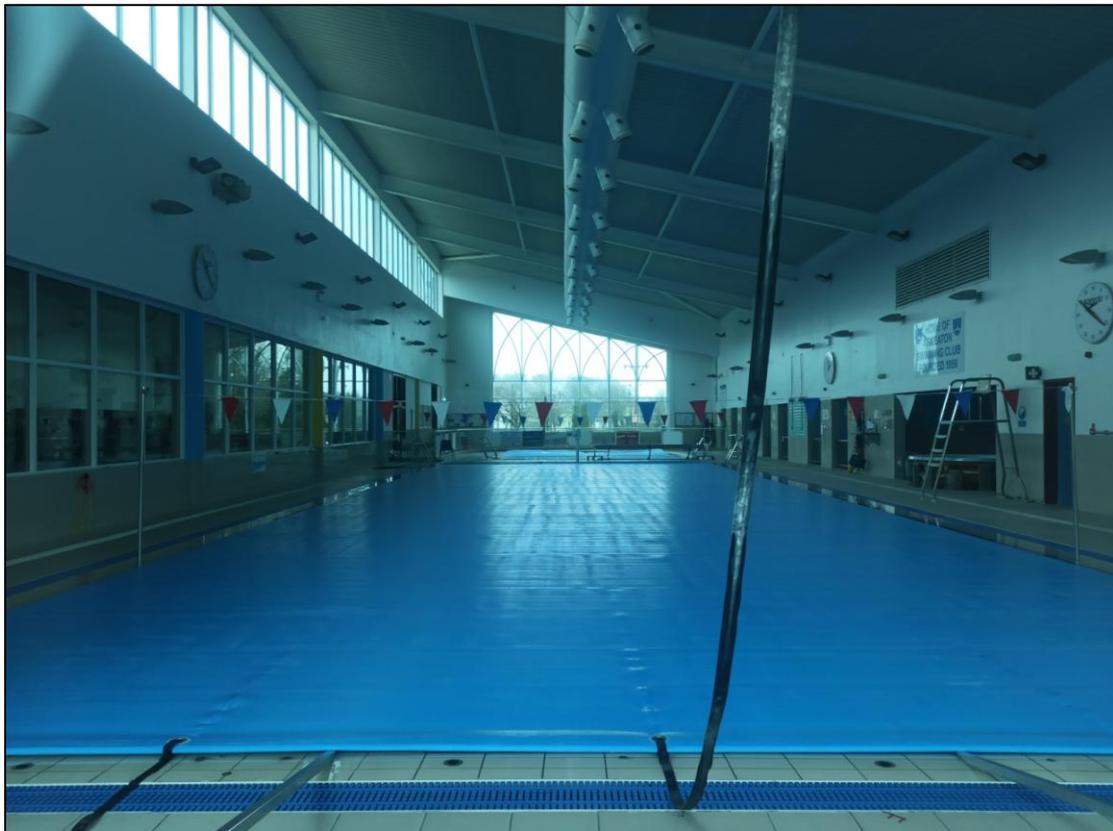


# Appropriate Assessment Screening for Flood Defence Project in Askeaton Swimming Pool, Co. Limerick

Prepared on behalf of Limerick County Council, by Rory Dalton, Independent Ecologist.



13.1.2021

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## 1. Executive Summary

The current report determines, through the Appropriate Assessment process, that the construction and operational phases of the works outlined in Section 3 of this document will not have a significant impact on any Natura 2000 Sites in the area. Five Natura 2000 Sites were considered: The River Shannon and River Fergus Estuaries SPA (004077), The Lower River Shannon SAC (002165), Barrigone SAC (000432), Askeaton Fen Complex SAC (0002279) and Curraghchase Woods SAC (000174).

Barrigone SAC and Curraghchase Woods SAC were not in the same sub-catchment as the proposed works, and as such were not hydrologically connected. The Askeaton Fen Complex SAC was found to be at a higher altitude than the works, and since the work does not involve large scale drainage, this SAC would not be impacted

The Deel, the main potential pathway for pollution to The River Shannon and River Fergus Estuaries SPA and The Lower River Shannon SAC, is only directly hydrologically connected to the works site during exceptionally high water levels. However, cementitious material during the works will be contained within the plant room and the shuttering of the bund until it cures, meaning that potential contaminants involved in the works are not hydrologically connected to the river and the protected areas downstream. During the operational phase, the works will afford additional protection from potentially dangerous materials becoming incident upon the river.

## 2. Introduction

Rory Dalton Ecology was appointed by Limerick County Council to undertake an Appropriate Assessment Screening for work to be completed within the grounds of Askeaton swimming pool. The work is designed to prevent flooding in parts of the building and its utilities when the Deel has burst its banks in the area.

This Appropriate Assessment Screening Report outlines the results of a Habitats Directive Stage 1 Screening Assessment for the proposed work. It has been undertaken in order to comply with the requirements of the Habitats Directive Article 6(3). The function of this Screening Statement is to provide information that will facilitate the competent authority in completing a Stage 1 Screening Assessment of the proposed project's potential to result in likely significant effects to the Conservation Objectives of Natura 2000 Sites either alone or in-combination with other plan or projects.

### 2.1. Appropriate Assessment Process

An Appropriate Assessment is undertaken to establish if any proposed plan or project is likely to have a significant effect or impact on any site that has been designated under: the E.U. Habitats Directive (92/43/EEC) i.e. SAC; or the E.U. Birds Directive (79/409/EEC as amended 2009/147/EC) i.e. SPA. Collectively, SAC's and SPA's are known as Natura 2000 sites. The need to undertake one or more stages of this process has arisen from Articles 6(3) and 6(4) of the aforementioned Habitats Directive; where the former Article is primarily concerned with the protection of sites from likely significant effects and the latter allows derogation from such protection in very specific circumstances involving imperative reasons of overriding public interest.

