its banks with the latter comprised primarily of agricultural grassland habitats of varying quality. Treeline and hedgerows are present as linear features and the route also transects one small stream and several land drains situated on the northern bank. Most of the Lee River and adjacent treelines and agricultural grassland habitats are fenced off.

The habitats through which the route traverses are described in more detail and are categorised under the Fossitt (Fossitt, 2000) system in section 2.2.4.1 below.

The eastern end of the study area borders the *Ballyseedy Wood cSAC (Site code 002112)* an area of woodland which is of importance due to the presence of the EU Habitats Directive Annex I priority habitat type 'Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) (91E0) '.

2.2.4.1 Results of Ecological Survey

The proposed route traverses a number of different terrestrial habitats along its path and also runs adjacent to the River Lee throughout. These habitats are described in detail in the sections herein under.

The river bank survey area is a corridor 9m in width and approximately 3km long which is situated adjacent to the River Lee and alternating between the northern and southern banks along the route.

FW2 – Depositing/lowland rivers

The River Lee is a meandering lowland river with banks which vary between 1m and 2m high. The substrate is a mixture of rocks, stones, coarse sand and silt. The average width of the river is 5m. There is a small amount of submergent vegetation the dominant species of which is a Crowfoot species (*Ranunculus* spp.) Most of the river is shaded with treelines or woodlands on the banks.

GS1– Dry calcareous and neutral grassland

This narrow strip of grassland is situated on the southern bank of the river adjacent to the access road to the Hunters Wood housing estate. Due to the microtopography there are wet and dry areas within this strip and some species more typical of the wet grassland category are present. However, the overall species mix is comprised predominantly of species which are indicative of the Dry calcareous neutral grassland category.

Some of the dominant species include Yorkshire Fog (*Holcus lanatus*), Clover (*Trifolium* spp.), Creeping Buttercup (*Ranunculus repens*), and Creeping Bent (*Agrostis stolonifera*). Other species include Greater Birds-foot-trefoil (*Lotus pendunculatus*), Yellow Iris (*Iris pseudacorus*), Yarrow

(*Achillea millefolium*) and Common Ragwort (*Senecio jacobaea*). In the wet patches, mint (*Mentha* spp.), sedges (*Carex* spp.) and mosses occur. This area is bounded to the north along the river bank by a section of the treeline described in the section following.

WS1 – Scrub

An area of scrub habitat occurs adjacent to the entrance to the Hunters Wood estate within the woodland habitat described above. This area is dominated by Gorse (*Ulex europaeus*) and Bramble (*Rubus fruticosus* agg.). It extends southwards from the riverbank to the fence bounding the footpath adjacent to the housing estate access road. Species additional to the dominants referred to above include Bush Vetch (*Vicia sepium*) and Coltsfoot (*Tussilago farfara*). While this habitat type occurs at a number of locations it is not a substantial component of the overall habitat mix nor is it dominant at any location.

GA2 – Amenity grassland (improved)

A strip of amenity grassland occurs to the north-east of the entrance road to the Hunters Wood housing estate. Part of the estate's landscaping, it lies between the woodland habitat described above and the access road to the housing estate and is separated from the former by a timber fence. A small patch lies outside of the entrance gates with the majority of this habitat lying just within the entrance gates. The grassland strip is approximately 4 metres in width and the sward is dominated by Meadow-grass (*Poa* spp.), Daisy (*Bellis perennis*) and Creeping Buttercup (*Ranunculus repens*). Other species include Clover (*Trifolium* spp.), Dandelion (*Taraxacum* spp.), Ribwort Plantain (*Plantago lanceolata*) and Sheep's Sorrel (*Rumex acetosella*).

BL3- Buildings and artificial surfaces

The estate access road and footpath from the N70 are situated at the western end of the study area contiguous to the amenity grassland habitat described above. Both road and footpath are devoid of any vegetation.

WL2 – Treelines

This habitat type is situated in the river and continues with some interruptions along much of the proposed route as it traverses both banks. Due to the slope and the height of the river bank along much of the route corridor the treeline is generally situated between 1 and 2 metres above, and at a slight remove from, the edge of the main channel albeit with some variation where the character and slope of the river bank differs. In places the tree cover has developed to become more extensive and not purely linear in its extent however, overall it is its linearity that characterises this habitat along most of the river bank. The treeline is dominated by Alder (*Alnus glutinosa*) with some Willow (*Salix* spp.) and Dogwood (*Cornus* spp.) In one section, the treeline is dominated by Crack Willow (*Salix fragilis*), which is spreading across the river. Under the trees and along the river bank the species mix is highly variable. Species present include Pendulous Sedge (*Carex pendula*), Creeping Buttercup (*Ranunculus repens*), Bramble (*Rubus fruticosus* agg.), Ivy (*Hedera helix*), Common Nettle (*Urtica dioica*), Yorkshire Fog (*Holcus lanatus*), Rushes (*Juncus* spp.) and Figwort (*Scrophularia* spp.).

GA1- Improved agricultural grassland

This habitat is present at a number of sections both on the southern and northern bank; in the mid section of the route and also at the eastern end. See map for distribution of the habitat. These grassland areas are intensively managed for grass production and consist of areas managed for grazing and for silage cutting. Rye grasses (*Lolium* spp.) were dominant in the sward with clovers (*Trifolium* spp.), docks (*Rumex* spp.), and buttercup (*Ranunculus* spp.) variously distributed throughout the ground flora.

GS4- Wet Grassland

This habitat comprises a significant proportion study area to the north of the river. See map for distribution of the habitat. This predominantly contains Rush species (*Juncus* spp.), Yellow Iris (*Iris pseudacorus*) and various grasses. There is a good moss layer present including species such as *Rhytidiadelphus* spp.

WL1 – Hedgerows

The route intersects a number of hedgerows along the route. These variously contain Ash (*Fraxinus excelsior*), Willow (*Salix* spp.), Alder (*Alnus glutinosa*), Hawthorn (*Crataegus monogyna*), and a varied herb layer component including Yorkshire Fog (*Holcus lanatus*), Creeping Bent (*Agrostis stolonifera*), Marsh Thistle (*Cirsium palustre*), Self-heal (*Prunella vulgaris*), False Oat-grass (*Arrhenatherum elatius*), Fescue species (*Festuca* spp.), Brambles (*Rubus fruticosus* agg.), Cocksfoot (*Dactylis glomerata*), Ivy (*Hedera helix*), Pendulous Sedge (*Carex pendula*) and Hart's-tongue fern (*Asplenium scolopendrium*).

FW4 -Drainage Ditch

There are a number of drainage ditches leading into the river at various points along the study area.

At the western side of the study area there is a drainage ditch with pipe outflow flowing into the River Lee from the South. Historic 25" OSI mapping, dating to the period 1888 – 1913, indicates that a sluice was in situ at this location at that time suggesting that the feature is manmade rather than natural. The ditch is very densely overgrown resulting in its not being visible other than at the end where the pipe leads to the river. The dense growth consists predominantly of Bramble (*Rubus fruticosus* agg.) and Bindweed (*Convolvulaceae* family). On the west side of the ditch is a hedgerow containing Alder (*Alnus glutinosa*), Hawthorn (*Crataegus monogyna*) and some Leylandii species.

At the eastern side of the study area there are two drainage ditches running from the North East leading into the River Lee. These drainage ditches have not been cleared recently. The ditches run through Wet Grassland which borders the ditches. There are some Grey Willow (*Salix cinerea*), Alder (*Alnus glutinosa*), Bramble (*Rubus fruticosus* agg.), Honeysuckle (*Lonicera periclymenum*) and Common Nettle (*Urtica dioica*) on the banks.

One of the drainage ditches is mapped by the EPA as the 'Manor East'³ stream.

³ <http://gis.epa.ie/Envision/>

2.2.5 Characteristics of the Project

The project relates to the construction of a new walkway between the bridge on the River Lee on the Tralee Killorglin Road and Ballyseedy Wood. The route of the walk is set out on both sides of the River Lee on different stretches.

There are two primary walkway construction types and a total of 5 stream crossing points. The details of same are outlined hereunder.

<i>Size, scale, area, land-take</i>	A 3m wide footprint, approximately 3km in length. The route will be positioned such that, where it is situated along the bank of the River Lee, there will be a minimum 3m buffer strip between the path and the river, and another 3m buffer between the path and the farmland. Approximately 540m of the route will be situated within the Ballyseedy Wood cSAC. Along this length the new amenity walkway surface will be laid on the existing gravel path.
<i>Details of physical changes that will take place during the various stages of implementing the proposal</i>	Bituminous Finish Walkway • Topsoil will be stripped from a linear area to ~200mm depth and to between 3-4m in width along the route. Excavated material, which is primarily topsoil, will be stockpiled away from drains or watercourses and used to landscape the path boundaries once path construction is complete. • A sub-base comprising limestone hardcore will be positioned on top of the excavated area, to a depth of 300-450mm and treated sleepers will be laid to create a path edge on both sides. • Blinding will be placed on top of hardcore and compacted with vibrating rollers. • A 55mm Dense Bitumen Macadam or 50mm two coat spray and chip finish will be laid to complete the path construction. • A treated timber post and rail fence 900mm high will be constructed adjacent to the edge of the pathway in order to give protection to walkers and to avoid live stock encroaching on the walkway. • A land drain will be incorporated adjacent to the walkway. The walkway will have an inbuilt cross fall towards the land drain to facilitate drainage from the walkway. The land drain will require excavation and the placement of filter gravel, geotextile and land drainage pipe which will discharge to River Lee via filter heads through river bank vegetation. • Disturbed ground and topsoil will be graded and seeded with suitable grass species upon completion of the works. Boardwalk sections of the walkway • At intervals of approximately 2.0m, 200mm diameter timber/steel piles will be augured into the ground. • Timber decking 3m wide supported on timber cross members with timber supports will be supported off the piles • A railing comprised of timber rails with protective mesh will be constructed above the decking surface on both sides to provide safety to walkers River crossing structures (5nr) • The abutments of the bridges will be established by means of auguring a number of either steel, concrete or timber piles into the river bank face at a

	high level and set back from the flood level. • A base plate unit will then be placed on top of the augured piles to provide a receiving platform for the pre-fabricated bridge structure. • Prefabricated clear-span bridges composed of a steel body clad with timber will then be lifted into place. • A smooth level transition from either the bituminous or timber boardwalk structure will be constructed. The bridge structure will have a 3m wide timber deck surface with two guide rails on each side.
<i>Description of resource requirements for the construction/operation and decommissioning of the proposal (water resources, construction material, human presence etc)</i>	• Auger • Dumper • Tractor and trailer • Tar Macadam Paving Machinery • Excavators • Small light duty crane • 8 person site construction team. • Temporary safety fencing
<i>Description of timescale for the various activities that will take place as a result of implementation (including likely start and finish date)</i>	• Timescale is dependent on funding – the intent would be to undertake the work outside of the winter season. The period of construction for this phase would be approximately 3 months.
<i>Description of wastes arising and other residues (including quantities) and their disposal</i>	• Wastes are minimal and relate to packaging and off cuts from timber elements. • Vegetation brash • Spoil from excavations • Construction materials packaging; pallets etc • Materials will be disposed of to appropriately licenced landfill
<i>Identification of wastes arising and other residues (including quantities) that may be of particular concern in the context of the Natura 2000 network</i>	None arising.
<i>Description of any additional services required to implement the project or plan, their location and means of construction</i>	None arising

2.2.6 Environmental Management Plan

2.2.6.1 *Riparian leave strip*

With regard to near stream work, a riparian leave strip will be clearly marked and its significance explained to all operatives. (Leave strips are the areas of land and vegetation adjacent to watercourses that are to remain in an undisturbed state, throughout and after the development process.) This strip should be marked out adjacent to the proposed route footprint and machinery should be excluded. This will also prevent access to river banks by machinery and avoid any erosion of the bank or the buffer.

2.2.6.2 *Runoff and sediment control*

Excavation will be required for certain sections of the proposed amenity walkway. Erosion control, where runoff is prevented from flowing across exposed ground, and sediment control, where runoff is slowed in order to allow suspended sediment to settle, is an important element in runoff and sediment control. It is proposed to prepare and implement an erosion and sediment control plan to prevent sediment and pollutant runoff into any water body during the construction phase.

The controls will:

- Implement control measures to prevent runoff flowing across exposed ground within the working areas and become polluted by sediments. The provision of a temporary land drainage system to divert surface water from the work areas will be included in the works scope;
- Regularly inspect and maintain surface water and sediment controls. Inspection and maintenance is especially important after prolonged or intense rainfall;
- Designate a stockpiling area located away from drains and surface water bodies. Additional protection by silt trapping apparatus such as a geotextile silt fence to prevent contaminated runoff; and
- Temporary silt fences should be erected on the river side buffer strip to trap sediment particles when work is taking place during a prolonged wet weather period or intense rainfall event.

2.2.6.3 *Phasing of excavation works*

The phasing of the proposed works will be designed to ensure that the laying of the bitumen path occurs after the excavation and provision of sub base is complete and thereby avoiding excessive exposure of excavated areas. This will minimise the risk that surface run-off will transport sediment into the River Lee and interstitial spaces in river bed gravels thereby reducing the risk of indirect habitat loss along the bed of the River Lee.

2.2.6.4 *Wheel wash, dewatering and concrete*

It is recommended that a designated bunded and impermeable wheel wash area be provided. Resultant waste water is to be diverted to siltation pond for settling out of solids, prior to release. It is important that a pumping / dewatering system is well planned. Pumped water will need to be

treated in the adequate settlement pond and silt trap before it can enter the River Lee. It is important to prevent concrete from entering water on-site and entering watercourses. Concrete may be used to fix posts on site and for the prefabricated clear span bridge abutment and the following measures will be implemented:

- Designate a concrete washout area away from drains and watercourses;
- Washout of concrete trucks should occur off-site at a designated, contained impermeable area;
- A designated trained operator experienced in working with concrete will be employed during
- the concrete pouring phase; and
- Large volumes of concrete water to be pumped into a skip to settle out; Wash down water from exposed aggregate surfaces, cast-in-place concrete and from concrete trucks should be trapped on-site to allow sediment to settle out and reach neutral pH before clarified water is released to any stream or drain system or allowed to percolate into the ground. Settled solids will need to be appropriately disposed off-site.

2.2.6.5 *Fuel Oils and Hydraulic fluid Control*

All plant and machinery site e.g. excavators, dumpers etc, will be fuelled and parked off site. No servicing or repair of plant, machinery or vehicles will be undertaken on site. The management of fuel on site will have regard to the following elements:

- Prior to any in stream work it will be ensured that all construction equipment is mechanically sound to avoid leaks of oil, fuel, hydraulic fluids and grease;
- Mobile bowzers, tanks and drums will be stored in a secure, impermeable storage area, at least 50m away from drains and open water;
- Fuel containers will be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores;
- Ancillary equipment such as hoses, pipes must be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and oil stores, including tanks and drums, will be regularly inspected for leaks and signs of damage;
- Waste oils and hydraulic fluids should be collected in leak-proof containers and removed from the site for disposal or re-cycling
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans should be set up to deal with emergency accidents or spills;
- An emergency spill kit with oil boom and absorbers is to be kept on site in the event of an accidental spill; and
- Any spillage of fuels, lubricants or hydraulic oils should be immediately contained and the contaminated soil removed from the site and properly disposed of.

2.2.6.6 *Waste Control*

The main contractor will engage a waste company to deal with all its wastes during construction, so all waste streams are identified at the outset and a selection of skips and bins are delivered to the contractor's compound at the outset and the waste is then managed throughout the construction phase. The contractor will prepare a Waste Management Plan.

2.2.6.7 *Storage*

The storage of materials, containers, stockpiles and waste, however temporary, should follow best practice at all times and be stored at designated areas. Storage should be located:

- At least 50m from drains and any watercourses or drains;
- On an impermeable base;
- Under cover to prevent damage from the elements;
- In secure areas;
- Well away from moving plant, machinery and vehicles; and
- On land not required until later in the development.

All containers should be stored upright and clearly labelled. Sufficient waste storage should be supplied near to all working areas.

2.2.6.8 *Concrete Control*

Cementitious material must not be allowed enter the water environment. The following measures should be adopted in the event that concrete works are being undertaken along the route of the proposed walkway and adjacent to the riparian zone:

- Raw or uncured waste concrete should be disposed of by removal from the site;
- Cementitious material should be stored at least 50m from any watercourses or drains at the contractors compound;
- Washout of concrete trucks should occur off site at a designated, contained impermeable area.

2.2.6.9 *Bitumen control*

- No mixing or preparation of bitumen material on site. All bitumen surfacing material to be delivered to site and ready for use.
- Cleaning of machinery required for laying of tarmacadam should occur off site at a designated, contained impermeable area;
- Trained operators experienced in working with tarmacadam will be employed.

2.2.6.10 *Invasive Species Management*

In 2011 a detailed survey of invasive flora species was completed throughout the River Lee catchment and the data taken, including grid references for the individual records, were published in the *County Kerry Invasive Species Survey* report (Crushell *et al.*, 2011). The report indicates that Japanese Knotweed (*Fallopia japonica*) and Himalayan Balsam (*Impatiens glandulifera*) were

recorded at a number of locations along the proposed route. Crushell *et al.* (2011) recommended a programme of measures and indicated which management techniques should be used to ensure that these invasives can be successfully eradicated.

Japanese knotweed (*F. japonica*)

Japanese knotweed (*F. japonica*) is an established invasive species that can spread quickly and form dense stands that are very persistent and difficult to remove. It has an extensive network of roots; the underground rhizomes can extend laterally up to 7 meters from the parent plant and can be up to 3 meters in depth. The plant is spread by means of the accidental movement of either rhizome fragments or pieces of cut stems. Some reports suggest a fragment of knotweed as little as 0.6 grams can result in new growth⁴.

Japanese knotweed along and adjacent to the proposed route will require clearance prior to any works on the amenity walkway as it can grow through tarmac and concrete and also because the construction work could result in the spread of the plant. Japanese knotweed can be eradicated by excavation and disposal at a licensed landfill site or excavation, burial and/or bunding on site prior to treatment with herbicide. Bio security measures to prevent spreading of Japanese Knotweed will also be required during construction and these include:

- All vehicles and equipment will be cleaned to avoid cross contamination;
- All operatives must be made aware of the threat of colonisation from upstream areas washing Japanese knotweed material downstream;
- Safe disposal of plant material and growing media must be ensured ; and
- Japanese knotweed must not be composted.

Further information on Japanese Knotweed can be viewed on <http://invasivespeciesireland.com/>. The Best Management Practice Guidelines developed by Invasive Species Ireland for Japanese Knotweed will be implemented (see Appendix 3). Method statements for the removal of Japanese Knotweed will be prepared and approved by a suitably qualified ecologist or the NPWS.

Himalayan Balsam (*I. glandulifera*)

Himalayan Balsam (*I. glandulifera*) is an annual plant that flowers in June –August. It forms dense stands which suppress the growth of grasses and native plants and it can, during its die back period in autumn and winter , leave the banks bare of vegetation and, therefore, vulnerable to erosion. The seedbank lasts for approximately 18 months, so two years control should eradicate the plant if there is no further infestation from upstream.

The plant can be controlled either mechanically or chemically. The plant is easy to cut, either by hand or machine, provided there is adequate access. Because Himalayan Balsam regrows annually from seed, any form of control carried out after the seed pods have formed will have no long-term benefit. Control measures should aim to prevent the formation of flowers and seeds and are best carried out before June for maximum effectiveness. The plant must be cut below the lowest node or

⁴ <http://invasivespeciesireland.com/toolkit/invasive-plant-management/terrestrial-plants/japanese-knotweed/> [accessed 10/06/2013]

it will regrow and produce flowers later in the season. Small infestations can be controlled by hand pulling as the plant is shallow rooted. Cutting, strimming or pulling on a regular basis for about three years will be effective and may even eradicate the plant from isolated sites.

The Best Practice Management Guidelines (See Appendix 3) published by Invasive Species Ireland - a joint venture between the Northern Ireland Environment Agency and the National Parks and Wildlife Service – indicates that Glyphosate has been shown to be effective in controlling Himalayan balsam. However, as it is sold under a number of brand names, some of which are not licensed for use near water, it is essential that the correct product is selected. Any herbicides which contain the active ingredient 2, 4-d amine are not approved for use near water and should not be used.

2.2.7 Identification of other projects or plans

The Natura 2000 Standard Data Form (N2SDF) for the Ballyseedy Woods cSAC⁵ site indicates that the main pressures on the ecological integrity of the site derive from the continued spread of alien species, especially *Rhododendron* (*Rhododendron ponticum*), Horse-chestnut (*Aesculus hippocastanum*) and Poplar (*Populus spp.*). It also indicates that the some pressure also results from the dispersed spread of domestic dwellings and by the ongoing road improvement schemes in the area extending away from the Natura 2000 site.

The N2SDF for the *Tralee Bay and Magharees Peninsula, West to Cloghane cSAC* (002070)⁶ indicates the site is subject to a range of pressures across the various qualifying ecological features of interest for which the site is designated. However it is activities that have the potential to create indirect impacts, by contributing to either the nutrient or the sediment load within the River Lee, that are most relevant to this Natura 2000 site in the context of the assessment conducted in this document.

Bearing in mind the pressures listed above it is considered that the construction of the N22 Tralee Bypass is the current significant project of scale that has the potential to contribute to the cumulative pressures directly on the *Ballyseedy Wood cSAC* site from the geographical area surrounding it, and indirectly on the on the *Tralee Bay and Magharees Peninsula, West to Cloghane cSAC* by means of adverse water quality impacts on the River Lee. This project is described below.

The N22 Tralee Bypass/Bealagrellagh Road Improvement Scheme of Tralee has two components. The first links the N69 Listowel Road with the N70 Killorglin Road via the N21 Limerick Road, and the second is the N22 Tralee to Bealagrellagh road that will provide a separate access route to Tralee from the N22 from Killarney. The section of the N22 Tralee Bypass planned for the area of the proposed River Lee riverwalk is described below as extracted from the Non-Technical Summary of the 'N22 Tralee Bypass to Bealagrellagh Environmental Impact Statement'.

N22 Tralee Bypass Section C (N21 Ballingowan Roundabout to N22 Camp Roundabout) N21 Ballingowan Roundabout marks the changeover from Section B to Section C of the N22 Tralee Bypass. Section C commences at the southern arm of Ballingowan roundabout and

⁵ (Available at <http://www.npws.ie/media/npwsie/content/images/protectedsites/natura2000/NF002112.pdf> [accessed 08/10/2013])

⁶ (Available at <http://www.npws.ie/media/npwsie/content/images/protectedsites/natura2000/NF002070.pdf> [accessed 08/10/2013])

continues in a southerly direction through the townland of Manor East before turning in a more westerly direction, passing north of Ballyseedy Wood cSAC and intersecting the River Lee in the townland of Camp. The bypass will pass over the river Lee by means of a river bridge. The route continues west of the river Lee for approximately 150 metres before intersecting the proposed N22 Access Route in the townland of Camp. A Roundabout junction will be provided at this intersection (N22 Camp Roundabout).

An assessment of cumulative impacts is included in section 2.5.7, below.

2.3 Identification of Natura 2000 sites

2.3.1 Zone of impact influence

The screening stage of AA involves compiling a 'long list' of European sites within a zone of potential impact influence for later analysis which may or may ultimately not be impacted upon by the proposal. All Natura 2000 sites within 15km of the proposal location will be characterised in the context of the rationale for designation and qualifying features, in accordance with NPWS guidance. Following this, the potential impacts associated with the proposal will be identified before an assessment is made of the likely significance of these impacts. Finally, in the conclusion of the screening stage, the Natura 2000 sites within 15km whose integrity will not be adversely impacted will be ruled out. If screening indicates sites will be affected it will be necessary to proceed to Stage 2, Appropriate Assessment for a more detailed assessment.

2.3.2 Identification of Natura 2000 and Ramsar sites

Adopting the precautionary principle in identifying potentially affected European sites, it has been decided to include all cSACs and SPAs/Ramsar sites, within a 15km radius of the proposal site. The Convention on Wetlands of International Importance especially as Waterfowl Habitat, more commonly known as the Ramsar Convention, was ratified by Ireland in 1984. Ramsar sites are also subject to AA screening. Although not specifically required, it would be considered best practice to include Ramsar sites (classified under the Ramsar Convention 1971) in the appropriate assessment process⁷.

Table 2 below lists all designated cSACs and classified SPA sites (referred to as designated sites from here on in) within 15km of the proposal site including their proximity.

Table 2. Designated conservation sites within a 15km radius of proposal site

No.	Designated Site	Site Code	Proximity of site to nearest point of designated site (km)
1	Ballyseedy Wood cSAC	002112	Sections of the proposed route are adjacent to this designated site
2	Slieve Mish Mountains cSAC	002185	1.7 to the north
3	Tralee Bay and Magharees Peninsula, West to Cloghane cSAC	002070	2.0 to the east (The proposed route is adjacent to River Lee, a river that drains to this designated site)
4	Tralee Bay Complex SPA	004188	2.0 to the east
5	Tralee Bay Ramsar Site	7IE015	5.2 to the east
6	Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA	004161	6.7 to the south
7	Lower River Shannon cSAC	002165	10.1 to the south east
8	Akeragh, Banna and Barrow Harbour cSAC	000332	10.6 to the south east
9	Castlemaine Harbour SPA	004029	11.3 to the north east
10	Castlemaine Harbour cSAC	000343	11.3 to the north east
11	Castlemaine Harbour Ramsar Site	7IE016	11.3 to the north east

⁷ EPA, A Note on Waste Water Discharging Licence Appropriate Assessments

2.3.3 Characteristics of Natura 2000 and Ramsar sites

The following tables lists the cSAC, SPA and Ramsar sites that lie within 15km of the proposal site and includes their qualifying ecological features of interest which form the basis of the rationale behind their designation as well as listing the qualifying features and other conservation interests (information pertaining to designated sites is from site synopses, conservation objectives and other information available on www.npws.ie and on the Ramsar website).

Table 3 Natura 2000 sites with Qualifying Ecological Features of Interest

Designated Site	Qualifying Ecological Features of Interest
Ballyseedy Wood cSAC (002112)	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0]
Slieve Mish Mountains cSAC (002185)	Killarney fern (<i>Trichomanes speciosum</i>) [1421] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Siliceous rocky slopes with chasmophytic vegetation [8220]
Tralee Bay and Magharees Peninsula, West to Cloghane cSAC (002070)	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] <i>Salicornia</i> and other annuals colonizing mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Otter (<i>Lutra lutra</i>) [1355] Petalwort (<i>Petalophyllum ralfsii</i>) [1395] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salix arenariae</i>) [2170] Humid dune slacks [2190] <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0]

Designated Site	Qualifying Ecological Features of Interest
Tralee Bay Complex SPA (004188)	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Mallard (<i>Anas platyrhynchos</i>) [A053] Pintail (<i>Anas acuta</i>) [A054] Scaup (<i>Aythya marila</i>) [A062] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Turnstone (<i>Arenaria interpres</i>) [A169] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Common Gull (<i>Larus canus</i>) [A182]
Tralee Bay RAMSAR (7IE015)	A shallow embayment fringed by sandy beaches and protected from the sea by a rocky promontory and sand spits. The site includes a compound spit of a series of pebble beaches and sand dunes and extensive saltmarsh and mudflats. This complex of habitats is of considerable geomorphological and botanical interest. The mudflats support one of the four largest areas of <i>Zostera</i> (<i>Z. noltii</i> and <i>Z. angustifolia</i>) in Ireland. In winter the reserve supports internationally important numbers of the goose <i>Branta bernicla hrota</i> and various other waterbirds.
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	Hen Harrier (<i>Circus cyaneus</i>) [A082]

Designated Site	Qualifying Ecological Features of Interest
Lower River Shannon cSAC 002165	<u>Species</u> Freshwater pearl mussel (<i>Margaritifera margaritifera</i>) [1029] Sea lamprey (<i>Petromyzon marinus</i>) [1095] Brook lamprey (<i>Lampetra planeri</i>) [1096] River lamprey (<i>Lampetra fluviatilis</i>) [1099] Salmon (<i>Salmo salar</i>) [1106] Bottle-nosed dolphin (<i>Tursiops truncatus</i>) [1349] Otter (<i>Lutra lutra</i>) [1355] <u>Habitats</u> Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] <i>Salicornia</i> and other annuals colonizing mud and sand [1310] <i>Spartina</i> swards (<i>Spartinion maritimae</i>) [1320] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]
Akeragh, Banna and Barrow Harbour cSAC (000332)	Annual vegetation of drift lines [1210] <i>Salicornia</i> and other annuals colonizing mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190] European dry heaths [4030]

Designated Site	Qualifying Ecological Features of Interest
Castlemaine Harbour SPA (004029)	Red-throated Diver (<i>Gavia stellata</i>) [A001] Cormorant (<i>Phalacrocorax carbo</i>) [A017] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Wigeon (<i>Anas penelope</i>) [A050] Mallard (<i>Anas platyrhynchos</i>) [A053] Pintail (<i>Anas acuta</i>) [A054] Scaup (<i>Aythya marila</i>) [A062] Common Scoter (<i>Melanitta nigra</i>) [A065] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Sanderling (<i>Calidris alba</i>) [A144] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Redshank (<i>Tringa totanus</i>) [A162] Greenshank (<i>Tringa nebularia</i>) [A164] Turnstone (<i>Arenaria interpres</i>) [A169] Chough (<i>Pyrrhocorax pyrrhocorax</i>) [A346] Wetlands & Waterbirds [A999]
Castlemaine Harbour cSAC (000343)	Sea lamprey (<i>Petromyzon marinus</i>) [1095] River lamprey (<i>Lampetra fluviatilis</i>) [1099] Salmon (<i>Salmo salar</i>) [1106] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] <i>Salicornia</i> and other annuals colonizing mud and sand [1310] <i>Spartina</i> swards (<i>Spartinion maritimae</i>) [1320] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Otter (<i>Lutra lutra</i>) [1355] Petalwort (<i>Petalophyllum ralfsii</i>) [1395] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salix arenariae</i>) [2170] Humid dune slacks [2190] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]

Designated Site	Qualifying Ecological Features of Interest
Castlemaine Harbour RAMSAR (71E016)	The estuary of two rivers at the head of Dingle Bay and a complex of mudflats, sandbanks, and saltmarshes protected from the sea by extensive dunes. The mudflats support one of the four largest <i>Zostera</i> beds in Ireland providing food for various species of wintering waterbirds, including internationally important numbers of the goose <i>Branta bernicla hrota</i> .

Site synopses of the sites outlined in Table 3 above are included in Appendix 1.

2.3.4 Conservation Objectives

According to the Habitat's Directive, the *conservation status of a natural habitat* will be taken as 'favourable' when:

- its natural range and areas it covers within that range are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable as defined below.

According to the Habitat's Directive, the *conservation status of a species* means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations. The *conservation status* will be taken as 'favourable' when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

These conservation objectives are of a wide-ranging nature and most of the conservation objectives developed by NPWS for Natura 2000 sites are adapted from these and are published on-line as 'Generic Conservation Objective' documents. However, more comprehensive Conservation Objective⁸, Conservation Statement⁹ or Conservation Plan documents have been developed for some sites and these are published on-line, by the NPWS. While these documents were considered during the screening assessment they are not included in the appendices to this document. They are available on line at www.npws.ie.

⁸ Published for : Lower River Shannon cSAC and Castlemaine Harbour cSAC and SPA sites

⁹ Published for: Ballyseedy Wood and Slieve Mish Mountains cSACs

The published Generic Conservation Objectives are included in Appendix 2 and are available on www.npws.ie.

2.4 Identification of Potential Impacts

Potential impacts are identified in this section. Only those features of the development that have the potential to impact on qualifying features, conservation interests and conservation objectives of the identified Natura 2000 sites are considered.

<i>Description of elements of the project likely to give rise to impacts on Natura 2000 sites.</i>	- Proposed programme of works are to be conducted in close proximity to a river that drains to an estuarine and marine area designated under the Natura 2000 and Ramsar criteria for the protection of a range of habitats and species. - Part of the proposed programme of works is to be conducted adjacent to the site boundary of a cSAC site.
<i>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on Natura 2000 sites by virtue of:</i> - Size and scale; - Land-take; - Distance from Natura 2000 Site or key features of the Site; - Resource requirements; - Emissions; - Excavation requirements; - Transportation requirements; - Duration of construction, operation etc.; and - Other.	- It is estimated that the proposed works will require 4 to 6 months. As a consequence, the time frame within which the various ecological receptors will be exposed to potential impacts is of a significant duration. - There is a risk that indirect impacts to otters¹⁰, due to a reduction in prey availability by means of adverse water quality impacts to the adjacent River Lee such as the ingress of silt or spillage of petrochemicals, could ensue from the proposal as a result of the following elements of that proposal being conducted in close proximity to the river: - the operation of plant machinery and work activities of personnel could lead to abrasion of river bank areas, the consequent erosion of exposed areas and ingress of silt to river bed habitats - exposure of soil due to excavations required for path construction and the consequent risk of sediment being released to the stream from the excavated area or from stockpiled soil - the use of petrochemicals - the use of herbicides - There is a risk that indirect impacts to otters due to noise or human presence during the construction phase could ensue by means of: - disturbance due to increased level of human activity and/or fugitive noise from the operation of machinery during the construction phase - There is a risk that indirect impacts to otters due to noise or human presence during the operational phase could ensue by means of: - disturbance and/or fugitive noise due to increased level of human activity - There is potential that the ecological resources within the adjacent river would be enhanced and the biological water quality would be improved as a result of the habitat enhancement measures outlined in section 2.5.3 below. This could create indirect beneficial impacts on otters by means of an increase in prey availability

¹⁰ The only animal species included in the list of qualifying ecological features of interest for which the Tralee Bay and Magharees Peninsula, West to Cloghane cSAC (002070) is designated

<i>Describe any likely changes to the site arising as a result of:</i> • <i>Reduction of habitat area;</i> • <i>Disturbance of key species;</i> • <i>Habitat or species fragmentation;</i> • <i>Reduction in species density;</i> • <i>Changes in key indicators of conservation value; and</i> • <i>Climate change.</i>	It is considered that changes to the site from the conditions listed opposite are not reasonably foreseeable as result of the proposal considered in this document.
<i>Describe any likely impacts on the Natura 2000 site as a whole in terms of:</i> • <i>Interference with the Key relationships that define the structure of the site; and</i> • <i>Interference with Key relationships that define the function of the site.</i>	It is considered that impacts ensuing from the proposal that could interfere with the key relationships that define the structure or function of the site are not reasonably foreseeable as result of the proposal considered in this document.

2.5 Assessment of Significance of Potential Impacts

This section considers the list of sites identified in section 2.3 above. The magnitude/extent, probability and duration of significant impacts affecting these sites are examined in the following sections.

2.5.1 Natura 2000 sites outside the zone of impact influence

With regard to the proposed amenity walk, it is considered that the proposal does not include any element that has the potential to significantly alter the favourable conservation status of species and habitats for which certain Natura 2000 and Ramsar sites, listed at Table 2 and Table 3 above, are designated. It is considered that these Natura 2000 and Ramsar sites are outside the zone of impact influence of the proposed amenity walk and that the conditions required to initiate a potential 'source-pathway-target' vector connecting the proposal site to these Natura 2000 and Ramsar sites will not be created. It is further considered that no potential impact pathway connects these sites to the location of the proposed amenity walkway development.

Therefore, bearing in mind these aforementioned factors and considering the attenuating effect of the distance intervening between these sites and the location of the programme of works associated with the proposed amenity walk, it is objectively concluded that no significant impacts on these sites are reasonably foreseeable as a result of the programme of works described at section 2.2, above. These sites are listed in Table 4, below, and will not be considered further in this document.

Table 4 Natura 2000 and Ramsar sites outside the zone of impact influence

Designated Site	Site Code	Proximity of site to nearest point of designated site (km)
Slieve Mish Mountains SAC	002185	1.7 to the north
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA	004161	6.7 to the south
Lower River Shannon SAC	002165	10.1 to the south east
Akeragh, Banna and Barrow Harbour SAC	000332	10.6 to the south east
Castlemaine Harbour SPA	004029	11.3 to the north east
Castlemaine Harbour SAC	000343	11.3 to the north east
Castlemaine Harbour RAMSAR	7IE016	11.3 to the north east

Therefore, the assessment of significance of potential impacts that follows focuses on the four remaining designated sites. Three of these sites, namely those situated within Tralee Bay, occupy overlapping and coinciding areas. These designated sites are listed in Table 5 below, with their proximity to the location of the proposed amenity walk.