Article 6(3) of the Habitats Directive requires that:

*“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.”*

And Article 6(4) of the Habitats Directive requires that:

*“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.”*

In Stage 1, a screening process is undertaken to identify likely significant effects on a Natura 2000 site are likely to arise from the project or plan in question. If significant effects are likely to occur or if it is unclear whether significant effects are likely to occur, then the process moves on to Stage 2 where an AA considers potential mitigation measures for adverse effects. If it is considered that mitigation measures will not be able to satisfactorily reduce potential adverse effects on a Natura 2000 site then an assessment of alternative solutions is considered in Stage 3. This is then followed by Stage 4 in the event that adverse effects remain and the proposed activity or development is deemed to be of Imperative Reasons of Overriding Public Interest (IROPI), allowing an assessment of compensatory measures to be considered. The outcome of a Stage 2 and higher assessment is presented in a report known as a Natura Impact Statement (NIS). While an AA NIS is provided by the advocate of the plan or project in question, the AA NIS itself is undertaken by the competent authority.

## 2.2. Methodology

Documents associated with the proposed project and relevant ecology databases were consulted as part of this assessment. Furthermore, the following guidelines were used in the completion of this assessment;

- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – European Commission Methodical Guidance on the provisions of Article 6(3) and 6(4) of the ‘Habitats’ Directive 92/43/EEC (European Commission 2001)
- Integrated Biodiversity Impact Assessment – Streamlining AA, SEA and EIA Processes: Practitioner’s Manual (EPA 2013)
- Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (DoEHLG 2009)
- European Commission (2018). Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC. Brussels, 21.11.2018 C(2018) 7621 final.

The Screening Stage of Appropriate Assessment is used to identify whether the Plan, either alone or in combination with other plans or projects, is likely to have a significant effect on a Natura 2000 site. This report follows European Commission (2001) guidance which recommends that screening should follow a four step process as outlined below:

1. : Determine whether the plan is directly connected with or necessary to the management of the site. If it is, then no further assessment is necessary.
2. : Describe the plan and other plans and projects that, ‘in combination’, have the potential to have significant effects on a European site.
3. : Identify the potential effects on the European site.
4. : Assess the significance of any effects on the European site.

### 3. Brief Description of the Site and Proposed works

The Askeaton Leisure center, located at The Green, Askeaton, Co.Limerick, on the banks of the River Deel is Limerick's only public pool and gym, owned by Limerick County Council and operated by Coral Leisure. Its facilities include a gym and pool and are offered alongside personal training services and various fitness classes.

The proposed works aim to protect the property during the river and coastal flooding which occurs periodically at the site. Firstly, it is proposed to raise the Plant Room floor internally from a level of 3.000m (AOD - above ordinance datum, or above sea level) to a level of 4.300m, on new waterproof concrete base, to provide an impermeable Plant Room area and to use stone ballast to achieve negative buoyancy. The doors will also be raised accordingly. There will be a raised steel access gantry added to the south west of the building in order to gain entry to door openings newly raised to 4.300m from 2.900m. Additionally, the proposed works aim to raise an external oil tank bund wall to 4.300m and thicken the floor to achieve negative buoyancy. The heat exchangers will also be raised to 4.300m. A service yard gate will be moved to facilitate new steps down to the service yard and a path on the north side will be raised locally from level 2.900m to 4.150m.