2.5.2 Natura 2000 sites within the zone of impact influence

Table 5, below lists the Natura 2000 and Ramsar sites considered to be within the zone of impact influence of the proposal.

Table 5 Natura 2000 and Ramsar sites within the zone of impact influence

Designated Site	Site Code	Proximity of site to nearest point of designated site (km)
Ballyseedy Wood cSAC	002112	Sections of the proposed route are adjacent to this designated site
Tralee Bay and Magharees Peninsula, West to Cloghane cSAC	002070	2.0 to the east (The proposed route is adjacent to the River Lee, a river that drains to this designated site)
Tralee Bay Complex SPA	004188	2.0 to the east
Tralee Bay RAMSAR	7IE015	5.2 to the east

It is noted that the qualifying ecological features of interest for the Natura 2000 sites within the Tralee Bay area overlap with those habitats and species for which the Tralee Bay Ramsar site has been designated. Therefore, while the content in the remainder of this document refers most specifically to the Natura 2000 sites, it is considered that any assessments made, or conclusions drawn, apply equally, by inference, to the conservation interests of the Ramsar site.

The potential for significant impacts arising from the proposal was determined based on a number of indicators including:

- Habitat loss;
- Habitat alteration;
- Habitat or species fragmentation;
- Disturbance and/or displacement of species;
- Water quality and resource.

The potential for significance of cumulative/in-combination effects is assessed in 2.5.7 below.

2.5.3 Habitat Loss and Alteration

With the exception of two clear-span footbridges which do encroach slightly at their southern ends into the *Ballyseedy Wood cSAC* site area, and 450m of pathway which will be laid on the existing gravel path within the wood, no actual land take within any Natura 2000 site is proposed and the majority of the proposed route does not traverse through or intersect with the *Ballyseedy Wood cSAC (002112)* site. It is considered that neither of these aspects of the proposal constitutes a significant alteration of any existing habitat. The proposed footbridges will span the River Lee and their encroachment into the cSAC will be restricted to the footprint required to secure and support the southern end of each foot bridge's deck at points adjacent to, but set back from, the bank of the Lee. The risk of morphological impacts to the riverbank has been avoided by the use of clear span bridges of sufficient width to accommodate the necessary set back. These footbridges will connect the proposed amenity walkway to the existing network of paths within Ballyseedy Wood

With regard to the remainder of the proposed route it is noted that, while there will be a certain amount of habitat loss along the proposed amenity walkway due to the construction works, any such loss will occur outside the cSAC and will, for the most part, occur in areas of habitat that are of low intrinsic ecological value and are widely available in the both in the immediate environs and in the wider geographical area. The losses will occur in areas of Improved agricultural grassland (GA1), Wet grassland (GS4), Treelines (WL2), Scrub (WS1), Dry calcareous and neutral grassland (GS1), and Amenity grassland (improved) (GA2). The completion of the route will also necessitate the loss of individual 9m wide sections of Hedgerows (WL1) Riparian Woodland (WN5) and Wet Pedunculate Oak-Ash Woodland (WN4) treelines (MWP, 2009). It is noted that where the pathway traverses through the wet grassland habitat, a habitat type that constitutes a significant proportion of the proposed works, it is proposed, in order to avoid habitat, loss that the walkway will consist of a raised boardwalk. As a result, it is considered that the wet grassland habitat areas are unlikely to be altered significantly.

It is noted that the programme of works will incorporate habitat improvement measurements recommended in a previously completed Ecological Impact Assessment report (Reidy & Hurley, 2009) some of which will occur in, and overlap with, the loss of Hedgerows (WL1) Riparian Woodland (WN5) and Wet Pedunculate Oak-Ash Woodland (WN4) sections referred to in the preceding paragraph. This programme of planned tree removal is designed to produce an overall beneficial impact on the biodiversity of the aquatic ecosystem of the River Lee, particularly with regard to its salmonid carrying capacity, which could result in an increase in the level of prey available to otter, a species for which the *Tralee Bay and Magharees Peninsula, West to Cloghane cSAC (002070)* is designated. This habitat management technique is also expected to reduce riverbank erosion due to the increased cover of bankside vegetation. These habitat improvement measures have been developed in consultation with the Inland Fisheries Ireland (Boyle, K. 2013, pers. comm. [phone] June 7th). Other habitat improvement techniques include the retention of willow and other non-alder tree species and the removal of the invasive plant species mapped previously (Crushell, *et al.* 2011) along the riverbank.

The timing of the tree felling and removal will be chosen to avoid the breeding season of birds and bats. In addition, it will avoid the hibernation period of bats. This means that all tree felling will occur between late August and early November.

It is concluded that no significant habitat loss or alteration impacts within any Natura 2000 site are reasonably foreseeable as a result of the proposal considered in this report.

Some potential for indirect impacts on the conservation objectives of the *Tralee Bay and Magharees Peninsula, West to Cloghane cSAC (002070)* by means of adverse water quality impacts on the River Lee resides in the proposal. This potential impact is dealt in section 2.5.6 below.

2.5.4 Habitat or Species Fragmentation

Habitat fragmentation has been defined as 'reduction and isolation of patches of natural environment' (Hall *et al.*, 1997 cited in Franklin *et al.*, 2002) usually due to an external disturbance such that an alteration of the spatial composition of an area occurs that 'create[s] isolated or tenuously connected patches of the original habitat' (Wiens, 1989 cited in Franklin *et al.*, 2002). This results in spatial separation of habitat units which had previously been in a state of greater continuity.

Adverse effects of habitat fragmentation on species or populations can include increased isolation of populations or species which can detrimentally impact on the resilience or robustness of the populations reducing overall species diversity and altering species abundance.

It is noted that permanent loss of 0.016ha of Wet pedunculate oak-ash woodland (WN4) will occur in one area as a result of the proposal. However, given the size and scale of the proposal and of the habitat loss it is not expected that any significant habitat or species fragmentation impacts will result from the proposal

2.5.5 Disturbance and/or displacement of species

The habitats and species immediately adjacent to the proposed amenity walkway will be subject to certain levels of disturbance during the construction phase of the project.

The main causes of disturbance will be the physical disturbance of the soil and vegetation and the disturbance to species due to the increase in noise levels and presence of machinery and humans. The level of this disturbance will be local and may include disturbance to species occurring in the adjacent area of *Ballyseedy Wood SAC (002112)*. The operational phase of the project will include disturbance factors such as noise and physical disturbance due to the increased presence of pedestrians and cyclists and, potentially, an increase in littering.

Species at risk of impact include Otter, bats and birds. A Lesser horseshoe bat roost is known to exist within 500 m of Ballyseedy Wood (O'Neill *et al.* 2008). While *Ballyseedy Wood SAC (002112)* has not been designated specifically for the protection of any Annex II species, it is an objective of this site to maintain the extent, species richness and biodiversity of the site. The Otter is a qualifying interest for *Tralee Bay and Magharees Peninsula, West to Cloghane SAC (002070)* and the River Lee forms a physical link to this Natura 2000 site. Hence, if disturbance during the operational phase resulted in disturbance or displacement of species within either the designated site that significantly impacted upon their populations, then this would be regarded as a significant impact. The impacts upon these species include disturbance during construction and/or usage of the walkway and possibly impacts as a result of pollution to the waterway. The construction disturbance will be temporary and relatively low in scale. The existing woodland walk is within the SAC woodland, while the proposed walkway will be adjacent to but outside of the SAC. Hence, the disturbance impacts on the species listed is unlikely to be significant.

The current amenity facilities for Ballyseedy Woods include two car parks and existing paths within the woodland. These facilities mean that there is already a certain level of human presence within the woodland. It is considered that the operational phase of proposed walkway is not expected to result in significantly higher levels of disturbance than currently pertains within the existing Ballyseedy Woodland walk. The woodland walk exists within the SAC woodland, the proposed amenity walkway will be adjacent to but outside of the SAC. Hence, the disturbance impacts on the Lesser horseshoe bats and other woodland species is unlikely to be significant.

Potential indirect disturbance or displacement impacts on aquatic species, by means of adverse water quality impacts, are considered in section 2.5.6 following.

2.5.6 Water Quality

There is potential for the proposed amenity walkway to impact upon the water quality of the River Lee. Potential routes for water quality impacts include the direct input of sediment, fuel or construction materials during construction. These types of developments also present a limited risk of pollution during the operational phase. The current proposal is for a pedestrian and cyclist pathway and hence the operational phase of this walkway is not expected to present a significant source of pollution. Hence, the main risk of a pollution event occurring is during the construction phase. Pollution could be in the form of sedimentation or a fuel spill. If a severe pollution event that caused pollutants to be transported downstream to Tralee Bay occurred, this could have a direct impact on the *Tralee Bay and Magharees Peninsula, West to Cloghane cSAC*.

Standard best practices will be followed carefully during the construction of this section of the proposed walkway. In addition, a sediment and erosion plan, a fuel management plan, concrete control system and the implementation of a buffer strip along the riverbank (as outlined in section 2.2.6 above, will be implemented. This means that the risk of a significant pollution event occurring within the freshwater habitat is unlikely to be significant.

It is considered that the drainage associated with the bitumen sections of the proposed amenity walkway will not result in an increase in erosion or transport of deleterious material to the stream. While the sealed surface will cause run-off to be released at a faster rate than would occur if the water percolated through natural soil and vegetation, the drainage will ameliorate this affect and will control and redirect the flow causing it to percolate to ground. The portion of the river that is at risk of this impact lies outside of any Natura 2000 network and is not a habitat of qualifying interest of the adjacent *Ballyseedy Wood cSAC* or the nearby *Tralee Bay and Magharees Peninsula, West to Cloghane cSAC*.

It is considered that, on the basis that the environmental management measures, as detailed at section 2.2.6 above, are adequately implemented during the construction phase no significant water quality impacts are expected. Consequently, it is not expected that significant disturbance or displacement impacts on Salmon, Trout or Otter, by means of adverse water quality impacts will result from the proposal.

2.5.7 Cumulative / In-Combination Impacts

As well as singular effects, the potential for in-combination or cumulative effects also need to be considered. A cumulative impact arises from incremental changes caused by another past, present or reasonably foreseeable future actions together with the proposed developments. Relevant plans and projects have been identified in 2.2.7 above.

A cumulative impact arises from incremental changes caused by other past, present or reasonably foreseeable actions together with the proposed walkway. The relevant existing and planned developments that could result in cumulative impacts are outlined below.

As was noted previously, in section 2.2.7 above, the construction of the Tralee Bypass is the significant infrastructural project of scale most recently completed in the area adjacent to the proposed amenity walkway that could potentially interact cumulatively with the proposed amenity

walkway. It is considered that the potential for synergistic interaction, between the construction of the bypass and the proposal considered in this document, is attenuated by a number of factors. In the first instance the proposal considered in this document will not be undertaken until the bypass project is completed therefore no overlap of construction activities will occur. In addition the two projects are radically different in terms of size and scale across all indicators – including, *inter alia*, duration and extent of the works, quantity and range of equipment required, number of personnel required etc. The bypass constitutes a major infrastructural project; the amenity walkway is a minor works programme. It is not expected that significant cumulative and/ or in-combination impacts between the proposal and the By-pass will ensue.

Ballyseedy Wood has been developed and is managed by Kerry County Council as a recreational resource for the people of Tralee and surrounding areas. It incorporates a network of signposted looped walks on gravel paths and is accessible from two car parks one situated to the north and one to the south of the wood. The completion of the proposed amenity walkway considered in this document could result in a cumulative disturbance impact on *Ballyseedy Wood* cSAC due to additional disturbance from pedestrians and cyclists. However, Ballyseedy Wood has intentionally been developed, and is used and managed, both as a recreational resource for the people of Tralee and surrounding areas (O'Neill *et al.* 2008) by the local authority and as an ecological resource (SAC) by the NPWS. While this may result in an increase in users due to the direct access from the edge of Tralee town, the users of the walkways are expected to keep to existing designated recreational paths and routes, so any adverse impact to the sites ecology is extremely unlikely to be significant.

2.6 Conclusion of screening stage

In conclusion, to determine the potential impacts, if any, of the proposed amenity walkway on nearby Natura 2000/Ramsar sites, a screening process for AA was undertaken. The proposed development is within 15km of nine Natura 2000 and two Ramsar sites.

It is considered that the proposed development does not include any element that has the potential to significantly alter the favourable conservation objectives associated with the species and habitats, or, interfere with the key relationships that define the structure or function, either alone or in combination with other impacts, of the Natura 2000 sites considered in this document provided that the following is carried out:

- The proposal is conducted as described and in the manner outlined in section 2.2.5 above;
- Best practice, standards and controls as integrated into the project design and as summarised in section 2.2.6 above are fully implemented particularly those elements that ensure that:
 - fuels are stored in bunded areas more than 50m from water courses and the shoreline;
 - refuelling takes place more than 50m from any watercourse or drain;
 - excavated material is removed off site;
 - all movement of machinery and personnel are confined to the works area and outside the riparian leave strip.

It has been objectively concluded during the screening process none of these sites are likely to be significantly impacted by the proposal considered in this document and these are:

1. **Ballyseedy Wood cSAC (002112)**
2. **Slieve Mish Mountains cSAC (002185)**
3. **Tralee Bay and Magharees Peninsula, West to Cloghane cSAC (002070)**
4. **Tralee Bay Complex SPA (004188)**
5. **Tralee Bay Ramsar Site (7IE015)**
6. **Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)**
7. **Lower River Shannon cSAC (002165)**
8. **Akeragh, Banna and Barrow Harbour cSAC (000332)**
9. **Castlemaine Harbour SPA (004029)**
10. **Castlemaine Harbour cSAC (000343)**
11. **Castlemaine Harbour Ramsar Site (7IE016)**

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Appendix 1

Site Summaries

SITE SYNOPSIS

SITE NAME: STACK'S TO MULLAGHAREIRK MOUNTAINS, WEST LIMERICK HILLS AND MOUNT EAGLE SPA

SITE CODE: 004161

The Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA is a very large site centred on the borders between the counties of Cork, Kerry and Limerick. The site is skirted by the towns of Newcastle West, Ballydesmond, Castleisland, Tralee and Abbeyfeale. The mountain peaks included in the site are not notably high or indeed pronounced, the highest being at Knockfeha (451 m). Other mountains included are Mount Eagle, Knockanefune, Garraunbaun, Taur, Rock Hill, Knockacummer, Mullaghmuish, Knight's Mt, Ballincollig Hill, Beennageeha Mt, Sugar Hill, Knockanimpuba and Knockathea, amongst others. Many rivers rise within the site, notably the Blackwater, Owentaraglin, Owenkeal, Glenlara, Feale, Clydagh, Allaghaun, Allow, Oolagh, Galey and Smerlagh.

The site consists of a variety of upland habitats, though almost half is afforested. The coniferous forests include first and second rotation plantations, with both pre-thicket and post-thicket stands present. Substantial areas of clear-fell are also present at any one time. The principal tree species present are Sitka Spruce (*Picea sitchensis*) and Lodgepole Pine (*Pinus contorta*). A substantial part (28%) of the site is unplanted blanket bog and heath, with both wet and dry heath present. The vegetation of these habitats is characterised by such species as Ling Heather (*Calluna vulgaris*), Bilberry (*Vaccinium myrtillus*), Common Cottongrass (*Eriophorum angustifolium*), Hare's-tail Cottongrass (*Eriophorum vaginatum*), Deergrass (*Scirpus cespitosus*) and Purple Moor-grass (*Molinia caerulea*). The remainder of the site is mostly rough grassland that is used for hill farming. This varies in composition and includes some wet areas with rushes (*Juncus* spp.) and some areas subject to scrub encroachment.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for Hen Harrier.

This SPA is a stronghold for Hen Harrier and supports the largest concentration of the species in the country. A survey in 2005 resulted in 40 confirmed and 5 possible breeding pairs, which represents over 29% of the national total. A similar number of pairs had been recorded in the 1998-2000 period. The mix of forestry and open areas provides optimum habitat conditions for this rare bird, which is listed on Annex I of the E.U. Birds Directive. The early stages of new and second-rotation conifer plantations are the most frequently used nesting sites, though some pairs may still nest in tall heather of unplanted bogs and heath. Hen Harriers will forage up to c. 5 km from the nest site, utilising open bog and moorland, young conifer plantations and hill farmland that is not too rank. Birds will often forage in openings and gaps within forests. In Ireland, small birds and small mammals appear to be the most frequently taken prey.

Short-eared Owl, also listed on Annex I of the E.U. Birds Directive and very rare in Ireland, has been known to breed within the site. Nesting certainly occurred in the late 1970s and birds have been recorded intermittently since. The owls are considered to favour this site due to the presence of Bank Voles, a favoured prey item. Merlin, a further E.U. Birds Directive Annex I species, also breeds but the size of the population is not known. Red Grouse is found on some of the unplanted areas of bog and heath – this is a species that has declined in Ireland and is now Red-listed.

The main threat to the long-term survival of Hen Harriers within the site is further afforestation, which would reduce and fragment the area of foraging habitat, resulting in possible reductions in breeding density and productivity. The site has a number of wind farm developments but it is not yet known if these have any adverse impacts on the Hen Harriers.

Overall, the site provides excellent nesting and foraging habitat for breeding Hen Harrier, and is considered to be among the top two sites in the country for the species.

SITE SYNOPSIS

SITE NAME: CASTLEMAINE HARBOUR SPA

SITE CODE: 004029

Castlemaine Harbour SPA is a large coastal site occupying the innermost part of Dingle Bay. It extends from the lower tidal reaches of the River Maine and River Laune to west of the Inch and Rosbehy peninsulas (c. 16 km from east to west). The average width of the estuary is 4-5 km though it is c. 11 km wide at the outer limit. The site comprises the estuaries of the River Maine and the River Laune, both substantial rivers, and has extensive areas of intertidal sand and mud flats. A number of other rivers, e.g. the Caragh and the Emlagh, flow into the site, as well as numerous small streams. Conditions in the bay are very sheltered due to the presence of three protruding sand spits on its seaward side. These spits overly gravel bars. Two of the spits, Rosbehy and Inch, are included within the site. Salt marshes fringe much of the shoreline. A very large dune system occurs on the Inch peninsula. A substantial area of shallow marine water is included in the site.

The intertidal flats are mostly muds or muddy sands and have high densities of polychaete worms such as Ragworm (*Hediste diversicolor*) and Lugworm (*Arenicola marina*), along with a good variety of bivalves and molluscs. Eelgrass (*Zostera* spp.) is common in places. The introduced Common Cord-grass (*Spartina anglica*) is found in sheltered areas of the intertidal flats and has colonised the lower part of the saltmarsh at Inch. Salt marsh vegetation includes Thrift (*Armeria maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Sea Rush (*Juncus maritimus*) and Sea Plantain (*Plantago maritima*). The sand dune system at Inch is the largest and arguably the best remaining intact dune system in the country and includes large areas of embryo dunes, Marram (*Ammophila arenaria*) dunes and fixed dunes, as well as dune slacks.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Red-throated Diver, Cormorant, Light-bellied Brent Goose, Wigeon, Mallard, Pintail, Scaup, Common Scoter, Oystercatcher, Ringed Plover, Sanderling, Bar-tailed Godwit, Redshank, Greenshank, Turnstone and Chough. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Castlemaine Harbour SPA is one of the most important sites for wintering waterfowl in the south-west. It provides habitats for an excellent diversity of waterbirds, including divers and seaduck. It is of international importance for its Light-bellied Brent Goose population (694) - figures given are mean peaks for the five winters 1995/96-1999/2000, as well as nationally important populations of a further fourteen waterbird species, i.e. Red-throated Diver (56), Cormorant (136), Wigeon (6,819), Mallard (487), Pintail (145), Scaup (74), Common Scoter (3,637), Oystercatcher (1,035), Ringed Plover (206), Sanderling (335), Bar-tailed Godwit (397), Redshank

(341), Greenshank (46) and Turnstone (144). The population of Wigeon is of note, being 7.6% of the all-Ireland total, while that of Sanderling is over 5%. Other species which have important populations include Great Northern Diver (22), Shelduck (90), Teal (287), Red-breasted Merganser (29), Golden Plover (972), Grey Plover (46), Knot (199), Dunlin (933) and Curlew (474). Black-headed Gull occurs frequently (538). The site provides good quality habitat for the feeding and roosting requirements of the various bird species which winter here. Whilst not breeding within the site, Chough occur in nationally important numbers and are regularly found on the sand dunes at Inch where they feed and socialise; during the autumn in 2002/03 and 2003/04 the dunes at Inch held flocks of up to 40 and 64 birds respectively.

Castlemaine Harbour SPA is a very important ornithological site, with one species, Light-bellied Brent Goose, occurring in numbers of international importance. In addition, it supports nationally important populations of a further fifteen species. Of particular note is that five species that occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Red-throated Diver, Great Northern Diver, Golden Plover, Bar-tailed Godwit and Chough. The site includes a Nature Reserve and two Wildfowl Sanctuaries.

SITE SYNOPSIS

SITE NAME: SLIEVE MISH MOUNTAINS

SITE CODE: 002185

The Slieve Mish Mountains form the backbone of the eastern half of the Dingle Peninsula. The highest peak is Baurtregaum (851m). The range is composed predominantly of Old Red Sandstone.

The dominant habitat within the site is heath. Wet heath, dry heath and acid grassland occur in mosaics on the lower slopes of the mountains, while dry heath tends to dominate the upper, steeper slopes. Typical species of the wet heath include Purple Moor-grass (*Molinia caerulea*), Cross-leaved Heath (*Erica tetralix*), Common Cotton-grass (*Eriophorum angustifolium*) and Deer-grass (*Scirpus cespitosus*). The dry heath is dominated by Heather (*Calluna vulgaris*), with grasses (e.g. *Agrostis capillaris*, *A. canina* and *Festuca ovina*) and mosses. Some alpine heath occurs on the highest ridges; this supports a number of locally scarce species, including Dwarf Willow (*Salix herbacea*), Stiff Sedge (*Carex bigelowii*), Thrift (*Armeria maritima*) and Crowberry (*Empetrum nigrum*).

The site is intersected, particularly on its northern flank, by several steep-sided glaciated river valleys or glens. The head of Derrymore Glen features a classic oligotrophic corrie lake which is surrounded by steep cliffs. Steep cliffs, scree and rocky ridges are features of the site above 650m. Cliffs within the site support a number of rare bryophytes, i.e. *Acrobolbus wilsonii*, *Lejeunea flava*, *Lejeunea holtii* and *Sematophyllum micans*, along with several relatively scarce vascular plant taxa typical of high-altitude inland cliffs, i.e. Starry Saxifrage (*Saxifraga stellaris*), Roseroot (*Rhodiola rosea*), Alpine Scurvygrass (*Cochlearia officinalis* subsp. *alpina*), Alpine Hair-grass (*Deschampsia cespitosa* subsp. *alpina*), Mountain Everlasting (*Antennaria dioica*), Mountain Sorrel (*Oxyria digyna*), Brittle Bladder-fern (*Cystopteris fragilis*) and Irish Saxifrage (*Saxifraga rosacea*). The cliffs also support Kidney Saxifrage (*Saxifraga hirsuta*), St Patrick's-cabbage (*Saxifraga spathularis*) and the hybrid between these two species.

The site includes a small area of dry deciduous woodland, supporting such species as Sessile Oak (*Quercus petraea*), Ash (*Fraxinus excelsior*) and Holly (*Ilex aquifolium*).

The site contains a good population of Killaney Fern (*Trichomanes speciosum*), a species that is listed on Annex II of the EU Habitats Directive. Two other plants that are also listed in the Irish Red Data Book occur, namely Betony (*Stachys officinalis*) and Cornish Moneywort (*Sibthorpia europaea*). In Ireland, the latter species is confined to the Dingle Peninsula - its most easterly known station lies within the site. Other notable plant species recorded from the site include Whorled Caraway (*Carum verticillatum*), Lemon-scented Fern (*Oreopteris limbosperma*) and Ivy-leaved Bellflower (*Wahlenbergia hederacea*).

Peregrines breed on cliffs within the site and Chough are known to feed in the area. Both of these species are listed on Annex I of the EU Birds Directive.

Most of the site is grazed by sheep, with a smaller area being grazed by cattle. Over-grazing on parts of the site has led to some habitat degradation, particularly of the wet heath covering the lower slopes. Most of the blanket bog within the site has been extensively cut for turf and some of the turbary is still active. The lack of forestry within the Slieve Mish range is notable.

Overall, the site is of considerable conservation significance, particularly for the presence of several habitats and species that are listed on Annexes I and II, respectively, of the EU Habitats Directive. The presence of two bird species that are listed on Annex I of the EU Birds Directive and the populations of several rare or scarce plant species adds to the importance of the site.

SITE SYNOPSIS

SITE NAME : LOWER RIVER SHANNON

SITE CODE : 002165

This very large site stretches along the Shannon valley from Killaloe to Loop Head/ Kerry Head, a distance of some 120 km. The site thus encompasses the Shannon, Feale, Mulkear and Fergus Estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. The Shannon and Fergus flow through Carboniferous limestone as far as Foynes, but west of Foynes Namurian shales and flagstones predominate (except at Kerry Head, which is formed from Old Red Sandstone). The eastern sections of the Feale catchment flow through Namurian Rocks and the western stretches through Carboniferous Limestone. The Mulkear flows through Lower Palaeozoic Rocks in the upper reaches before passing through Namurian Rocks, followed by Lower Carboniferous Shales and Carboniferous Limestone. The Mulkear River itself, immediately north of Pallas Green, passes through an area of Rhyolites, Tuffs and Agglomerates. Rivers within the sub-catchment of the Feale include the Galey, Smearlagh, Oolagh, Allaughaun, Owveg, Clydagh, Caher, Breanagh and Glenacarney. Rivers within the sub-catchment of the Mulkear include the Killeenagarraiff, Annagh, Newport, the Dead River, the Bilboa, Glashacloonaraveela, Gortnageragh and Cahernahallia.

The site is a candidate SAC selected for lagoons and alluvial wet woodlands, both habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for floating river vegetation, *Molinia* meadows, estuaries, tidal mudflats, Atlantic salt meadows, Mediterranean salt meadows, *Salicornia* mudflats, sand banks, perennial vegetation of stony banks, sea cliffs, reefs and large shallow inlets and bays all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Bottle-nosed Dolphin, Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic Salmon and Otter.

The Shannon and Fergus Estuaries form the largest estuarine complex in Ireland. They form a unit stretching from the upper tidal limits of the Shannon and Fergus Rivers to the mouth of the Shannon estuary (considered to be a line across the narrow strait between Kilcredaun Point and Kilconly Point). Within this main unit there are several tributaries with their own 'sub-estuaries' e.g. the Deel River, Mulkear River, and Mague River. To the west of Foynes, a number of small estuaries form indentations in the predominantly hard coastline, namely Poulmasherry Bay, Ballylongford Bay, Clonderalaw Bay and the Feale or Cashen River Estuary.

Both the Fergus and inner Shannon estuaries feature vast expanses of intertidal mudflats, often fringed with saltmarsh vegetation. The smaller estuaries also feature mudflats, but have their own unique characteristics, e.g. Poulmasherry Bay is stony and unusually rich in species and biotopes. Plant species are typically scarce on the mudflats, although there are some Eel-grass beds (*Zostera* spp.) and patches of green

algae (e.g. *Ulva* sp. and *Enteromorpha* sp.). The main macro-invertebrate community, which has been noted from the inner Shannon and Fergus estuaries, is a *Macoma-Scrobicularia-Nereis* community.

In the transition zone between mudflats and saltmarsh, specialised colonisers of mud predominate: swards of Common Cord-grass (*Spartina anglica*) frequently occur in the upper parts of the estuaries. Less common are swards of Glasswort (*Salicornia europaea* agg.). In the innermost parts of the estuaries, the tidal channels or creeks are fringed with species such as Common Reed (*Phragmites australis*) and Club-rushes (*Scirpus maritimus*, *S. tabernaemontani* and *S. triquetrus*). In addition to the nationally rare Triangular Club-rush (*Scirpus triquetrus*), two scarce species are found in some of these creeks (e.g. Ballinacurra Creek): Lesser Bulrush (*Typha angustifolia*) and Summer Snowflake (*Leucojum aestivum*).

Saltmarsh vegetation frequently fringes the mudflats. Over twenty areas of estuarine saltmarsh have been identified within the site, the most important of which are around the Fergus Estuary and at Ringmoylan Quay. The dominant type of saltmarsh present is Atlantic salt meadow occurring over mud. Characteristic species occurring include Common Saltmarsh Grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea-milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush (*Juncus gerardi*), Long-bracted Sedge (*Carex extensa*), Lesser Sea-spurrey (*Spergularia marina*) and Sea Arrowgrass (*Triglochin maritima*). Areas of Mediterranean salt meadows, characterised by clumps of Sea Rush (*Juncus maritimus*) occur occasionally. Two scarce species are found on saltmarshes in the vicinity of the Fergus Estuary: a type of robust Saltmarsh-grass (*Puccinellia foucaudii*), sometimes placed within the compass of Common Saltmarsh-grass (*Puccinellia maritima*) and Hard-grass (*Parapholis strigosa*).

Saltmarsh vegetation also occurs around a number of lagoons within the site. The two which have been surveyed as part of a National Inventory of Lagoons are Shannon Airport Lagoon and Cloonconeen Pool. Cloonconeen Pool (4-5 ha) is a natural sedimentary lagoon impounded by a low cobble barrier. Seawater enters by percolation through the barrier and by overwash. This lagoon represents a type which may be unique to Ireland since the substrate is composed almost entirely of peat. The adjacent shore features one of the best examples of a drowned forest in Ireland. Aquatic vegetation in the lagoon includes typical species such as Beaked Tasselweed (*Ruppia maritima*) and green algae (*Cladophora* sp.). The fauna is not diverse, but is typical of a high salinity lagoon and includes six lagoon specialists (*Hydrobia ventrosa*, *Cerastoderma glaucum*, *Lekanesphaera hookeri*, *Palaemonetes varians*, *Sigara stagnalis* and *Enochrus bicolor*). In contrast, Shannon Airport Lagoon (2 ha) is an artificial saline lake with an artificial barrier and sluiced outlet. However, it supports two Red Data Book species of Stonewort (*Chara canescens* and *Chara cf. connivens*).

Most of the site west of Kilcredaun Point/Kilconly Point is bounded by high rocky sea cliffs. The cliffs in the outer part of the site are sparsely vegetated with lichens, Red Fescue, Sea Beet (*Beta vulgaris*), Sea Campion (*Silene maritima*), Thrift and Plantains (*Plantago* spp.). A rare endemic Sea Lavender (*Limonium recurvum* subsp.

pseudotranswallinum) occurs on cliffs near Loop Head. Cliff-top vegetation usually consists of either grassland or maritime heath. The boulder clay cliffs further up the estuary tend to be more densely vegetated, with swards of Red Fescue and species such as Kidney Vetch (*Anthyllis vulneraria*) and Bird's-foot Trefoil (*Lotus corniculatus*).

The site supports an excellent example of a large shallow inlet and bay. Littoral sediment communities in the mouth of the Shannon Estuary occur in areas that are exposed to wave action and also in areas extremely sheltered from wave action. Characteristically, exposed sediment communities are composed of coarse sand and have a sparse fauna. Species richness increases as conditions become more sheltered. All shores in the site have a zone of sand hoppers at the top and below this each of the shores has different characteristic species giving a range of different shore types in the pcSAC.

The intertidal reefs in the Shannon Estuary are exposed or moderately exposed to wave action and subject to moderate tidal streams. Known sites are steeply sloping and show a good zonation down the shore. Well developed lichen zones and littoral reef communities offering a high species richness in the sublittoral fringe and strong populations of *Paracentrotus lividus* are found. The communities found are tolerant to sand scour and tidal streams. The infralittoral reefs range from sloping platforms with some vertical steps to ridged bedrock with gullies of sand between the ridges to ridged bedrock with boulders or a mixture of cobbles, gravel and sand. Kelp is very common to about 18m. Below this it becomes rare and the community is characterised by coralline crusts and red foliose algae.

Other coastal habitats that occur within the site include the following:

- stony beaches and bedrock shores - these shores support a typical zonation of seaweeds (*Fucus* spp., *Ascophyllum nodosum* and kelps).
- shingle beaches - the more stable areas of shingle support characteristic species such as Sea Beet, Sea Mayweed (*Matricaria maritima*), Sea Campion and Curled Dock (*Rumex crispus*).
- Sandbanks which are slightly covered by sea water at all times – there is a known occurrence of sand/gravel beds in the area from Kerry Head to Beal Head.
- sand dunes - a small area of sand dunes occurs at Beal Point. The dominant species is Marram Grass (*Ammophila arenaria*).

Flowing into the estuaries are a number of tidal rivers.

Freshwater rivers have been included in the site, most notably the Feale and Mulkear catchments, the Shannon from Killaloe to Limerick (along with some of its tributaries, including a short stretch of the Kilmastulla River), the Fergus up as far as Ennis, and the Cloon River. These systems are very different in character: the Shannon being broad, generally slow-flowing and naturally eutrophic; the Fergus being smaller and alkaline; while the narrow, fast-flowing Cloon is acid in nature. The Feale and Mulkear catchments exhibit all the aspects of a river from source to mouth. Semi-natural habitats, such as wet grassland, wet woodland and marsh occur by the rivers, however, improved grassland is most common. One grassland type of

particular conservation significance, *Molinia* meadows, occurs in several parts of the site and the examples at Worldsend on the River Shannon are especially noteworthy. Here are found areas of wet meadow dominated by rushes and sedges and supporting a diverse and species-rich vegetation, including such uncommon species as Blue-eyed Grass (*Sisyrinchium bermudiana*) and Pale Sedge (*Carex pallescens*).

Floating river vegetation characterised by species of Water-crowfoot (*Ranunculus* spp.), Pondweeds (*Potamogeton* spp.) and the moss *Fontinalis antipyretica* are present throughout the major river systems within the site. The rivers contain an interesting bryoflora with *Schistidium alpicola* var. *alpicola* recorded from in-stream boulders on the Bilboa, new to county Limerick.

Alluvial woodland occurs on the banks of the Shannon and on islands in the vicinity of the University of Limerick. The woodland is up to 50m wide on the banks and somewhat wider on the largest island. The most prominent woodland type is gallery woodland where White Willow (*Salix alba*) dominates the tree layer with occasional Alder (*Alnus glutinosa*). The shrub layer consists of various willow species with sally (*Salix cinerea* ssp. *oleifolia*) and what appear to be hybrids of *S. alba* x *S. viminalis*. The herbaceous layer consists of tall perennial herbs. A fringe of Bulrush (*Typha* sp.) occurs on the riverside of the woodland. On slightly higher ground above the wet woodland and on the raised embankment remnants of mixed oak-ash-alder woodland occur. These are poorly developed and contain numerous exotic species but locally there are signs that it is invading open grassland. Alder is the principal tree species with occasional Oak (*Quercus robur*), Elm (*Ulmus glabra*, *U. procera*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and the shrubs Guelder-rose (*Viburnum opulus*) and willows. The ground flora is species-rich.

Woodland is infrequent within the site, however Cahiracon Wood contains a strip of old Oak woodland. Sessile Oak (*Quercus petraea*) forms the canopy, with an understorey of Hazel and Holly (*Ilex aquifolium*). Great Wood-rush (*Luzula sylvatica*) dominates the ground flora. Less common species present include Great Horsetail (*Equisetum telmateia*) and Pendulous Sedge (*Carex pendula*).

In the low hills to the south of the Slievefelim mountains, the Cahernahallia River cuts a valley through the Upper Silurian rocks. For approximately 2km south of Cappagh Bridge at Knockanavar, the valley sides are wooded. The woodland consists of Birch (*Betula* spp.), Hazel, Oak, Rowan (*Sorbus aucuparia*), some Ash (*Fraxinus excelsior*) and Willow (*Salix* spp.). Most of the valley is not grazed by stock, and as a result the trees are regenerating well. The ground flora feature prominent Greater wood-rush and Bilberry (*Vaccinium myrtillus*) with a typical range of woodland herbs. Where there is more light available, Bracken (*Pteridium aquilinum*) features.