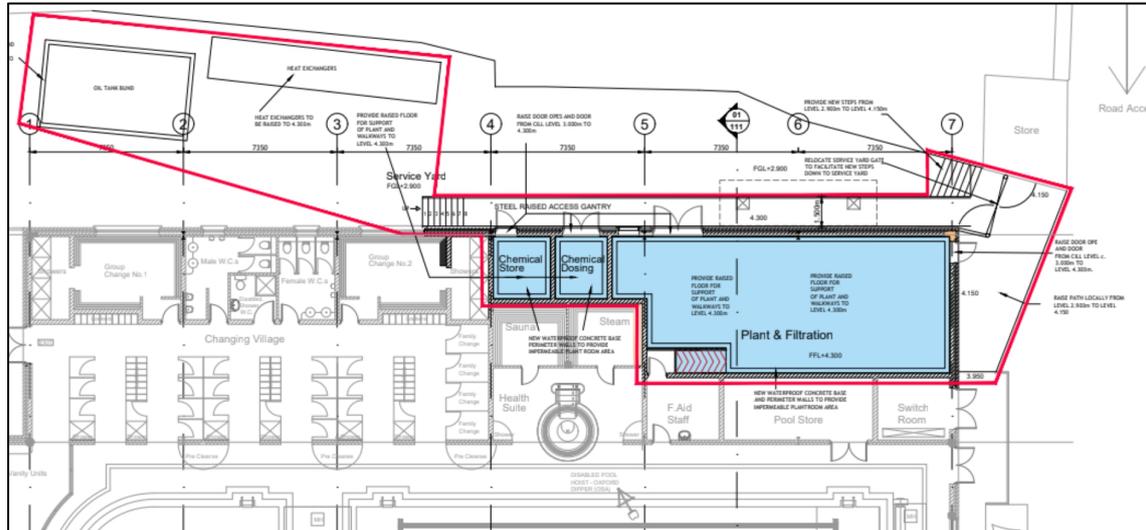


Figure 1: Plan of the proposed works

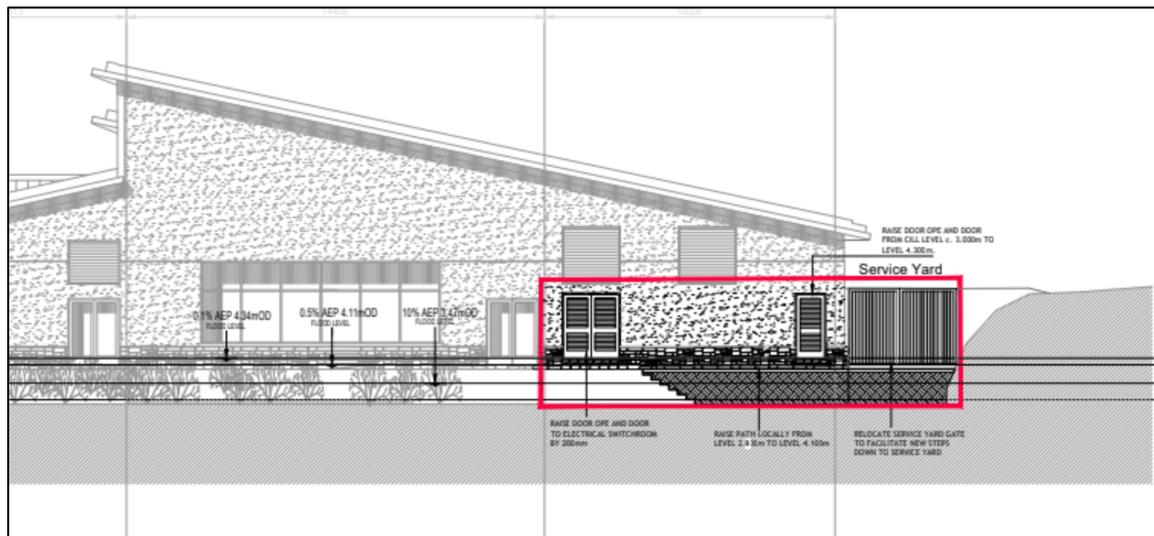


Figure 2: North-western end elevation of the proposed works



Figure 3: North-western end elevation of the proposed works as above

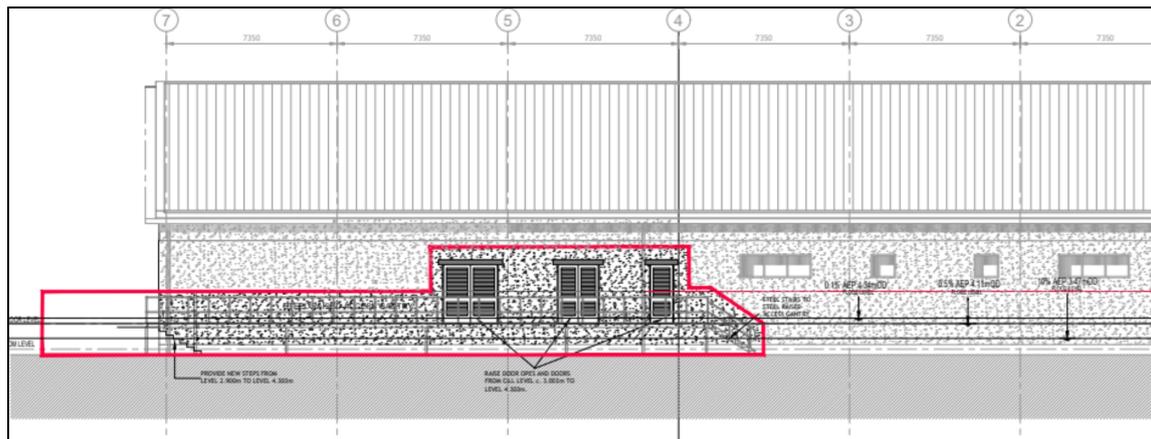


Figure 4: South-western end elevation of the proposed works



Figure 5: the door to the plant room; the cill (sill) of this is to be raised 1.3m.



Figure 6: This is the bunded oil tank, the bund is to be raised as part of the project.



Figure 7: The main building is above the floodplain as can be seen here



Figure 8: The proposed site outlined in red



Figure 9: The Site with respect to the River Deel

## **4. Natura 2000 Sites and the Potential for Negative Impacts**

### **4.1 Sources and Pathways of Pollution**

The River Deel is the main potential pathway for carrying pollution from the works site to the protected areas downstream. The proposed works site is directly hydrologically connected when the river is in exceptionally high flood, most likely due to a combination of fluvial and tidal inputs. The proposed site is not directly hydrologically connected to the river (and hence not connected to the protected areas downstream) during normal water levels, which constitute the vast majority of the time.

During the construction phase, cementitious material will be present onsite and will be mobile until it has cured. The cementitious material used to build up the floor of the “Plant Room” will be contained within the plant room itself. The sill of the door to the plant room will be raised from 3.000m AOD to 4.300m AOD before pouring the cementitious material, meaning that the plant room is isolated from the floodplain during the pouring of the concrete.

Currently, there is a large oil tank surrounded by a bund capable of containing the amount of oil that the tank contains. In its current state, the bund is liable to flood during exceptional conditions. It is proposed to build up the bund to 4.300m AOD by placing standard shutters to allow for the pouring of the concrete, and then striking the shutters off when the concrete has cured. In this manner the concrete for this is also isolated from the floodplain while it is curing.

As such, both the plant room, and the proposed bund extension are isolated from the floodplain while the cement is curing, and so they are not directly hydrologically connected to the river and the protected areas downstream.

Carrying out this work means that during the operational phase (post works) of this project, the plant room and oil bund will not flood, and so oil contained within the bund as well as chemicals that may be stored within the plant room will not become incident on the river, and as a result, will not reach the protected areas downstream. In this manner, the works reduce risks to the protected areas downstream.

In summary, the Deel, the main potential pathway is only directly hydrologically connected to the works site during exceptionally high water levels. However, cementitious material during the works will be contained within the plant room and the shuttering of the bund until it cures, meaning that the works are not hydrologically connected to the protected areas downstream. During the operational phase, the works will afford additional protection from potentially dangerous materials becoming incident upon the river.

## 4.2 The Natura 2000 sites to be included in this assessment

Natura Site	Reason for Inclusion in the current Screening	Distance From the Project Site
<b>River Shannon and River Fergus Estuaries SPA (004077)</b>	Proposed works within 15km of protected area	Proposed works would be, at the closest point, 220m from the site
<b>Lower River Shannon SAC (002165)</b>	Proposed works within 15km of protected area	Proposed works would be, at the closest point, 2.1 km from this site
<b>Barrigone SAC (000432)</b>	Proposed works within 15km of protected area	Proposed works would be, at the closest point, 3.7 km from this site
<b>Askeaton Fen Complex SAC (0002279)</b>	Proposed works within 15km of protected area	Proposed works would be, at the closest point, 3.7 km from the site
<b>Curraghchase Woods SAC (000174)</b>	Proposed works within 15km of protected area	Proposed works would be, at the closest point, 6 km from this site

### 4.3 Assessment of Potential Impacts to each Conservation Interest of each Natura 2000 Site

Natura Site	Distance From the Project Site	Conservation Interests	Assessment of Potential Impacts	Are Mitigations Required
<b>River Shannon and River Fergus Estuaries SPA (004077)</b>	Proposed works would be, at the closest point, 220m from the site	[A017]Cormorant ( <i>Phalacrocorax carbo</i> )	The Deel, which is the main potential pathway for pollution to the SPA, is only directly hydrologically connected to the works site during exceptionally high water levels. However, cementitious material during the works will be contained within the plant room and the shuttering of the bund until it cures, meaning that the works are not hydrologically connected to the SPA 200m downstream. During the operational phase, the works will afford additional protection from potentially dangerous materials becoming incident upon the river. Disturbance from machinery is not likely to be elevated greatly from the normal traffic of the town and its agricultural surroundings and work will most likely be carried out during daylight hours in line with normal building practice. The majority of the work is to be carried out within the plant room building. No suitable nesting, roosting or foraging habitat for these birds was found within or adjacent to the works area.  As such, these conservation interests will not be impacted by the proposal	No
		[A038]Whooper Swan ( <i>Cygnus cygnus</i> )		No
		[A046]Light-bellied Brent Goose ( <i>Branta bernicla hrota</i> )		No
		[A048]Shelduck ( <i>Tadorna tadorna</i> )		No
		[A050]Wigeon ( <i>Anas penelope</i> )		No
		[A052]Teal ( <i>Anas crecca</i> )		No
		[A054]Pintail ( <i>Anas acuta</i> )		No
		[A056]Shoveler ( <i>Anas clypeata</i> )		No
		[A062]Scaup ( <i>Aythya marila</i> )		No
		[A137]Ringed Plover ( <i>Charadrius hiaticula</i> )		No
		[A140]Golden Plover ( <i>Pluvialis apricaria</i> )		No
		[A141]Grey Plover ( <i>Pluvialis squatarola</i> )		No
		[A142]Lapwing ( <i>Vanellus vanellus</i> )		No
		[A143]Knot ( <i>Calidris canutus</i> )		No
		[A149]Dunlin ( <i>Calidris alpina</i> )		No
		[A156]Black-tailed Godwit ( <i>Limosa limosa</i> )		No
		[A157]Bar-tailed Godwit ( <i>Limosa lapponica</i> )		No
		[A160]Curlew ( <i>Numenius arquata</i> )		No
[A162]Redshank ( <i>Tringa totanus</i> )	No			
[A164]Greenshank ( <i>Tringa nebularia</i> )	No			
[A179]Black-headed Gull ( <i>Chroicocephalus ridibundus</i> )	No			
[A999]Wetland and Waterbirds	No			
<b>Lower River Shannon SAC (002165)</b>	Proposed works would be, at the closest point, 2.1 km from this site	[1110] Sandbanks	No significant negative impacts are envisaged for these habitats. These habitats do not exist within the footprint of the works. The closest possible hydrological connection to these habitats within the SAC is estimated at over 2km via The Deel River. At the mouth of the Deel	No
		[1130] Estuaries		No
		[1140] Tidal Mudflats and Sandflats		No
		[1150] Coastal Lagoons*		No
		[1160] Large Shallow Inlets and Bays		No

	[1170] Reefs	Estuary, within the SAC, "Estuaries" and "Tidal Mudflats and Sandflats" are present. The Deel would have to be experiencing an exceptionally large flood to be in direct hydrological connectivity to the works site - given the scale of the project and the rarity and dilution rates of such a flood event, it is safe to say these habitats won't be impacted.	No
	[1220] Perennial Vegetation of Stony Banks		No
	[1230] Vegetated Sea Cliffs		No
	[1310] Salicornia Mud		No
	[1330] Atlantic Salt Meadows		No
	[1410] Mediterranean Salt Meadows		No
	[6410] Molinia Meadows	This habitat does not exist within the site. This habitat is not known to occur downstream, however if this habitat does occur downstream, it will not be impacted by the works due to a combination of the nature of this habitat and the scale of the works.	No
	[3260] Floating River Vegetation	This habitat does not exist adjacent to or downstream of the site. The conservation objectives supporting document: " <i>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation (habitat code 3260)</i> " shows that the closest floating river vegetation community of note within the SAC is on the Mague, which is in a different catchment and theretofore not hydrologically connected	No
	[91E0] Alluvial Forests*	This habitat does not exist within the site. If this habitat does occur downstream, it will not be impacted by the works due to a combination of the nature of this habitat and the scale of the works.	No
	[1029] Freshwater Pearl Mussel ( <i>Margaritifera margaritifera</i> )	Freshwater Pearl Mussel are not known to occur in brackish water, which is the water chemistry present within the Deel adjacent to and downstream of the site. Furthermore, the Deel drains a limestone catchment, rendering it unsuitable for <i>Margaritifera margaritifera</i> .	No
	[1095] Sea Lamprey ( <i>Petromyzon marinus</i> )	The Deel is only directly hydrologically connected to the works site during exceptionally high water levels. However, cementitious material during the works will be contained within the plant room and the shuttering of the bund until it cures, meaning that the works are not hydrologically connected to the SPA 200m downstream. During the operational phase, the works will afford additional protection from potentially dangerous	No
	[1099] River Lamprey ( <i>Lampetra fluviatilis</i> )		No
	[1096] Brook Lamprey ( <i>Lampetra planeri</i> )		No
	[1106] Atlantic Salmon ( <i>Salmo salar</i> )		No
	[1349] Bottle-nosed Dolphin ( <i>Tursiops truncatus</i> )		No