The valley sides of the Bilboa and Gortnageragh Rivers, on higher ground north east of Cappamore, support patches of semi-natural broadleaf woodland dominated by Ash, Hazel, Oak and Birch. There is a good scrub layer with Hawthorn, Willow, Holly and Blackthorn (*Prunus spinosa*) common. The herb layer in these woodlands is often open with a typically rich mixture of woodland herbs and ferns. Moss species diversity is high. The woodlands are ungrazed. The hazel is actively coppiced in places.

There is a small area of actively regenerating cut away raised bog at Ballyrorheen. It is situated approx. 5km north west of Cappamore Co. Limerick. The bog contains some wet areas with good moss (*Sphagnum*) cover. Species of particular interest include the Cranberry (*Vaccinium oxycoccos*) and the White Sedge (*Carex curta*) along with two other regionally rare mosses including *S. fimbriatum*. The site is being invaded by Birch (*Betula pubescens*) scrub woodland. Both commercial forestry and the spread of rhododendron has greatly reduced the overall value of the site.

A number of plant species that are Irish Red Data Book species occur within the site - several are protected under the Flora (Protection) Order, 1999:

- Triangular Club-rush (*Scirpus triquetrus*) - in Ireland this protected species is only found in the Shannon Estuary, where it borders creeks in the inner estuary.
- Opposite-leaved Pondweed (*Groenlandia densa*) - this protected pondweed is found in the Shannon where it passes through Limerick City.
- Meadow Barley (*Hordeum secalinum*) - this protected species is abundant in saltmarshes at Ringmoylan and Mantlehill.
- Hairy Violet (*Viola hirta*) - this protected violet occurs in the Askeaton/Foynes area.
- Golden Dock (*Rumex maritimus*) - noted as occurring in the River Fergus Estuary.
- Bearded Stonewort (*Chara canescens*) - a brackish water specialist found in Shannon Airport lagoon.
- Convergent Stonewort (*Chara connivens*) - presence in Shannon Airport Lagoon to be confirmed.

Overall, the Shannon and Fergus Estuaries support the largest numbers of wintering waterfowl in Ireland. The highest count in 1995-96 was 51,423 while in 1994-95 it was 62,701. Species listed on Annex I of the E.U. Birds Directive which contributed to these totals include: Great Northern Diver (3; 1994/95), Whooper Swan (201; 1995/96), Pale-bellied Brent Goose (246; 1995/96), Golden Plover (11,067; 1994/95) and Bar-tailed Godwit (476; 1995/96). In the past, three separate flocks of Greenland White-fronted Goose were regularly found but none were seen in 1993/94.

Other wintering waders and wildfowl present include Greylag Goose (216; 1995/96), Shelduck (1,060; 1995/96), Wigeon (5,976; 1995/96); Teal (2,319; 1995-96); Mallard (528; 1995/96), Pintail (45; 1995/96), Shoveler (84; 1995/96), Tufted Duck (272; 1995/96), Scaup (121; 1995/96), Ringed Plover (240; 1995/96), Grey Plover (750; 1995/96), Lapwing (24,581; 1995/96), Knot (800; 1995/96), Dunlin (20,100; 1995/96), Snipe (719, 1995/96), Black-tailed Godwit (1062; 1995/96), Curlew (1504; 1995/96), Redshank (3228; 1995/96), Greenshank (36; 1995/96) and Turnstone (107; 1995/96). A number of wintering gulls are also present, including Black-headed Gull (2,216; 1995/96), Common Gull (366; 1995/96) and Lesser Black-backed Gull (100; 1994/95). This is the most important coastal site in Ireland for a number of the waders including Lapwing, Dunlin, Snipe and Redshank. It also provides an important staging ground for species such as Black-tailed Godwit and Greenshank.

A number of species listed on Annex I of the E.U. Birds Directive breed within the site. These include Peregrine Falcon (2-3 pairs), Sandwich Tern (34 pairs on Rat Island, 1995), Common Tern (15 pairs: 2 on Sturamus Island and 13 on Rat Island, 1995), Chough (14-41 pairs, 1992) and Kingfisher. Other breeding birds of note include Kittiwake (690 pairs at Loop Head, 1987) and Guillemot (4010 individuals at Loop Head, 1987)

There is a resident population of Bottle-nosed Dolphin in the Shannon Estuary consisting of at least 56-68 animals (1996). This is the only known resident population of this E.U. Habitats Directive Annex II species in Ireland. Otter, a species also listed on Annex II of this directive, is commonly found on the site.

Five species of fish listed on Annex II of the E.U. Habitats Directive are found within the site. These are Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*Lampetra fluviatilis*), Twaite Shad (*Allosa fallax fallax*) and Salmon (*Salmo salar*). The three lampreys and Salmon have all been observed spawning in the lower Shannon or its tributaries. The Fergus is important in its lower reaches for spring salmon while the Mulkear catchment excels as a grilse fishery though spring fish are caught on the actual Mulkear River. The Feale is important for both types. Twaite Shad is not thought to spawn within the site. There are few other river systems in Ireland which contain all three species of Lamprey.

Two additional fish of note, listed in the Irish Red Data Book, also occur, namely Smelt (*Osmerus eperlanus*) and Pollan (*Coregonus autumnalis pollan*). Only the former has been observed spawning in the Shannon.

Freshwater Pearl-mussel (*Margaritifera margaritifera*), a species listed on Annex II of the E.U. Habitats Directive, occurs abundantly in parts of the Cloon River.

There is a wide range of landuses within the site. The most common use of the terrestrial parts is grazing by cattle and some areas have been damaged through over-grazing and poaching. Much of the land adjacent to the rivers and estuaries has been improved or reclaimed and is protected by embankments (especially along the Fergus Estuary). Further, reclamation continues to pose a threat as do flood relief works (e.g. dredging of rivers). Gravel extraction poses a major threat on the Feale.

In the past, Cord-grass (*Spartina* sp.) was planted to assist in land reclamation. This has spread widely, and may oust less vigorous colonisers of mud and may also reduce the area of mudflat available to feeding birds.

Domestic and industrial wastes are discharged into the Shannon, but water quality is generally satisfactory - except in the upper estuary, reflecting the sewage load from Limerick City. Analyses for trace metals suggest a relatively clean estuary with no influences by industrial discharges apparent. Further industrial development along the Shannon and water polluting operations are potential threats.

Fishing is a main tourist attraction on the Shannon and there are a large number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. The River Feale is a designated Salmonid Water under the

E.U. Freshwater Fish Directive. Other uses of the site include commercial angling, oyster farming, boating (including dolphin-watching trips) and shooting. Some of these may pose threats to the birds and dolphins through disturbance. Specific threats to the dolphins include underwater acoustic disturbance, entanglement in fishing gear and collisions with fast moving craft.

This site is of great ecological interest as it contains a high number of habitats and species listed on Annexes I and II of the E.U. Habitats Directive, including the priority habitat lagoon, the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. A good number of Red Data Book species are also present, perhaps most notably the thriving populations of Triangular Club-rush. A number of species listed on Annex I of the E.U. Birds Directive are also present, either wintering or breeding. Indeed, the Shannon and Fergus Estuaries form the largest estuarine complex in Ireland and support more wintering wildfowl and waders than any other site in the country. Most of the estuarine part of the site has been designated a Special Protection Area (SPA), under the E.U. Birds Directive, primarily to protect the large numbers of migratory birds present in winter.

6.10.2006

SITE SYNOPSES

SITE NAME: BALLYSEEDY WOOD

SITE CODE: 2112

Ballyseedy Wood lies south of the River Lee, some 2 km south-east of Tralee, Co. Kerry. Most of the wood is situated in the flood plain of the R. Lee on sticky, gleyed clay.

The site is dominated by native tree species: Ash (*Fraxinus excelsior*), Alder (*Alnus glutinosa*), Grey Willow (*Salix cinerea*) and Hazel (*Corylus avellana*) with Oak (*Quercus* spp.), Yew (*Taxus baccata*), Elm (*Ulmus* sp.) and Spindle (*Euonymus europaeus*) also occurring. Non-native tree species found include Sycamore (*Acer pseudoplatanus*), Horse-chestnut (*Aesculus hippocastanum*), Poplar (*Populus* sp.), Beech (*Fagus sylvatica*) and Hornbeam (*Carpinus betulus*). Three semi-natural woodland types are represented, i.e. areas dominated by Alder and Ash (following and adjacent to the R. Lee), areas dominated by Ash and Hazel (on sloping, better-drained soil, mostly on the western half of the site), and areas dominated by Alder and Grey Willow (on level sections further removed from the R. Lee).

The Alder/Ash-dominated woodland is a high canopy wood. The very large Alder trees present were probably planted, but much of the secondary regeneration is also very mature, being up to 100 years old. Sycamore, Horse-chestnut, Poplar and Beech can also be found here. In the understorey are Hawthorn (*Crataegus monogyna*), Holly (*Ilex aquifolium*), Elm, Spindle and Guelder-rose (*Viburnum opulus*). The Ash/Hazel-dominated woodland is also mature, with Sycamore, Hornbeam and Beech also present. Hazel is frequent in the sub-canopy with Hawthorn and the occasional Elm also occurring. The Alder/Willow woodland stands are, for the most part, dominated by Alder, with Grey Willow occurring as scattered trees.

The ground flora is represented by Wild Angelica (*Angelica sylvestris*), Meadowsweet (*Filipendula ulmaria*), Golden-saxifrage (*Chrysosplenium oppositifolium*), Enchanter's-nightshade (*Circaea lutetiana*), Soft Shield-fern (*Polystichum setiferum*), Broad Buckler-fern (*Dryopteris dilatata*), Scaly Male-fern (*D. affinis*), Thin-spiked Wood-sedge (*Carex strigosa*), Remote Sedge (*C. remota*) and Pendulous Sedge (*C. pendula*).

The Alder/Ash-dominated woodland conforms well with the woodland type "Residual Alluvial Forest" listed with priority status on Annex I of the EU Habitats Directive. Several plant species which are nationally or locally scarce are found on the site: Rough Horsetail (*Equisetum hyemale*), Thin-spiked Wood-sedge, Dark-leaved Willow (*Salix myrsinifolia*) and Wood Horsetail (*Equisetum sylvaticum*). The rare moss, *Pylaisia polyantha*, a species known in Ireland only from Cos Donegal, Kerry and Mayo, has also been recorded from the site.

Ballyseedy Wood is a nesting site for Long-eared Owl and the river is frequented by Otters, a species listed on Annex II of the EU Habitats Directive.

The site is very undisturbed and apparently infrequently visited by man. Non-nature tree species are present within the site but account for less than 30% of the woodland. Exotic shrub species present include Rhododendron (*Rhododendron ponticum*), Snowberry (*Symphoricarpos albus*), Cherry Laurel (*Prunus laurocerasus*), Japanese Knotweed (*Reynovtria japonica*) and Bamboo. These are, however, localised within the site and are not found throughout the woodland. In fact, some stands of woodland are remarkable for the complete absence of exotic species.

Ballyseedy Wood is of prime importance for its Alder/Ash- dominated woodland stands, a habitat that is rare and threatened in Europe, and listed, with priority status, on Annex I of the EU Habitats Directive. The site is also of significance for the several rare or scarce plant species that occur. The scarcity of woodlands in north Kerry adds to the importance of the site.

SITE SYNOPSIS

SITE NAME: TRALEE BAY AND MAGHAREES PENINSULA, WEST TO CLOGHANE

SITE CODE: 002070

This large site stretches from Tralee town westwards to Fenit Harbour and Cloghane, encompassing Tralee Bay, Brandon Bay and the Magharees Peninsula. It includes extensive mudflats at the eastern end, the beaches of Derrymore Island, the sand dunes and lagoons of the Magharees Peninsula as well as the rocky headlands at its end. The site includes two Statutory Nature Reserves, Tralee Bay and Derrymore Island, and much of the estuarine part of the site has been designated an SPA. Many coastal habitats that are listed on Annex I of the EU Habitats Directive, including three which are recognised as priority habitats (fixed dune, alluvial forest and lagoon), occur within the site. Populations of the Annex II bryophyte *Petalophyllum ralfsii* also occur here.

The site is mostly underlain by limestone, but significant parts of this are covered with glacial drift or windblown sand. The main exposures occur at Fenit port, Oyster Hall, Blennerville and at Rough Point and Fahamore, but there are some other low outcrops on the beaches west to Castlegregory. Elsewhere the sandstones and slates of the Dingle Beds appear.

The site is a candidate SAC selected for lagoon, fixed dunes and alluvial forests, all priority habitats on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for other habitats listed on Annex I of the directive – perennial vegetation of stony banks, drift line vegetation, estuaries, reefs, Marram dunes, dune slack, dunes with Creeping Willow, *Salicornia* mudflats, tidal mudflats, large shallow inlets and bays, Atlantic saltmarsh and Mediterranean saltmarsh. In addition, the site is also selected as a candidate SAC for the liverwort, Petalwort and the Otter, a plant and animal species listed on Annex II of the E.U. Habitats Directive.

Both the Tralee and Brandon (Owenmore) estuaries feature wide expanses of sheltered intertidal flats, often fringed with saltmarsh vegetation. Plant species are typically scarce on the flats, although there are some Eel-grass (*Zostera* spp.) beds and patches of green algae (e.g. *Ulva* sp. and *Enteromorpha* sp.). The Eel-grass beds at Derrymore Island include *Zostera noltii*, a species which has a limited distribution in Ireland. A variety of polychaetes (worms) and bivalves are also present in the intertidal sections.

The majority of Tralee Bay is shallow and composed of sublittoral sediments. In the more sheltered areas of the bay, there is a variety of important sublittoral sediment communities in which a number of rare species occur. Seagrass beds in sandy substrates are characterized by oysters and the rare anemone *Calliactis parasitica* which lives on shells inhabited by the hermit crab *Pagurus bernhardus*. The little known hydroid, *Laomedea angulata*, is also found on the fronds of the seagrass. The

native oyster, *Ostrea edulis* occurs in sediment communities throughout the bay. Maerl beds, composed of the free-living coralline algae *Lithothamnion corallioides* and *Phymatolithon calcareum*, and characterized by anemones (*Anthopleura balli*) and oysters, occur in the middle of the bay. The rare anemone, *Halcampa chrysanthellum*, has been recorded here.

The intertidal reefs of Tralee Bay and the Magharees peninsula range from being exposed to sheltered from wave action and the communities present are good examples of the communities found on shores with this range of exposure to wave action. The barnacle/limpet community with the lichen *Lichina pygmaea* is an uncommon community and is found in the upper mid shore at Rough Point. The low shore at Rough Point, which is moderately exposed to wave action, and the shore at Coosanea, which is sheltered from wave action, are both very species rich. Rocky outcrops on the shore half way round the bay near Camp are known to support a community of the honeycomb worm *Sabellaria alveolata* which is uncommon. The sublittoral reefs support communities characterised by a variety of red foliose algae, as well as the brown algae *Dictyota dichotoma*, and are typical of communities that are subjected to sand scour as indicated by the presence of the red algae *Furcellaria lumbricalis* and *Polyides rotundus*.

In the transition zone between the intertidal flats and saltmarsh, specialised colonisers of mud predominate - swards of Common Cord-grass (*Spartina anglica*) are extensive on the leeward side of Derrymore Island, while swards of Glasswort (*Salicornia europaea* agg.) also occur in parts of the site.

Saltmarsh vegetation frequently fringes the mudflats, with the most extensive areas being found at Blennerville, Derrymore Island and Formoyle in Brandon Bay. The dominant type of saltmarsh present is Atlantic salt meadow. Characteristic species occurring include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea-milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush (*Juncus gerardii*), Long-bracted Sedge (*Carex extensa*), Lesser Sea-spurrey (*Spergularia marina*) and Sea Arrowgrass (*Triglochin maritima*). Areas of Mediterranean salt meadows, characterised by clumps of Sea Rush (*Juncus maritimus*), occur occasionally.

Sandy beaches backed by strips of 'white' dunes are common along the southern shore of the site. The vegetation of these 'white' dunes is dominated by Marram Grass (*Ammophila arenaria*). However, the main dune area on this southern shore occurs on the Magharees Peninsula - a tombolo which joins a number of the Magharees Islands with the mainland. Here there are extensive areas of fixed 'grey' dunes, which feature a number of damp hollows or dune slacks. The fixed dunes are species-rich with characteristic species such as White Clover (*Trifolium repens*), Lesser Hawkbit (*Leontodon taraxacoides*), Common Centaury (*Centaureum erythraea*), Lady's Bedstraw (*Galium verum*) and grasses (e.g. *Festuca rubra*, *Poa trivialis* and *Avenula pubescens*).

Relatively scarce plants found on the dunes include the following: Fringed Rock-cress (*Arabis brownii*), Fragrant Orchid (*Gymnadenia conopsea*), Squinancywort (*Asperula cynanchica*), Autumn Lady's-tresses (*Spiranthes spiralis*) and Dodder (*Cuscuta*

epithymum). Dune slack species include Strawberry Clover (*Trifolium fragiferum*), Chaffweed (*Anagallis minima*) and a fungus, *Inocybe halophila*.

Lough Gill, a natural sedimentary lagoon, is located at the base of the Magherees Peninsula. The lagoon is only slightly brackish and therefore contains freshwater species along with lagoon specialists. Submerged flora present includes Beaked Tasselweed (*Ruppia maritima*) and Horned Pondweed (*Zannichellia palustris*), while species fringing the lagoon include Common Reed (*Phragmites australis*), Sea Club-rush (*Scirpus maritimus*) and Grey Club-rush (*Scirpus lacustris* subsp. *tabernaemontani*).

Other coastal habitats that occur within the site include shingle beaches, rocky shores and vegetated sea-cliffs. The site also contains fragments of terrestrial habitats such as deciduous woodland, scrub, heath, dry limestone grassland, wet grassland and freshwater marshes.

There is some good limestone flora on the hill at Oyster Hall, with Burnet Rose (*Rosa pimpinellifolia*), Southern Polypody (*Polypodium australe*) and Hairy Rock-cress (*Arabis hirsuta*) occurring. There is an old record too for the Red Data Book species, Sea-kale (*Crambe maritima*). At Fahamore and Rough Point it is the intertidal communities that are particularly rich, benefiting from a multitude of microhabitats in the eroded limestone. Red algae are frequent including the agar seaweeds, *Gelidium* and *Pterocladia*.