			materials becoming incident upon the river. As such, these conservation interests will not be impacted by the proposal	
		[1355] Otter ( <i>Lutra lutra</i> )	An otter holt survey was carried out on 11.01.2021 and found no holts present on or near the site. Disturbance from machinery is not likely to be elevated greatly from the normal traffic of the town and its agricultural surroundings and work will most likely be carried out during daylight hours in line with normal building practice; otter tend to be a crepuscular creature operating mainly at dawn and dusk. No impacts are envisaged for this species	No
<b>Barrigone SAC (000432)</b>	Proposed works would be, at the closest point, 3.7 km from this site	[5130]Juniperus communis formations on heaths or calcareous grasslands	This SAC is in the Shanagolden Stream Subcatchment (Shanagolden[Stream]_SC_010), is elevated above the proposed site, and as such is not hydrologically connected with the proposal.	No
		[6210]Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)		No
		[8240]Limestone pavements		No
		[1065]Euphydryas aurinia (Marsh Fritillary)		No
<b>Askeaton Fen Complex SAC (0002279)</b>	Proposed works would be, at the closest point, 3.7 km from the site	[7210]Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>	The Fens within this fen complex range in altitude between 16m and 34m AOD (above ordinance datum), the works are between 2m and 4m AOD; as such this SAC will not be impacted by the works	No
		[7230]Alkaline fens		No
<b>Curraghchase Woods SAC (000174)</b>	Proposed works would be, at the closest point, 6 km from this site	[91E0]Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> )	This SAC is in the Greanagh Subcatchment (Greanagh_SC_010), is elevated above the proposed site, and as such is not hydrologically connected with the proposal	No
		[91J0]Taxus baccata woods of the British Isles		No
		[1016]Vertigo moulinsiana (Desmoulin's Whorl Snail)		No
		[1303] Rhinolophus hipposideros (Lesser Horseshoe Bat)	Disturbance will not be an issue for this species as the habitat needed for this species is absent from the works area.	No

#### **4.4 Cumulative Impacts**

As detailed in section 4.1 above, the particulars of the site ensure that silt, cementitious material, hydrocarbons etc are contained within the site. Since no surface water run-off and it's associated loading can reach any Natura 2000 site, it will not cause cumulative negative impacts.

The permeability of the site is to remain similar. What exists is a sealed ground in the form of a building and concrete yard, and the proposal seeks to build upon that without removing it. As such the cumulative problems associated with increasing the amount of hard stand within a catchment are not an issue here.

Conversely, the proposed works will constitute an improvement to the risks associated with having chemicals (hydrocarbons) stored inadequately within a floodplain, lowering the risk to the Natura 2000 Sites downstream.

#### **5. Conclusion**

It is concluded beyond reasonable scientific doubt that there are not likely to be significant effects from the proposed works on the European sites identified for consideration (or any other European site beyond 15km) either alone or in combination with other plans or projects. No effects on the European Sites listed below are predicted. Therefore, the following five European sites have been 'screened out' within the Stage 1 Appropriate Assessment Screening Report:

- 1) River Shannon and River Fergus Estuaries SPA (004077)
- 2) Lower River Shannon SAC (002165)
- 3) Barrigone SAC (000432)
- 4) Askeaton Fen Complex SAC (0002279)
- 5) Curraghchase Woods SAC (000174)

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NPWS (2014) Site Synopsis: Lower River Shannon SAC (002165) National Parks and Wildlife Services, Department of Arts, Heritage and the Gaeltacht

NPWS (2016) Site Synopsis: River Shannon and River Fergus Estuaries SPA (004077) National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2016) Site Synopsis: Barrigone SAC (000432) National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2016) Site Synopsis: Curraghchase Woods SAC (000174) National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

## 7. Synopsis of Relevant Sites

### 7.1 Askeaton Fen Complex SAC

Askeaton Fen Complex consists of a number of small fen areas to the east and southeast of Askeaton in Co. Limerick. This area has a number of undulating hills, some of which are quite steep, and is underlain by Lower Carboniferous Limestone. At the base of the hills a series of fens/reedbeds/loughs can be found, often in association with marl or peat deposits. At the south-east of Askeaton, both Cappagh and Ballymorisheen fens are surrounded by large cliff-like rocky limestone outcrops.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

[7210] Cladium Fens\*

[7230] Alkaline Fens

In Askeaton Fen Complex SAC a diversity of fen types are represented in a gradation from open water to drier seepage areas. One of the more important fen types, Cladium fen, which contains Great Fen-sedge (*Cladium mariscus*), occurs in various forms and is the most common fen type within the SAC. It is associated with wet conditions generally not >25 cm deep and can be found in mono-dominant stands growing on a marl base, such as at Feereagh and Mornane Loughs, and in the fen in the townland of Mornane. It can also be co-dominant with Common Reed (*Phragmites australis*) in slightly drier conditions, such as in Deegerty, Blind Lough and Dromlohan. It is also found in association with alkaline fen species such as Black Bog-rush (*Schoenus nigricans*) where it grows on a peaty substrate. Cladium fen is indicative of extremely base rich conditions. Typical species seen growing with the Great Fen-sedge include pondweeds (*Potamogeton* spp.), Marsh Horsetail (*Equisetum palustre*), Water Horsetail (*E. fluviatile*), Lesser Water-parsnip (*Berula erecta*), Lesser Marshwort (*Apium inundatum*), Bottle Sedge (*Carex rostrata*), particularly where marl is present, and Water Mint (*Mentha aquatica*). One such area of fen within the site is the only known location in Ireland for the water beetle *Hygrotus decoratus* and is also known to contain *Hydroporus scalesianus*, a rare water beetle indicative of undisturbed fens. At the edge of some of the Great Fen-sedge fens, particularly where improved grassland is not present, there is typically found a gradation to wet marsh, which in turn grades into wet grassland. These transition habitats add to the ecological diversity of the site.

Alkaline fen is characterised by the presence of Black Bog-rush in association with brown mosses and a small sedge community. The soil is permanently waterlogged but generally not flooded unless for a short period. Examples of this fen type are found at the edge of almost all the sites, but its extent is much less than the Great Fen-sedge fen type within the SAC. The fen in the townlands of Moig West and Graigues is a good example of alkaline fen. Species seen growing with Black Bog-rush include Purple Moor-grass (*Molinia caerulea*), Long-stalked Yellow-sedge (*Carex lepidocarpa*), Carnation Sedge (*C. panicea*), rushes (*Juncus* spp.) and an abundance of brown mosses, including *Campylium stellatum*, *Ctenidium molluscum*, *Calliergon cuspidatum* and *Bryum pseudotriquetrum*. This fen type also grades into marsh and wet grassland.

Scrub and woodland is present on high ground in some areas, such as Ballymorisheen, Blind Lough, Ballyvogue, Dromlohan and Lough Feereagh. Species include Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Ash (*Fraxinus excelsior*),

willow (*Salix* sp.), Downy Birch (*Betula pubescens*) and Hazel (*Corylus avellana*). This is a useful faunal habitat particularly as it is adjacent to reedbeds and fens.

A small area of limestone species-rich grassland is found to the north of Balinvirick fen. Species found which are typically associated with the habitat include the Earlypurple Orchid (*Orchis mascula*), Carline Thistle (*Carlina vulgaris*) and Mountain Everlasting (*Antennaria dioica*).

Snipe use the tall marsh vegetation at the edge of the fens. Birds of prey such as Sparrowhawk feed over the reedbeds and scrubland areas of the site. Land use in the area is quite intensive, with improved grassland extending down relatively steep slopes to the edge of the fens/loughs. New drainage or the deepening of existing drains poses a threat to the aquatic habitats at the site. In some instances, the fens appear to be drying out. This site is of conservation value because it supports two fen types, each of which exhibit many sub-types. Cladium fen is listed as an Annex I priority habitat under the E.U. Habitats Directive. These wetland habitats of fen, reedbeds, open water, marsh and wet grassland are also valuable in that they supply a refuge for fauna in an otherwise intensively managed countryside.

## **7.2 River Shannon and River Fergus Estuaries SPA**

The estuaries of the River Shannon and River Fergus form the largest estuarine complex in Ireland. The site comprises the entire estuarine habitat from Limerick City westwards as far as Doonaha in Co. Clare and Dooneen Point in Co. Kerry. The site has vast expanses of intertidal flats which contain a diverse macroinvertebrate community, e.g. *Macoma-Scrobicularia-Nereis*, which provides a rich food resource for the wintering birds. Salt marsh vegetation frequently fringes the mudflats and this provides important high tide roost areas for the wintering birds. Elsewhere in the site the shoreline comprises stony or shingle beaches. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Cormorant, Whooper Swan, Lightbellied Brent Goose, Shelduck, Wigeon, Teal, Pintail, Shoveler, Scaup, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Greenshank and Black-headed 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. The site is the most important coastal wetland site in the country and regularly supports in excess of 50,000 wintering waterfowl (57,133 - five year mean for the period 1995/96 to 1999/2000), a concentration easily of international importance. The site has internationally important populations of Light-bellied Brent Goose (494), Dunlin (15,131), Black-tailed Godwit (2,035) and Redshank (2,645). A further 17 species have populations of national importance, i.e. Cormorant (245), Whooper Swan (118), Shelduck (1,025), Wigeon (3,761), Teal (2,260), Pintail (62), Shoveler (107), Scaup (102), Ringed Plover (223), Golden Plover (5,664), Grey Plover (558), Lapwing (15,126), Knot (2,015), Bar-tailed Godwit (460), Curlew (2,396), Greenshank (61) and Black-headed Gull (2,681) - figures are five year mean peak counts for the period 1995/96 to 1999/2000. The site is among the most important in the country for several of these species, notably Dunlin (13 % of national total), Lapwing (6% of national total) and Redshank (9% of national total). The site also supports a nationally important breeding population of Cormorant (93 pairs in 2010). Other species that occur include Mute Swan (103), Mallard (441), Red-breasted Merganser (20), Great Crested Grebe

(50), Grey Heron (38), Oystercatcher (551), Turnstone (124) and Common Gull (445) - figures are five year mean peak counts for the period 1995/96 to 1999/2000. Apart from the wintering birds, large numbers of some species also pass through the site whilst on migration in spring and/or autumn. The River Shannon and River Fergus Estuaries SPA is an internationally important site that supports an assemblage of over 20,000 wintering waterbirds. It holds internationally important populations of four species, i.e. Light-bellied Brent Goose, Dunlin, Black-tailed Godwit and Redshank. In addition, there are 17 species that have wintering populations of national importance. The site also supports a nationally important breeding population of Cormorant. Of particular note is that three of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover and Bar-tailed Godwit. Parts of the River Shannon and River Fergus Estuaries SPA are Wildfowl Sanctuaries.