Beach features dominate the northern coast of the Dingle Peninsula with an excellent series of shingle ridges forming Derrymore Island and the tombolo which links former Magheree Islands (Rough Point, etc.) to the mainland. Here there is a large area of well-developed sand dunes with an exceptionally rich flora and great topographic variation. The flora includes Fringed Rock-cress, Squinancywort, Dodder, Autumn Lady's-tresses and Chaffweed - all plants with a restricted distribution in the west of Ireland. These occur in a vegetation of Red Fescue with scattered Marram and such herbs as Lady's Bedstraw, Wild Thyme (*Thymus praecox*), Common Bird's-foot-trefoil (*Lotus corniculatus*) and Kidney Vetch (*Anthyllis vulneraria*). Yellow-rattle (*Rhinanthus minor*), Eyebright (*Euphrasia* spp.), Pyramidal Orchid (*Anacamptis pyramidalis*) and Spotted Orchid (*Dactylorhiza maculata*) are four sensitive species which also occur here. At the seaward edge drift line vegetation is often present.

Between the dunes where erosion has removed the sand down to the watertable there are temporary ponds or dune slacks with many additional species. Marsh Pennywort (*Hydrocotyle vulgaris*), Silverweed (*Potentilla anserina*), various sedges (*Carex panicea* and *C. nigra*) and, in places, Strawberry Clover, Adder's-tongue (*Ophioglossum vulgatum*), Knotted Pearlwort (*Sagina nodosa*) and Marsh Orchids (*Dactylorhiza majalis* and *D. incarnata*) all occur. Some parts of the dune slacks feature a vegetation community characterised by the presence of Creeping Willow (*Salix repens*).

Woodland is rare on the Dingle Peninsula so the three stands included in this site are locally important. A deserted river valley at Killelton, the steep valley of the Finglas River at Camp and the west-facing slopes of Drom Hill opposite Cloghane all have

features of significant interest. The last site has many species of lower plant (liverworts and lichens) that form distinctive elements of the westernmost natural woods in Ireland. At Garrahies Wood, adjacent to the Finglas River, there is an example of wet woodland on base-rich soils subject to flooding. The woodland type falls into the ash-alder alluvial forest category.

The dune complex on the Magharees Peninsula supports the largest Irish breeding population of Natterjack Toads. Indeed, the population may be the largest breeding population in Britain and Ireland. The Natterjack is listed as vulnerable in the Red Data Book and is protected under both European and national legislation. The toads require shallow warm water to spawn in and sandy habitats for overwintering. Their tadpoles are vulnerable to predation in permanent lakes but despite this they have some success in Lough Gill which is a shallow lake with flat shores of sand, wet grassland or marsh. Natterjack Toads also breed within the site at Fermoy, to the west. Also recorded from Fermoy is the rare, semi-aquatic snail, *Vertigo angustior*, a species listed on Annex II of the EU Habitats Directive. Two species of hover fly - *Platycheris perpilladus* and *Sphaerophoria loewi* - have their only Irish records from the Magharees Peninsula dune system and a water beetle *Cercyon sternalis* was first recorded in Ireland in 1997 in Lough Gill.

The site supports populations of several rare plant species. The bryophyte Petalwort (*Petalophyllum ralfsii*), which is listed on Annex II of the E.U. Habitats Directive, is known from the dune slacks on the Magharees Peninsula and Smooth Brome (*Bromus racemosus*), a Red Data Book grass, has been recorded from two wet meadows within the site. Several aquatic plants of interest grow in Lough Gill, the rarest being the Red Data Book stonewort *Chara canescens*. The Slender-leaved Pondweed (*Potamogeton filiformis*) occurs far to the south of its distribution elsewhere in Ireland and Britain, while there are also old records for the Tasselweed (*Ruppia spiralis*). The marshes along the southern shore used to support a rich variety of vegetation including several species rare in Kerry such as Water Dock (*Rumex hydrolapathum*) and Greater Spearwort (*Ranunculus lingua*) as well as sedges (*Carex dioica*, *C. limosa* and *C. diandra*) on patches of peat. Despite local reclamation it is likely that most of these still survive.

Tralee Bay, including Lough Gill, is an internationally important wetland for wintering waders and wildfowl. Species present which are listed on Annex I of the E.U. Birds Directive include Whooper Swans (24, mid-1980s), Golden Plover (3053, 1994-95) and Bar-tailed Godwit (903, 1995-96). The dunes also provide an important feeding ground for Chough, a resident Annex I species.

Other wintering waders and wildfowl present include: Pale-bellied Brent Geese (944, mid-1980s), Shelduck (218, 1995-96), Gadwall (14, 1994-95), Teal (860, 1994-95), Pintail (56, 1995-96), Shoveler (144, mid-1980s), Scaup (1560, 1994-95), Scoter (620, 1994-95), Red-breasted Merganser (46, 1994-95), Ringed Plover (332, 1994-95), Grey Plover (674, 1995-96), Lapwing (5700, 1994-95), Knot (320, 1994-95), Sanderling (270, 1994-95), Purple Sandpiper (103, mid-1980s), Dunlin (4122, 1995-96), Black-tailed Godwit (508, 1994-95), Curlew (826, 1994-95), Redshank (352, 1995-96), Greenshank (21, 1994-95) and Turnstone (477, mid-1980s). Most of these species are present in nationally important numbers.

Otters regularly feed within this extensive site though it is not known if they breed. Otter is listed on Annex II of the EU Habitats Directive.

The dunes face pressures from intensive farming practises and recreational use by visitors to the site. The most threatening activities include fertilisation of the species-rich dune grasslands, overgrazing, and trampling of areas of dunes adjacent to tourist facilities (e.g. caravan parks). These activities may lead to severe erosion of the dune system and eutrophication of the dune grasslands and dune slacks. Parts of the dune system are also vulnerable to invasion by Sea Buckthorn (*Hippophae rhamnoides*).

Agricultural run-off from areas of fertilised dune grasslands in the vicinity of Lough Gill pose a continued threat to the nutrient status of the lagoon; algal blooms and fish kills have occurred in the past. Removal of sand has also occurred and poses a threat to the integrity of the system.

Generally, the intertidal areas are relatively robust, although certain communities are vulnerable. For example, *Spartina* has spread widely, and may oust less vigorous colonisers of mud and may also reduce the area of mudflat available to feeding birds. Other activities, such as land reclamation and aquaculture, pose potential threats in terms of damage to habitats and potential disturbance to wintering birds.

Domestic and industrial wastes are discharged into inner Tralee Bay, but water quality is generally satisfactory - except in the inner bay reflecting the sewage load from Tralee Town. Further industrial development along the bay in the vicinity of Tralee Town and Fenit and water polluting operations are potential threats.

This site is of considerable ecological and conservation significance for the excellent diversity of habitats it contains, many of which are listed on Annex I of the E.U. Habitats Directive. The occurrence of a species listed on Annex II of the E.U. Habitats Directive adds further importance to the site. The presence of a number of Red Data Book species including the largest population of Natterjack Toads in Ireland, is also notable, as is the occurrence of several species listed on Annex I of the E.U. Birds Directive.

SITE SYNOPSIS

SITE NAME: CASTLEMAINE HARBOUR

SITE CODE: 000343

This is a large site located on the south-east corner of the Dingle Peninsula, County Kerry. It consists of the whole inner section of Dingle Bay, i.e. Castlemaine Harbour, the spits of Inch and White Strand/Rosbehy and a little of the coastline to the west. The River Maine, almost to Castlemaine and much of the River Laune catchment, including the Gaddagh, Gweestion, Glanooragh, Cottoner's River and the River Loe, are also included within the site.

The site is a candidate SAC selected for fixed grey dunes and alluvial wet woodlands, both priority habitats on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for estuaries, tidal mudflats, Atlantic salt meadows, *Salicornia* mudflats, Mediterranean salt meadows, drift line vegetation, perennial vegetation of stony banks, dunes with creeping willow, dune slacks, embryonic shifting dunes and Marram dunes, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Sea Lamprey, River Lamprey, Atlantic Salmon, Otter and the liverwort, Petalwort.

Inch Spit holds a fine sand dune system. It is the largest and arguably one of the best remaining 'intact' dune systems in the country. In the younger, more mobile dunes, Marram (*Ammophila arenaria*) is common, with Groundsel (*Senecio vulgaris*), Sea Rocket (*Cakile maritima*) and Dandelion (*Taraxacum* sp.) also present. The fixed, more stable dunes support Lady's Bedstraw (*Galium verum*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Wild Thyme (*Thymus praecox*), Kidney Vetch (*Anthyllis vulneraria*), Wild Pansy (*Viola tricolor*) and Biting Stonecrop (*Sedum acre*), among others. The slightly damper conditions which prevail in dune slacks support Creeping Bent (*Agrostis stolonifera*), Crested Dog's-Tail (*Cynosurus cristatus*), Glaucous Sedge (*Carex flacca*), Creeping Willow (*Salix repens*) and Jointed Rush (*Juncus articulatus*). The rare bryophyte Petalwort (*Petalophyllum ralfsii*), which is listed on Annex II of the E.U. Habitats Directive, has been recorded in this system. A smaller spit, with a similar diversity of dune types, occurs at Rosbehy on the southern shore, from where Yellow Centaury (*Cicendia filiformis*) and Knotted Pearlwort (*Sagina nodosa*) have been recorded from a dune slack along with other, more common species.

The sand spits, and also the Coomore peninsula, are underlain by shingle and in places the shingle is exposed and supports a characteristic flora. Species present include Lyme-grass (*Leymus arenarius*), Sandwort (*Honkenya peploides*) and two Red Data Book plants, Sea Pea (*Lathyrus japonicus*) and Sea-kale (*Crambe maritima*).

The coastline is fringed in many places by saltmarsh. The vegetation here includes Thrift (*Armeria maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Sea Rush (*Juncus maritimus*) and Sea Plantain (*Plantago maritima*). Upper saltmarsh communities extend inland, along estuarine channels, where they are mixed with freshwater communities. Sea Club-rush (*Scirpus maritimus*) and Common Reed (*Phragmites australis*) occur at these locations. Cord-grass (*Spartina anglica*) has colonised the lower part of the saltmarsh at Inch and extends out onto the open mudflat.

West of Inch, cliffs of glacial drift occur, which support such plants as Ivy (*Hedera helix*), Red Fescue (*Festuca rubra*), Ling Heather (*Calluna vulgaris*) and Honeysuckle (*Lonicera periclymenum*). Along the cliff-tops there is coastal grassland with species such as Sweet Vernal-grass (*Anthoxanthum odoratum*), Cock's-foot (*Dactylis glomerata*) and Wood Sage (*Teucrium scorodonia*).

Much of the site consists of intertidal sand and mudflats, supporting beds of Eelgrass (*Zostera marina*) in some places.

The rivers and their associated habitats also make up a considerable portion of the site. These associated habitats include wet grassland, woodland, scrub and bog/heath. In the valley up-river of Killorglin, is an interesting area of alluvial wet woodland, dominated by Alder (*Alnus glutinosa*) and Willow (*Salix* spp.).

Five plants listed in the Irish Red Data Book have been recorded at this site: Sea-kale, Sea Pea, Corn Cockle (*Agrostemma githago*), Pennyroyal (*Mentha pulegium*) and Irish Lady's-tresses (*Spiranthes romanzoffiana*). The two last-named are legally protected under the Flora (Protection) Order, 1999 as is the rare bryophyte, Petalwort. Other scarce species which occur here are Yellow Bartsia (*Parentucellia viscosa*), Lax-flowered Sea-lavender (*Limonium humile*) and Blue-eyed-grass (*Sisyrinchium bermudiana*).

Castlemaine Harbour is a very important site for passage and wintering waterfowl. The following figures are derived from counts between 1994/5 and 1996/7. One species occurs here in internationally important numbers - Brent Goose (734) - with 16 species having populations of national importance: Cormorant (215), Shelduck (129), Pintail (167), Scaup (138), Wigeon (3,513), Red-breasted Merganser (51), Oystercatcher (1,539), Ringed Plover (330), Golden Plover (1940), Grey Plover (122), Knot (347), Sanderling (207), Dunlin (1360), Redshank (299), Greenshank (26) and Turnstone (296).

The vicinity of Castlemaine Harbour is also important as one of few areas in Ireland - all in Kerry - where the Natterjack Toad naturally occurs. This amphibian is listed in the Irish Red Data Book and on Annex IV of the E.U. Habitats Directive.

The site also supports a small colony of Common Seal, while two Lamprey species have been recorded in the Laune river catchment. The Laune catchment is used by Otter and is an important salmon system with nurseries, riffles pools and glides.

Castlemaine Harbour is of major ecological importance. It contains a range of coastal habitats of excellent quality, including many that are listed on Annex I of the EU Habitats Directive. It also includes long stretches of river and stream which are excellent habitats for Salmon, Lamprey and Otter. Inch dunes are recognised as among the finest in the country, with particularly well-developed dune slacks. The site supports internationally important waterfowl populations, rare plant species, the rare Natterjack Toad and populations of several animal species that are listed on Annex II of the E.U. Habitats Directive. Part of the site is designated a Special Protection Area and is listed as a site under the Ramsar Convention. Part of Castlemaine Harbour is a Statutory Nature Reserve, while Inch and Rosbehy are Wildfowl Sanctuaries.

6.10.2006

SITE SYNOPSIS

SITE NAME : AKERAGH, BANNA AND BARROW HARBOUR

SITE CODE : 000332

This is a large coastal site covering a 10km section of coastline in County Kerry, and including a wide diversity of habitats. The underlying rock is limestone, which outcrops only in the southern part of the site, in the impressive columns and hillsides north of Fenit. Elsewhere shell sand is predominant with occasional development of peat.

A number of coastal habitats which are listed on Annex I of the EU Habitats Directive are contained within the site. Sand dunes run southwards from Ballyheigue and they become especially interesting south of the Akeragh outflow where they show great variety in both physiography and vegetation. The largest proportion of the sand dune system is fixed dune grassland. The vegetation is made up of a mosaic of Marram (*Ammophila arenaria*) tussocks interspersed with low-lying patches of a Red Fescue-Lady's Bedstraw (*Festuca rubra*/*Galium verum*) community. Other species occurring Smooth Meadow-grass (*Poa pratensis*), Daisy (*Bellis perennis*), Ribwort Plantain (*Plantago lanceolata*) and Bulbous Buttercup (*Ranunculus bulbosus*). There is a sparse occurrence of moss species, including *Brachythecium rutabulum*, *Tortula ruralis* ssp. *ruraliformis* and *Homalothecium lutescens*. These tend to be restricted to areas close to rabbit burrows, where they are associated with species such as Germander Speedwell (*Veronica chamaedrys*), Squinancywort (*Asperula cynanchica*) and Dog Lichen (*Peltigera* spp.). A number of other species typical of Mesobromion grasslands are found in this habitat type, reflecting the calcareous nature of the site. These include Pyramidal Orchid (*Anacamptis pyramidalis*), Thyme-leaved Sandwort (*Arenaria serpyllifolia*) and Hairy Rock-cress (*Arabis hirsuta*). Common Dodder (*Cuscuta epithymum*), a parasitic plant, grows in abundance on the fixed dune slopes at Carrahane. Mobile Marram dunes occur as a narrow band running along the seaward side of the entire coastal strip. There is a slight increase in dune mobility towards the growing tip at Carrahane. The main ridges are dominated by Marram and reach heights in excess of 20m in places. Companion species include Sea Spurge (*Euphorbia paralias*), Colt's-foot (*Tussilago farfara*), Sea holly (*Eryngium maritimum*) and Sand Sedge (*Carex arenaria*). Also occurring are embryonic dunes, with such species as Sea Couch (*Elymus farctus*) and Sea Rocket (*Cakile maritima*).

The site contains a number of dune slack areas, these being best developed on the landward side of Carrahane dunes. Species present in these dune slacks include Common Bent (*Agrostis stolonifera*), Red Clover (*Trifolium pratense*), Glaucous Sedge (*Carex flacca*), Water Mint (*Mentha aquatica*), Creeping Willow (*Salix repens*) and the scarce, Marsh Helleborine (*Epipactis palustris*).

Of ecological interest is the gradation from fixed dune and dune slack to salt marsh at Carrahane. Salt marsh here is particularly well developed but also occurs at Barrow Harbour. Common salt marsh species include Thrift (*Armeria maritima*), Red Fescue,

Sea Plantain (*Plantago maritima*), Saltmarsh Rush (*Juncus gerardi*) and Sea Rush (*Juncus maritima*). A number of scarce species are associated with the salt marsh, notably Hard-grass (*Parapholis strigosa*), Saltmarsh Flat-sedge (*Blysmus rufus*), Strawberry Clover (*Trifolium fragiferum*) and a special Sea Lavender (*Limonium recurvum*). Glasswort (*Salicornia* spp.) occurs on the edges of the salt marsh and in sheltered areas extends onto the intertidal muds.

Akeragh Lough now supports extensive areas of brackish vegetation. It was formerly richer in birdlife, but the lake level has been controlled by a sluice on the outflow, the total water area has declined and the peaty land to the east has been afforested. The site supports important wintering waterfowl populations. Brent Geese occur in internationally important numbers (360 in winter 1996/97), while in winter 1996/97 nationally important populations of Ringed Plover (130), Grey Plover (62), Lapwing (c.2000), Sanderling (280) and Bar-tailed Godwit (345) occurred. Notable populations of Golden Plover, Oystercatcher, Dunlin, Curlew and Redshank also occur. The regular occurrence of Golden Plover and Bar-tailed Godwit is of note as these species are listed on Annex I of the EU Birds Directive.

The harbour is surrounded by low hills of limestone which support an interesting grassland community where they remain unfertilised. This is best seen at the entrance to Carrahan Bay but recurs sporadically elsewhere. Some dry heath also occurs.

This large site is of major ecological interest due both to its range of floristically-rich coastal habitats and as a wintering site for significant numbers of waterfowl.