### **7.3 Lower River Shannon SAC (002165)**

This very large site stretches along the Shannon valley from Killaloe in Co. Clare 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. Rivers within the sub-catchment of the Feale include the Galey, Smearlagh, Oolagh, Allaughaun, Owveg, Clydagh, Caher, Breanagh and Glenacarne. 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 Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

- [1110] Sandbanks
- [1130] Estuaries
- [1140] Tidal Mudflats and Sandflats
- [1150] Coastal Lagoons\*
- [1160] Large Shallow Inlets and Bays
- [1170] Reefs
- [1220] Perennial Vegetation of Stony Banks
- [1230] Vegetated Sea Cliffs
- [1310] Salicornia Mud
- [1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [3260] Floating River Vegetation
- [6410] Molinia Meadows
- [91E0] Alluvial Forests\*
- [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)
- [1095] Sea Lamprey (*Petromyzon marinus*)
- [1096] Brook Lamprey (*Lampetra planeri*)

- [1099] River Lamprey (*Lampetra fluviatilis*)
- [1106] Atlantic Salmon (*Salmo salar*)
- [1349] Bottle-nosed Dolphin (*Tursiops truncatus*)
- [1355] Otter (*Lutra lutra*)

The Shannon and Fergus Rivers 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.

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 eelgrass (*Zostera* spp.) beds 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 *MacomaScrobicularia-Nereis* community.

In the transition zone between mudflats and saltmarsh, specialised colonisers of mud predominate. For example, 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 (*Leucjum 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 species Common Saltmarsh-grass (*P. maritima*) and Hard-grass (*Parapholis strigosa*).

Saltmarsh vegetation also occurs around a number of lagoons within the site, two of which have been surveyed as part of a National Inventory of Lagoons. 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* subsp. *maritima*), Sea Campion (*Silene vulgaris* subsp. *maritima*), Thrift and plantains (*Plantago* spp.). A rare endemic type of sealavender, *Limonium recurvum* subsp. *pseudotranswallianum*, 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 Common 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.

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 the Purple Sea Urchin *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 18 m. 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 stony beaches and bedrock shores (these support a typical zonation of seaweeds such as *Fucus* spp., *Ascophyllum nodosum* and kelps), shingle beaches (with 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 (e.g. in the area from Kerry Head to Beal Head) and sand dunes (a small area occurs at Beal Point, where Marram – *Ammophila arenaria* is the dominant species).

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 is broad, generally slow flowing and naturally eutrophic; the Fergus is 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, but improved grassland is the most common habitat type. 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 (*Juncus* spp.) and sedges (*Carex* spp.), and supporting a diverse and species-rich vegetation, including such uncommon species as Blue-eyed Grass (*Sisyrinchium bermudiana*) and Pale Sedge (*C. 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 Co. 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 50 m 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 Rusty Willow (*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 river side of the woodland. On slightly higher ground above the wet woodland and on the raised embankment remnants of mixed oak-ashalder 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 Pedunculate Oak (*Quercus robur*), elm (*Ulmus glabra* and *U. procera*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and the shrubs Guelder-rose (*Viburnum opulus*) and willows. The ground flora is speciesrich.

While woodland is infrequent within the site, however Cahiracon Wood contains a strip of old oak woodland. Sessile Oak (*Q. 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 2 km 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 features prominent Great wood-rush and Bilberry (*Vaccinium myrtillus*), along with a typical range of woodland herbs. Bracken (*Pteridium aquilinum*) is a feature in areas where there is more light available.

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 approximately 5 km north-west of Cappamore in Co. Limerick. The bog contains some wet areas with good cover of bog mosses (*Sphagnum* spp.). Species of particular interest include Cranberry (*Vaccinium oxycoccos*) and White Sedge (*Carex curta*), along with two regionally rare mosses, including the bog moss *S. fimbriatum*. The site is being invaded by Downy Birch (*Betula pubescens*) scrub woodland. Both commercial forestry and the spread of Rhododendron (*Rhododendron ponticum*) has greatly reduced the overall value of the site.

A number of plant species that are listed in the Irish Red Data Book occur within the site, and several of these are protected under the Flora (Protection) Order, 1999. These include Triangular Club-rush (*Scirpus triquetrus*), a species which is only found in Ireland only in the Shannon Estuary, where it borders creeks in the inner estuary. Opposite-leaved Pondweed (*Groenlandia densa*) is found in the Shannon where it

passes through Limerick City, while Meadow Barley (*Hordeum secalinum*) is abundant in saltmarshes at Ringmoylan and Mantlehill. Hairy Violet (*Viola hirta*) occurs in the Askeaton/Foynes area. Golden Dock (*Rumex maritimus*) is noted as occurring in the River Fergus estuary. Finally, Bearded Stonewort (*Chara canescens*), a brackish water specialist, and Convergent Stonewort (*Chara connivens*) are both found in Shannon Airport Lagoon.

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 Bartailed Godwit (476; 1995/96). In the past, three separate flocks of Greenland Whitefronted 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 (1,062; 1995/96), Curlew (1,504; 1995/96), Redshank (3,228; 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 (4,010 individuals at Loop Head, 1987).

There is a resident population of Bottle-nosed Dolphin in the Shannon Estuary. This is the only known resident population of this E.U. Habitats Directive Annex II species in Ireland. The population is estimated (in 2006) to be  $140 \pm 12$  individuals. 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 species 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 land uses 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 where it reflects the sewage load from Limerick City. Analyses for trace metals suggest a relatively clean estuary with no influences of 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 habitats lagoon and alluvial woodland, 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.