SITE SYNOPSIS

SITE NAME: TRALEE BAY COMPLEX SPA

SITE CODE: 004188

The Tralee Bay Complex SPA is located along the coast of north Co. Kerry between Ballyheige in the north, Tralee in the east and Stradbally in the west. The site includes the inner part of Tralee Bay, including Derrymore Island, the inlets of Barrow Harbour and Carrahane Strand, Akeragh Lough, Lough Gill, and much of the intertidal habitat from Scraggane Point at the northern end of the Magharees Peninsula around the coast to c. 2 km south of Ballyheige. Inner Tralee Bay is well sheltered by the Derrymore Island peninsula. The intertidal sediments vary from muddy sands on the upper shore to firm rippled sands on the lower, more exposed shore. The sediments have a diverse macro-invertebrate fauna, with such species as Cockle (*Cerastoderma edule*), Lugworm (*Arenicola marina*), Ragworm (*Hediste diversicolor*), Baltic Tellin (*Macorna balthica*) and Shrimp (*Crangon crangon*) occurring. The intertidal flats have extensive beds of Eelgrass (*Zostera* spp.).

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Light-bellied Brent Goose, Shelduck, Wigeon, Teal, Mallard, Pintail, Scaup, Oystercatcher, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Sanderling, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Turnstone, Black-headed Gull and Common Gull. It is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Tralee Bay Complex SPA is an internationally important wetland for wintering waders and wildfowl. It supports an internationally important population of Light-bellied Brent Goose (1,412) and nationally important populations of a further 21 species, i.e. Whooper Swan (101), Shelduck (220), Wigeon (1,634), Teal (623), Mallard (571), Pintail (54), Scaup (892), Oystercatcher (1,011), Ringed Plover (344), Golden Plover (6,393), Grey Plover (195), Lapwing (6,106), Sanderling (228), Dunlin (2,444), Black-tailed Godwit (139), Bar-tailed Godwit (608), Curlew (1,170), Redshank (635), Turnstone (229), Black-headed Gull (1,320) and Common Gull (599) – all figures are five year mean peak counts for the period 1995/96 to 1999/2000, except the gulls which are four year mean peak counts for the period 1996/97 to 1999/2000.

Tralee Bay Complex SPA is of high ornithological importance as it annually supports over 20,000 wintering waterbirds, including an international important population of Light-bellied Brent Goose and nationally important populations of 21 other species. It is of note that three of the species that regularly occur, Whooper Swan, Golden Plover and Bar-tailed Godwit, are listed on Annex I of the E.U. Birds Directive.

Appendix 2

Conservation Objectives

Conservation Objectives for Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA [004161]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

- ♦ *Circus cyaneus* [breeding]

Citation:

NPWS (2011) *Conservation objectives for Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA [004161]. Generic Version 4.0. Department of Arts, Heritage & the Gaeltacht.*

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning

Conservation Objectives for Slieve Mish Mountains SAC [002185]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [1421] *Trichomanes speciosum*
- ◆ [4010] Northern Atlantic wet heaths with *Erica tetralix*
- ◆ [4030] European dry heaths
- ◆ [4060] Alpine and Boreal heaths
- ◆ [8220] Siliceous rocky slopes with chasmophytic vegetation

Citation:

NPWS (2011) Conservation objectives for Slieve Mish Mountains SAC [002185]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning

Conservation Objectives for Ballyseedy Wood SAC [002112]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [91E0] * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

Citation:

NPWS (2011) Conservation objectives for Ballyseedy Wood SAC [002112]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning

Conservation Objectives for Tralee Bay and Magharees Peninsula, West to Cloghane SAC [002070]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [1130] Estuaries
- ◆ [1140] Mudflats and sandflats not covered by seawater at low tide
- ◆ [1150] * Coastal lagoons
- ◆ [1160] Large shallow inlets and bays
- ◆ [1170] Reefs
- ◆ [1210] Annual vegetation of drift lines
- ◆ [1220] Perennial vegetation of stony banks
- ◆ [1310] *Salicornia* and other annuals colonizing mud and sand
- ◆ [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritima*)
- ◆ [1355] *Lutra lutra*
- ◆ [1395] *Petalophyllum ralfsii*
- ◆ [1410] Mediterranean salt meadows (*Juncetalia maritimi*)
- ◆ [2120] Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")
- ◆ [2130] * Fixed coastal dunes with herbaceous vegetation ("grey dunes")

Citation:

NPWS (2011) Conservation objectives for Tralee Bay and Magharees Peninsula, West to Cloghane SAC [002070].
Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning

-
- ◆ [2170] Dunes with *Salix repens* ssp.*argentea* (*Salix arenariae*)
 - ◆ [2190] Humid dune slacks
 - ◆ [6410] *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
 - ◆ [91E0] * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

Citation:

NPWS (2011) Conservation objectives for Tralee Bay and Magharees Peninsula, West to Cloghane SAC [002070].
Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning

Conservation Objectives for Akeragh, Banna and Barrow Harbour SAC [000332]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [1210] Annual vegetation of drift lines
- ◆ [1310] *Salicornia* and other annuals colonizing mud and sand
- ◆ [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- ◆ [1410] Mediterranean salt meadows (*Juncetalia maritimi*)
- ◆ [2110] Embryonic shifting dunes
- ◆ [2120] Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")
- ◆ [2130] * Fixed coastal dunes with herbaceous vegetation ("grey dunes")
- ◆ [2190] Humid dune slacks
- ◆ [4030] European dry heaths

Citation:

NPWS (2011) *Conservation objectives for Akeragh, Banna and Barrow Harbour SAC [000332]. Generic Version 3.0.* Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning

Conservation Objectives for Tralee Bay Complex SPA [004188]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

♦ <i>Cygnus cygnus</i>	[wintering]
♦ <i>Branta bernicla hrota</i>	[wintering]
♦ <i>Tadorna tadorna</i>	[wintering]
♦ <i>Anas penelope</i>	[wintering]
♦ <i>Anas crecca</i>	[wintering]
♦ <i>Anas platyrhynchos</i>	[wintering]
♦ <i>Anas acuta</i>	[wintering]
♦ <i>Aythya marila</i>	[wintering]
♦ <i>Haematopus ostralegus</i>	[wintering]
♦ <i>Charadrius hiaticula</i>	[wintering]
♦ <i>Pluvialis apricaria</i>	[wintering]
♦ <i>Pluvialis squatarola</i>	[wintering]
♦ <i>Vanellus vanellus</i>	[wintering]
♦ <i>Calidris alba</i>	[wintering]
♦ <i>Calidris alpina</i>	[wintering]

Citation:

NPWS (2011) Conservation objectives for Tralee Bay Complex SPA [004188]. Generic Version 4.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning



♦ <i>Limosa limosa</i>	[wintering]
♦ <i>Limosa lapponica</i>	[wintering]
♦ <i>Numenius arquata</i>	[wintering]
♦ <i>Tringa totanus</i>	[wintering]
♦ <i>Arenaria interpres</i>	[wintering]
♦ <i>Chroicocephalus ridibundus</i>	[wintering]
♦ <i>Larus canus</i>	[wintering]
♦ Wetlands	[]

Citation:

NPWS (2011) Conservation objectives for Tralee Bay Complex SPA [004188]. Generic Version 4.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning

Appendix 3

Invasive Species Management



Best Practice Management Guidelines

Himalayan balsam

(*Impatiens glandulifera*)

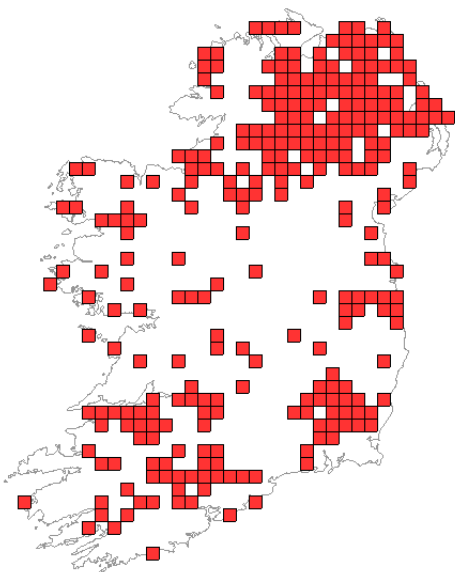


1. Aim of this advice

The aim of this plan is to provide best practice management guidance on the control of Himalayan balsam (*Impatiens glandulifera*) on the island of Ireland.

2. Introduction

Himalayan balsam is an attractive, non-native invasive terrestrial plant species. Since it was introduced, it has spread to most parts of Northern Ireland and the Republic of Ireland. The species is particularly frequent along the banks of watercourses, where it often forms continuous stands. It can also establish in damp woodland, flushes and mires. It is the tallest annual (species of plant that completes its life cycle in one year) in Ireland and due to its rapid growth, it shades out most of our native species. Individual plants reach 2m in height, have translucent fleshy stems, pink-purple slipper-shaped flowers and large oval pointed leaves with obvious teeth around their edges. Each tooth carries a small globular 'gland' and produces large numbers of flowers which are followed by 'seed pods' about 25mm long. When mature and dry, the fruits split open explosively if touched, flinging the seeds a considerable distance from the parent plant. Each plant produces about 2,500 seeds which fall to the ground, and with several parent plants close together, seeds can occur at a density of between 5000-6000 seeds per square metre. The seeds float, making watercourses a prime route for dispersal of the species. Seeds can also begin to germinate in water on their way to new sites.



Distribution of Himalayan balsam in Ireland. Source of data: National Biodiversity Network; accessed 07 April 2008.





3. Impacts

The risk assessment carried out by the Invasive Species in Ireland project identified Himalayan balsam as one of the highest risk (most unwanted) non-native invasive species in Ireland. This is largely due to its impact on native waterside vegetation within designated sites. Since the species is rapidly expanding its range, a major concern is Himalayan balsam will dominate waterside vegetation and damp ground, at the expense of native species across Ireland.

There appears to be no direct detrimental impact on animal life. However, recent research suggests it competes for pollinators such as bumblebees with the native riverbank species, and so reduces seed set in these other plants.

In the autumn, the plants die back, leaving the banks bare of vegetation and vulnerable to erosion leading to knock on effects such as increased siltation of fish spawning grounds.

4. Legal status - Northern Ireland

Himalayan balsam will be listed on the revised Schedule 9 of the Wildlife (Northern Ireland) Order 1985 and therefore it will be an offence to plant or cause it to grow in the wild, upon its inclusion.

5. Legal status - Republic of Ireland

At present, there are no specific legislative provisions that directly govern Himalayan balsam control or removal in the Republic of Ireland. However, the Wildlife (Amendment) Act 2000 states that anyone who plants or otherwise causes to grow in a wild state in any place in the State any species of (exotic) flora, or the flowers, roots, seeds or spores of (exotic) flora shall be guilty of an offence.

6. Managing Himalayan balsam

To reduce costs and additional effort it is important to prevent Himalayan balsam from spreading around a site contaminating unaffected areas. This is best achieved by:

- Production of a detailed Himalayan balsam management plan.
- Ensuring that all relevant staff are briefed and aware of Himalayan balsam issues, the management plan and their responsibilities.

For sites that do not have Himalayan balsam present, efforts should be put in place to prevent the species arrival. The most common ways a site can become infected are:

- Importation of infected soil.
- Contamination on vehicles and equipment.
- Colonisation from upstream or adjacent areas.
- Illegal dumping of contaminated soil.

7. Encouraging native species

Himalayan balsam is known to reduce native plant diversity with some figures estimated a loss of about a third. This effect can be detected at both small and riverbank scales. It is possible to successfully control or eradicate Himalayan balsam from infested sites. However, while removal of Himalayan balsam increases plant diversity, the species that respond most dramatically are other non-native plants. It is recommended that efforts are made to enhance native species, as part of a control programme.

8. Himalayan balsam on adjacent sites

It is particularly important to consider Himalayan balsam in the wider environment around a particular site. If this species is growing in an adjacent site, or upstream of a site on a riverbank, then no matter how good on-site control is, recolonisation is likely. An understanding of the wider area is necessary to determine if eradication or control efforts are likely to be successful. In some situations, eradication of all Himalayan balsam on site might not be possible due to the likelihood of re-colonisation. Work in partnership with neighbouring landowners to tackle Himalayan balsam.

For all sites, the following steps may be useful to ensure success and prevent spread:

1. Find out how much Himalayan balsam there is on the property and map it.
2. Ensure that everyone working on the site is aware of and adheres to good site hygiene such as:
 - Marking out of contaminated areas.
 - Ensuring that vehicles with caterpillar tracks do not work within contaminated areas.
 - Treating contaminated soils carefully.
 - Limit use of tracked machinery at infested sites.
 - Cleaning machinery or equipment that could be contaminated.
3. Attempt to establish the length of time Himalayan balsam has been on site. Long-standing infestations over many years will have larger seed banks.
4. Write a Management Plan to guide your work and make sure all staff working in the area are aware of it and the impacts of Himalayan balsam.
5. Follow-up control work will be necessary to ensure that any regrowth and seedlings are not missed.



9. Control options

9.1. Mechanical/physical control

Mechanical control, by repeated cutting or mowing, is effective for large stands, but plants can regrow if the lower parts are left intact. The plant must be cut below the lowest node to stop regeneration. Access to the sides of riverbanks can be difficult and inaccessible stands can quickly recolonise accessible cleared areas, so vigilance is needed if an area is to be effectively cleared. Regular grazing also suppresses this species.

Small infestations (most common in gardens) can easily be controlled by hand-pulling as the species is shallow rooted. Padded gloves should be worn to avoid risk of injury to hands. Seeds are not very robust and only survive for up to 18 months so a two year control programmes can be successful in eradicating this plant if there is not further infestation from upstream or adjacent sites.

To avoid additional spread do not disturb plants if seeds pods are visible (usually sometime after May). Programmes should be undertaken in April or early May. If hand pulling after this time, bag plant tops to prevent seed spread.

9.2. Chemical control

Himalayan balsam can be controlled by spraying the foliage with glyphosate. The plants should be sprayed in the spring before flowering but late enough to ensure that germinating seedlings have grown up sufficiently to be adequately covered by the spray. Glyphosate is sold under a number of brand names. Small infestations and individual plants can be controlled by using glyphosate in a weed wiper. This has the advantage of preserving native plants and grasses which would otherwise be killed by the glyphosate. The herbicide 2,4-D amine controls many broadleaved annual weeds and may also be used to control this species but is not recommended for use near waterbodies. This selective herbicide will not kill grasses. It may be preferable to glyphosate in situations where the weed has not reduced complete cover of the grasses. A long-lance sprayer may assist in the spraying of less accessible areas out of the reach of conventional knapsack sprayers.

Always follow health and safety procedures outlined by the herbicide manufacturer and take appropriate precautions when working near water.

10. Himalayan balsam Management Plan Template

Use this template to help formulate your own management plan outlining how you are going to proceed and what you will need.

Site Name: _____

Site Manager/Owner: _____

Site details

Address:			
Telephone:			
Email:			
Agencies/persons involved:			
Date:			
Date of introduction:			
Total site area:			
Total area colonised:			
Previous site management:			
Designation	On site	Near site	None present
Details:			
Establish if there is a requirement to apply for a license/notify before proceeding with plan.			

Actions and resources

Management options	Responsibility	Date to undertake
Resources needed	Responsibility	Date to undertake

Monitoring and evaluation

Name of person/s	Date to undertake	Report to	Additional treatments date (if required)

11. Summary of actions needed for effective management

1. Confirm Himalayan balsam identification.
2. Carry out a survey and produce a distribution map indicating the location across the site. Including rivers/streams is important.
3. Consider surrounding properties and potential for reintroduction. Talk to adjacent land owners and make them aware of the issues and what you plan to do, if possible work in partnership. Identify potential contamination routes to your site and mitigate against these. You may be unable to prevent reintroduction from upstream without the help of other landowners.
4. Decide should the programme aim for continuous control on a yearly basis or eradication from the site. Base your decision on an understanding of the biology, size of infestation, potential for reintroduction and other relevant sensitivities in the area.
5. Consider if you can successfully and safely carry out the work or if professional practitioners, with relevant training and certificates should undertake the work. Remember relevant health and safety legislation and procedures when working near water.
6. Identify if sufficient resources are/will be available to complete the work within the planned timescale. If work will take more than 1 year to complete, ensure you have sufficient funds to complete the work.
7. Ensure disposal options for the plant material are in place prior to work commencing.
8. Develop and produce a site specific control/management plan. Use the template provided in this document to guide you.
9. Monitor for regrowth and/or reintroduction during site visits. If applicable, ensure new members of staff are aware of your Himalayan balsam plan and report sightings.

12. Himalayan balsam treatment times

Mechanical control	J	F	M	A	M	J	J	A	S	O	N	D
Glyphosate	J	F	M	A	M	J	J	A	S	O	N	D

- Optimum treatment time.
■ Suboptimum treatment time but can be effective. Refer to text for details.

Please consider sharing your experience of a management plan with others. The Invasive Species in Ireland website will feature case studies to help guide others undertaking similar work.

The Invasive Species Ireland Project is undertaken, in partnership, by
EnviroCentre and Quercus.



www.envirocentre.co.uk



www.quercus.ac.uk

and is funded by the National Parks and Wildlife Service and the Northern
Ireland Environment Agency.



www.ni-environment.gov.uk



www.npws.ie

For more information on the Invasive Species Ireland Project please see the
website at www.invasivespeciesireland.com



Best Practice Management Guidelines

Note: This guidance document is currently undergoing review.
An updated version will be made available shortly.