## 7.4 Barrigone SAC (000432)

Barrigone is situated approximately 5 km west of Askeaton, Co. Limerick. The site comprises an area of dry, species-rich, calcareous grassland and patches of scrub on a gentle, north-east-facing slope. The underlying limestone outcrops occasionally, and the proximity of the site to the Shannon Estuary adds a maritime influence. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

- [5130] Juniper Scrub
- [6210] Orchid-rich Calcareous Grassland\*
- [8240] Limestone Pavement\*
- [1065] Marsh Fritillary (*Euphydryas aurinia*)

The open calcareous grassland supports an impressive range of plant species. Cowslip (*Primula veris*), Mountain Everlasting (*Antennaria dioica*), Carline Thistle (*Carlina vulgaris*), Wild Thyme (*Thymus praecox*), Wood Sage (*Teucrium scorodonia*) and Violets (*Viola* spp.) are present, while Burnet Rose (*Rosa pimpinellifolia*) is abundant and scattered throughout the grassland. The maritime influence is evident through the presence in the sward of Sea Plantain (*Plantago maritima*). The orchid flora is particularly well-developed and diverse, with eight species recorded on recent visits. These include Fragrant Orchid (*Gymnadenia conopsea*), Frog Orchid (*Coeloglossum viride*), Butterfly Orchid (*Platanthera bifolia*), Pyramidal Orchid (*Anacamptis pyramidalis*) and the scarce Irish Orchid (*Neotinea maculata*). A range of scrub types are present, including a dense stand of Hazel (*Corylus avellana*) towards the south, and a small area dominated by Juniper (*Juniperus communis*) in the north. Blackthorn (*Prunus spinosa*), Hawthorn (*Crataegus monogyna*) and Gorse (*Ulex europaeus*) also form scrub patches, and these tend to be less species-rich. Hairy Violet (*Viola hirta*), a species protected under the Flora (Protection) Order, 1999, occurs at Barrigone. The site also holds a large population of the Marsh Fritillary butterfly (*Euphydryas aurinia*), a species listed under Annex II of the E.U. Habitats Directive. The primary threat to this site is quarrying. Grazing is also an important factor; overgrazing would cause damage to the vegetation, while under-grazing would allow scrub encroachment at the expense of grassland species which require more open conditions. A balance between scrub and grassland is also important for invertebrate species. A number of factors, including substrate, bedrock, microclimate and maritime influence, contribute to the floristic richness at Barrigone and hence to the ecological interest of this site. The presence of rare species of plant and invertebrate highlight the site's conservation value.

## 7.5 Curraghchase Woods SAC (000174)

This site is situated approximately 7 km east of Askeaton in Co. Limerick. The area is characterised by glacial drift deposits over Carboniferous limestone. The site consists largely of mixed woodland and a series of wetlands. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

- [91E0] Alluvial Forests\*
- [91J0] Yew Woodlands\*

[1016] Desmoulin's Whorl Snail (*Vertigo moulinsiana*)

[1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*)

One of the main interests at the site is the presence of a hibernation site of the Lesser Horseshoe Bat. The bats hibernate in the cellars of the former mansion Curraghchase House. The entrance to the cellar is now gridded and all other access points blocked to prevent disturbance. In recent years bats have remained within the cellar throughout the year. In winter 1995/96 more than 60 bats were recorded in the hibernation site, rating the site of international importance. It is considered that the number of bats will increase now that the site is protected from disturbance. This is the largest known site for this species in Co. Limerick. The woodland consists of both deciduous species and stands of commercial conifers. Beech (*Fagus sylvatica*) is the most frequent deciduous species, but Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*), Sycamore (*Acer pseudoplatanus*) and Hornbeam (*Carpinus betulus*) are also present. Spruce (*Picea* sp.) and Scots Pine (*Pinus sylvestris*) are the commonest conifers. Hazel (*Corylus avellana*) scrub and areas of wet woodland (*Salix* spp.) also occur. The alluvial forest occurs in the southern part of the site and occupies low ground in a stream valley and some areas adjacent to a small lake. The dominant canopy species include Rusty Willow (*Salix cinerea* subsp. *oleifolia*), Alder (*Alnus glutinosa*), Downy Birch (*Betula pubescens*) and Ash. Exotics also occur, both conifer and broadleaved species, such as Beech and Horse-chestnut (*Aesculus hippocastanum*). A rich herb layer is found where the conifers are less dense, characterised by such species as Bugle (*Ajuga reptans*), Hemlock Water-dropwort (*Oenanthe crocata*), Yellow Version date: 14.9.2019 2 of 2 000174\_rev19.docx.Docx Iris (*Iris pseudacorus*), Meadowsweet (*Filipendula ulmaria*), Water-cress (*Nasturtium officinale*), Common Nettle (*Urtica dioica*) and Wood Sanicle (*Sanicula europaea*). The Yew wood occurs as a stand on a limestone ridge above a stream valley. It is associated with an Oak-Ash wood, but also has a range of commercial planted species. Nevertheless, Yew is well represented and is readily regenerating. Other species present include Holly (*Ilex aquifolium*), Ash, Pedunculate Oak, Hazel and Hawthorn (*Crataegus monogyna*). A series of small lakes and fens runs the length of the site. Some of these lakes are overgrown with vegetation. Black Bog-rush (*Schoenus nigricans*), Great Fen-sedge (*Cladium mariscus*), Greater Tussock-sedge (*Carex paniculata*), Carnation Sedge (*Carex panicea*) and Blunt-flowered Rush (*Juncus subnodulosus*) are some of the wetland species recorded. These wetlands, along with some wet grassland, add habitat diversity to the site. An important population of the Annex II molluscan species Desmoulin's Whorl Snail *Vertigo moulinsiana* is present on the site at its most south-westerly extant location. The best habitat for it is in the fringing vegetation of the lakes especially in vegetation dominated by *Carex acutiformis*. The semi-natural habitats within the site provide ideal foraging habitat for the Lesser Horseshoe Bat. Further planting of conifer tree species at the expense of deciduous species should be avoided and attempts should be made to increase the area of deciduous woodland. The combination of a secure hibernation site and suitable foraging habitat and the presence of over 60 individuals make Curraghchase Woods an internationally important site for the Lesser Horseshoe Bat. The presence of Desmoulin's Whorl Snail *Vertigo moulinsiana*, an Annex II species, and two woodland types that are listed with priority status on Annex I of the E.U. Habitats Directive, and especially Yew woodland, which is of very limited occurrence in Ireland, is of particular note.