Japanese knotweed

Fallopia japonica



1. Aim of this advice

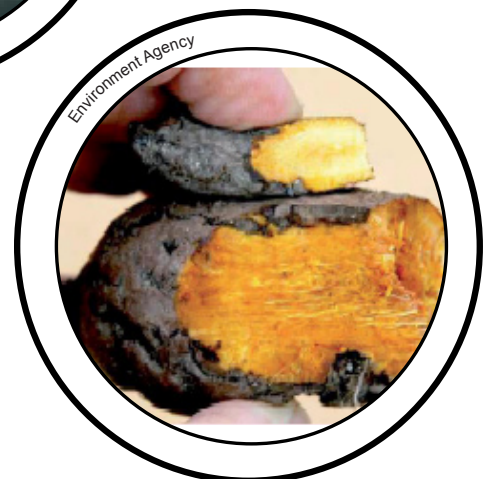
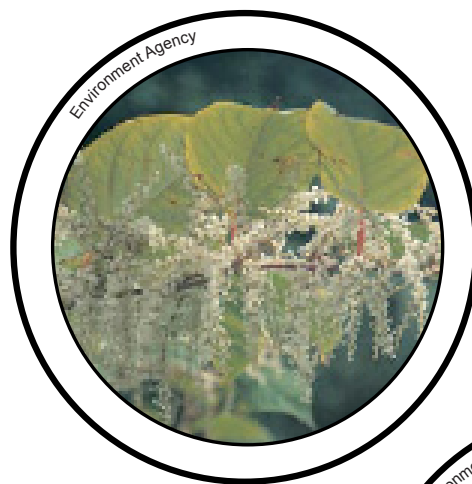
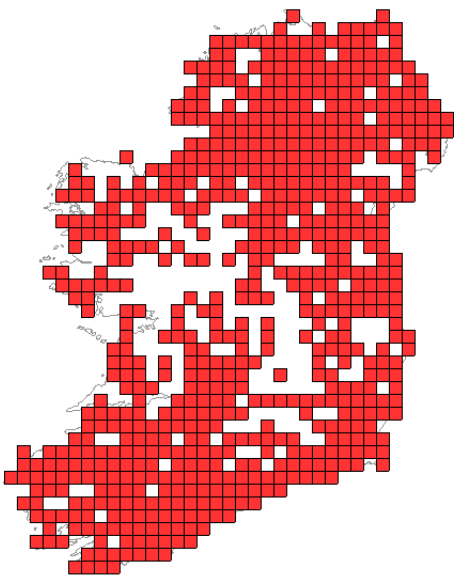
This document provides best practice management guidance on the control of Japanese knotweed (*Fallopia japonica*) on the island of Ireland.

2. Introduction

Japanese knotweed is a non-native invasive perennial (plant that lives more than one year) species in Ireland. Since it was introduced as an ornamental plant in the 19th Century from Japan it has spread across the UK and Ireland, particularly along watercourses, transport routes and infested waste areas.

It is rhizomatous (produces underground stems) with distinctive branched hollow, bamboo-like canes that can grow to over 3m in height. Red/purple shoots appear early in spring but as the canes grow, the leaves unfurl and the plant turns green. The mature canes are hollow and have a characteristic pattern of purple speckles. Flowering occurs in late summer/autumn and consists of creamy white flowers.

The underground rhizomes are thick and woody with a knotty appearance and when broken reveal a bright orange-coloured centre. During the winter the leaves die back and reveal orange/brown woody erect stems. Only female Japanese knotweed plants have been recorded to date in Ireland and although seeds are produced, they are hybrids and rarely survive. The principal means of spread is through the deliberate or accidental movement of rhizome fragments or cut stems.



Distribution of Japanese knotweed in Ireland. Source of data: National Biodiversity Network; accessed 07 April 2008.



3. Impacts

Japanese knotweed has vigorously invaded natural habitats and out competes native plants. Japanese knotweed forms tall thickets that exclude all other vegetation, shading the area below. Native plants can rarely compete with this invasive species and local plant biodiversity is reduced. Rivers, hedgerows, roadsides and railways form important wildlife corridors for native plants and animals to migrate and disperse along, and large infestations of Japanese knotweed can block these routes for wildlife.

Japanese knotweed can also seriously damage buildings, hard surfaces and infrastructure. Once established underneath or around the built environment, it can be particularly hard to control, growing through concrete and tarmac and other hardstandings. When Japanese knotweed colonises riverbanks, it can damage flood defence structures and reduce the capacity of channels to carry flood water.

The Global Invasive Species Programme categorises Japanese knotweed as one of the worlds 100 worst invasive alien species. In light of the economic and environmental damage associated with this species, the risk assessment process undertaken as part of the Invasive Species Ireland project identified Japanese knotweed as one of the highest risk (most unwanted) non-native invasive species in Ireland.

4. Legal status - Northern Ireland

Japanese knotweed is listed on Schedule 9 of the Wildlife (Northern Ireland) Order 1985 and it is therefore an offence to plant or cause it to grow in the wild. The current Northern Ireland Environment Agency policy on disposal of Japanese knotweed material and contaminated soils follows the Environment Agency guidelines and thereby places a duty of care on all waste producers to ensure Japanese knotweed is disposed of at a licensed landfill site and the site operator is notified. There is also a duty of care to prevent spread to adjacent land or by failing to dispose of Japanese knotweed by following the correct guidelines. Remember that not all licensed landfill sites will receive Japanese knotweed waste. Contact your local authority for information on where these sites are located.

5. Legal status - Republic of Ireland

At present, there are no specific legislative provisions that directly govern Japanese knotweed control or removal in the Republic of Ireland. However, the Wildlife (Amendment) Act 2000 states that anyone who plants or otherwise causes to grow in a wild state in any place in the State any species of (exotic) flora, or the flowers, roots, seeds or spores of (exotic) flora shall be guilty of an offence.



6. Managing Japanese knotweed on site

To reduce costs and additional effort it is important to prevent Japanese knotweed from spreading around a site contaminating unaffected areas. This is best achieved by:

- Production of a detailed Japanese knotweed management plan.
- Ensuring that all relevant staff are briefed and aware of Japanese knotweed issues, the management plan and their responsibilities.

For sites that do not have Japanese knotweed present, efforts should be put in place to prevent the species establishing. The four most common ways a site can become infected are:

- Importing infected soil.
- Contamination on vehicles and equipment.
- Colonisation from upstream areas washing Japanese knotweed material downstream.
- Illegal dumping.

7. Control and eradication

Currently there are three means by which Japanese knotweed can be eradicated from sites. These are:

- Long-term treatment with herbicides.
- Excavation and disposal at a licensed landfill site.
- Excavation, deep burial and/or bunding on site prior to treatment with herbicide.

Due to site specific variations in soil type, topography, adjacent sensitivities and degree of Japanese knotweed infestation, combinations of various control methods should be used. It is important that Japanese knotweed is controlled as soon as possible. These methods are generally expensive with costs increasing as the infestation size and duration increases.

8. Japanese knotweed on adjacent sites

It is particularly important to consider Japanese knotweed in the wider environment around a particular site. If Japanese knotweed is growing on an adjacent site, or upstream of a site on a riverbank, then no matter how good on-site Japanese knotweed control is, Japanese knotweed may recolonise recently cleared sites. Thus, an understanding of the wider context is necessary to determine if eradication or control efforts are likely to be successful. In some situations, treatment of all Japanese knotweed on site might not be appropriate due to the likelihood of re-colonisation, but infested areas within a construction footprint must be dealt with appropriately. Work in partnership with neighbouring landowners to tackle Japanese knotweed.

For all sites, the following six steps may be useful to ensure success and prevent spread:

1. Find out how much Japanese knotweed there is on the property and map it. Include at least 7m radius from stands to allow for below ground growth.
2. Ensure that everyone working on the site is aware of and adheres to good site hygiene, such as:
 - Marking out of contaminated areas.
 - Ensuring that vehicles with caterpillar tracks do not work within contaminated areas.
 - Treating contaminated soils carefully.
3. Attempt to establish the length of time Japanese knotweed has been on site. Long-standing infestations with many years worth of rhizome growth are much more difficult to control or eradicate.
4. Write a Management Plan to guide your work and make sure all staff working in the area are aware of it and Japanese knotweed. Include timeframes for planned clearance and repeated treatments.
5. Follow-up work will be necessary to ensure that any small plants and seedlings have not been missed.



9. Treatments options

9.1. Above ground removal

Cutting Japanese knotweed canes/stems will not successfully remove or reduce this species and cutting may result in material being spread elsewhere.

9.2. Below ground removal

Often it is not possible to estimate the size of large infestations until they are excavated. Research has found that Japanese knotweed can extend over 7m below ground. It is recommended to dig test pits and examine for the presence and the extent of rhizomes while digging out the parent stand. Excavations should also be to 3m below the surface if removing Japanese knotweed from a site. Wherever possible, the amount of Japanese knotweed excavated should be kept to a minimum and focus should be directed to treating the Japanese knotweed in its original location.

9.3. Herbicide application

If the area of Japanese knotweed is very small, it is possible to spray the leaves and canes with glyphosate. When spraying herbicides, always follow the manufacturers guidelines and consider if the herbicide is safe for the intended use of the site following treatment and the sites location. It is recommended that herbicide treatment is carried out by an experienced, competent and qualified operator. Several different herbicides with the following active ingredients can be used to kill Japanese knotweed: glyphosate, triclopyr, picloram and 2,4-D amine.

The majority of herbicides are not effective during the winter as the active ingredient needs to be taken up by live material. Advice on which methods are best or preferred under different circumstances can be provided by a range of qualified organisations that provide Japanese knotweed treatment advice and services. It should be noted that herbicide treatment is usually the most cost-effective method, however, it can take a long time to achieve acceptable control.

9.4. On-site disposal

If you intend to bury the dead Japanese knotweed material or dispose of it off-site, you should only use glyphosate formulations. Other persistent herbicides will not be allowed for burial under various waste regulations. Again, it is recommended that advice is taken from an expert that specialises in Japanese knotweed treatment and disposal before undertaking a spraying programme.

Burial must be to a depth of at least 5m. This can involve large scale engineering operations and large holes within a site. Various root barrier membranes are available which can prevent Japanese knotweed penetrating. These membranes need to be specially laid under expert supervision in order to be effective, protecting the surrounding soil.

A bund is a shallow area of Japanese knotweed contaminated soil, typically 0.5m deep. This method is used where conditions do not allow for burial and is usually only suitable for large sites as even small infestations, with limited above ground growth, can be very big. The bund method is used when it is not possible to treat Japanese knotweed in the area where it was originally located by moving it to an area that is not used. Bunds should be located at least 10 m away from site boundaries to prevent spread. The bund can be raised, on top of the ground or placed within an excavation. The material within the bund is treated as often as is necessary to prevent growth and spread. Bunds should use a root barrier membrane if being constructed in an area free of Japanese knotweed.

9.5. Off-site disposal

If Japanese knotweed cannot be dealt with effectively on site, it must be disposed of at a suitably licensed waste management site. The licensed waste manager must be informed that the material is Japanese knotweed. Disposal at licensed facilities can be very expensive and should be considered as a last resort. Great care must be taken when transferring contaminated material. Remember, it is an offence to cause Japanese knotweed to grow in the wild on the island of Ireland.

10. Japanese knotweed Management Plan Template

Use this template to help formulate your own management plan outlining how you are going to proceed and what you will need.

Site Name: _____

Site Manager/Owner: _____

Site details

Address:			
Telephone:			
Email:			
Agencies/persons involved:			
Date:			
Date of introduction:			
Total site area:			
Total area colonised:			
Previous site management:			
Designation	On site	Near site	None present
Details: Establish if there is a requirement to apply for a license/notify before proceeding with plan.			

Actions and resources

Management options	Responsibility	Date to undertake
Resources needed	Responsibility	Date to undertake

Monitoring and evaluation

Name of person/s	Date to undertake	Report to	Additional treatments date (if required)



11. Summary of actions needed for effective management

1. Confirm Japanese knotweed identification.
2. Carry out a survey and produce a distribution map of Japanese knotweed on the site. Include a 7 m radius away from the above ground growth in maps to help identify areas with potential rhizome growth.
3. Consider surrounding properties and potential for reintroduction. Talk to adjacent land owners and make them aware of the issues and what you plan to do. Identify potential contamination routes to your site and mitigate against these. You may be unable to prevent reintroduction from upstream without the help of other landowners.
4. Decide should the programme aim for continuous control on a yearly basis or eradication from the site. Base your decision on an understanding of the biology, size of infestation, potential for reintroduction and other relevant sensitivities in the area.
5. Consider if you can successfully and safely carry out the work or if professional practitioners, with relevant training and certificates should undertake the work. Remember relevant health and safety legislation and procedures when working near water and on construction sites.
6. Identify if sufficient resources are/will be available to complete the work within the planned timescale. It can take up to 3 years of herbicide treatment with monitoring and follow up control for up to 5 years so ensure you have sufficient funds to complete the work.
7. Ensure disposal options for plant material and contaminated soil are in place prior to work commencing.
8. Develop and produce a site specific control/management plan. Use the template provided in this document to guide you.
9. Monitor for regrowth and/or reintroduction during site visits. If applicable, ensure new members of staff are aware of your Japanese knotweed plan and report sightings.

12. Summary of Japanese knotweed growing season

Japanese growing season	J	F	M	A	M	J	J	A	S	O	N	D
Appearance of shoots												
Summer growth period												
Onset of flowering												
Winter dieback with canes visible												

13. Herbicide usage times

Glyphosate	J	F	M	A	M	J	J	A*	S*	O*	N	D
Tryclopyr	J	F	M	A	M*	J*	J*	A	S	O	N	D
2, 4 -D Amine	J	F	M	A	M*	J*	J*	A	S	O	N	D
Picloram	J	F	M	A	M	J	J	A	S	O	N	D

- Suitable for use
 * Preferred period of use

Please consider sharing your experience undertaking a management plan with others. The Invasive Species Ireland website will feature case studies to help guide others undertaking similar work.

The Invasive Species Ireland Project is undertaken, in partnership, by
EnviroCentre and Quercus.



www.envirocentre.co.uk



www.quercus.ac.uk

and is funded by the National Parks and Wildlife Service and the Northern
Ireland Environment Agency.



www.ni-environment.gov.uk



www.npws.ie

For more information on the Invasive Species Ireland project please see the
website at www.invasivespeciesireland.com

Appendix 4

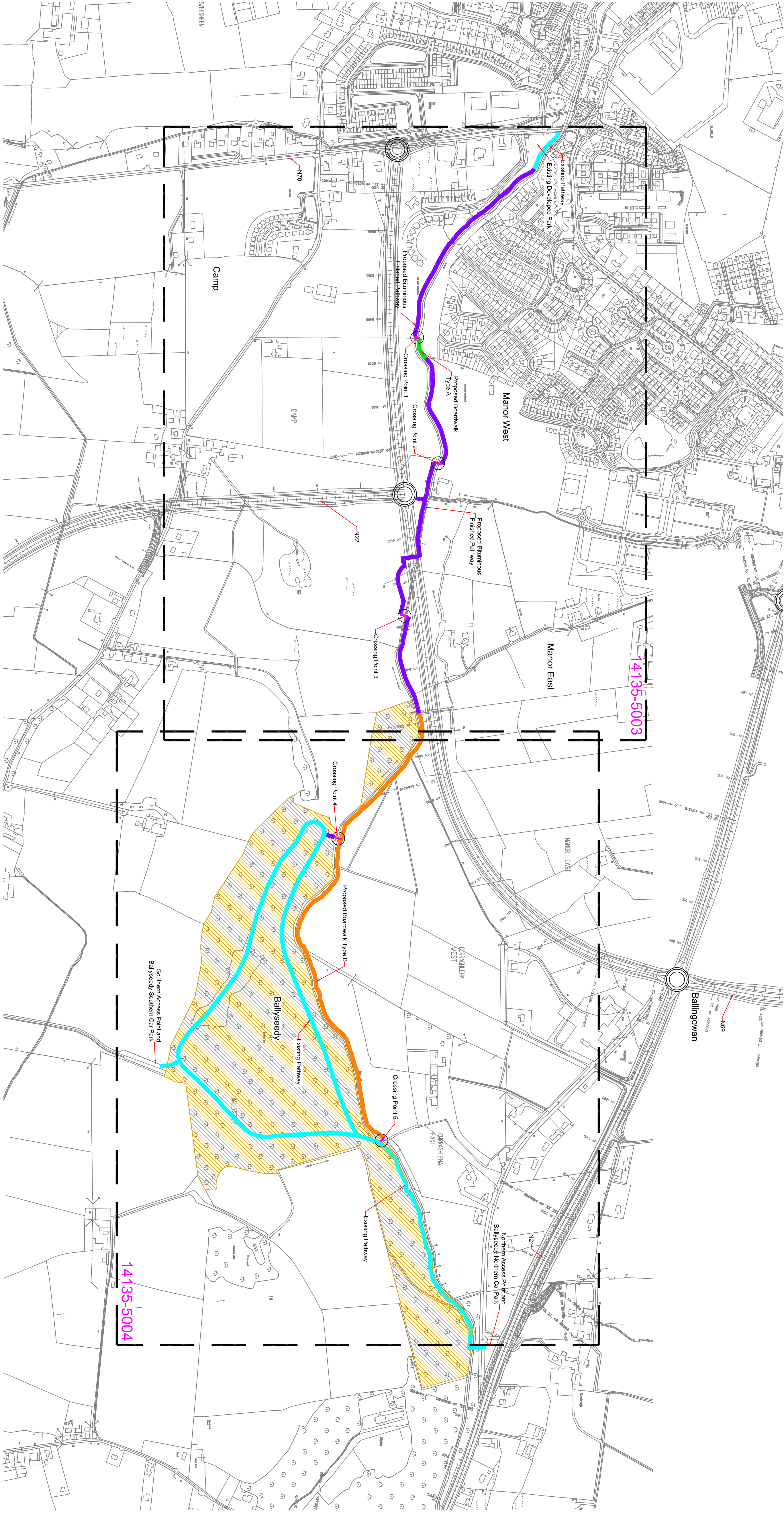
Drawings

Notes :

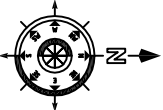
1. All drawings are to be read in conjunction with all relevant Specifications, Bills of Materials, Architectural Services and Engineering Drawings.
2. All dimensions are in millimetres, unless noted otherwise.
3. All levels are in metres related to Ordnance Datum.
4. Drawings are not to be scaled.

Legend :

- Existing Pathway
- Proposed Blumious Finished Pathway
- Proposed Boardwalk Type A
- Proposed Boardwalk Type B
- Proposed Crossing Point



Map Reproduced From Ordnance Survey Ireland
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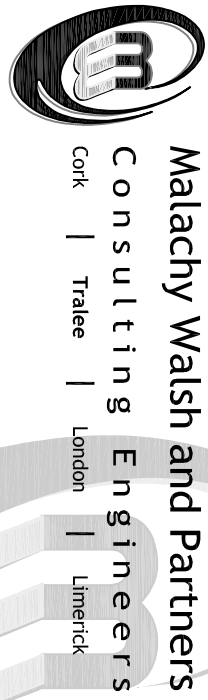


Rev.	Date	Description	by	chkd	app
A	15.10.2013	Issued For Planning	JK	KF	KF

Ballyseedy to Ballymillen Amenity Trail

Proposed Amenity Trail Layout - Master Sheet

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Scale	Drawn	Chkd	Appr'd	Rev. No.	Rev.
1:5000	JK	JK	JK	14135-5002	A