Natura Impact Report for the Draft Southern Environs Local Area Plan 2021 – 2027

10th October 2020

Forward/Strategic Planning

Comhairle Cathrach & Contae Luimnigh

Limerick City & County Council

Limerick City and County Council,

Economic Development Directorate,

Merchant's Quay,

Limerick

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1.0 Introduction

The Local Area Plan for the Southern Environs 2021 – 2027 includes the areas of Raheen, Dooradoyle, Mungret, and extends as far as the Tipperary Road. These are part of the suburbs of Limerick City and the area is located to the south and east of the City Centre.

The River Shannon forms part of the northern boundary of the LAP area. The Ballynaclough River/Ballinacurra Creek provide a barrier between the City and Southern Environs to the northeast. Both the River Shannon and the Ballynaclough River are part of the Lower River Shannon Special Area of Conservation (SAC) site.

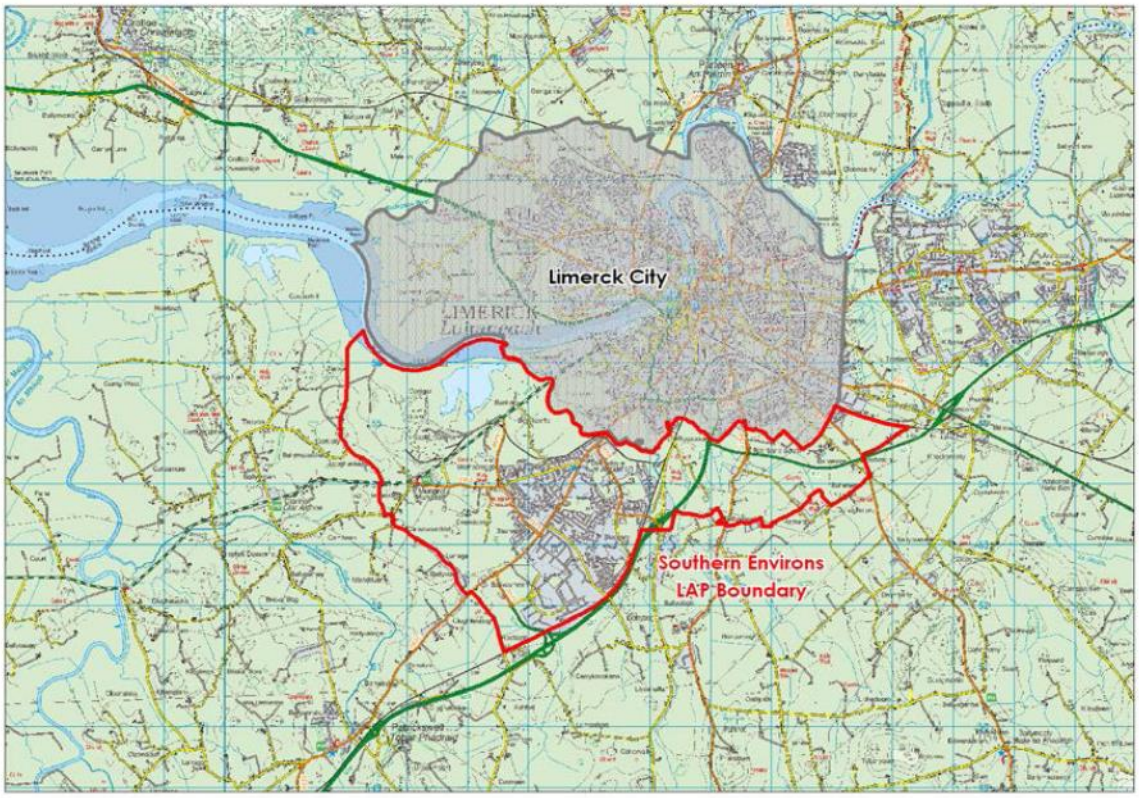

Figure 1: Boundaries of the Southern Environs Local Area Plan

The geology of the study area has been much modified by generations of building activity, where the original soil cover was removed or covered by the built environment. Along the Ballinacurra Creek on the western boundary of the city area marine sediments are present (see Strategic Flood Risk Assessment, Stage 1). These have not been built on for the most part. The underlying rock in the area in question is Lower Carboniferous Limestone. Soils in the area vary from Limestone Till, estuarine muds in undeveloped areas close to the Shannon and "made ground". Made ground is natural soil altered, partly with fill materials and is associated with construction activities.

As much of the underlying geology in the plan area is limestone based, and because of its features and permeability, this is a potential pathway for pollutants to reach groundwater and hence the River Shannon. This is discussed later in this report.

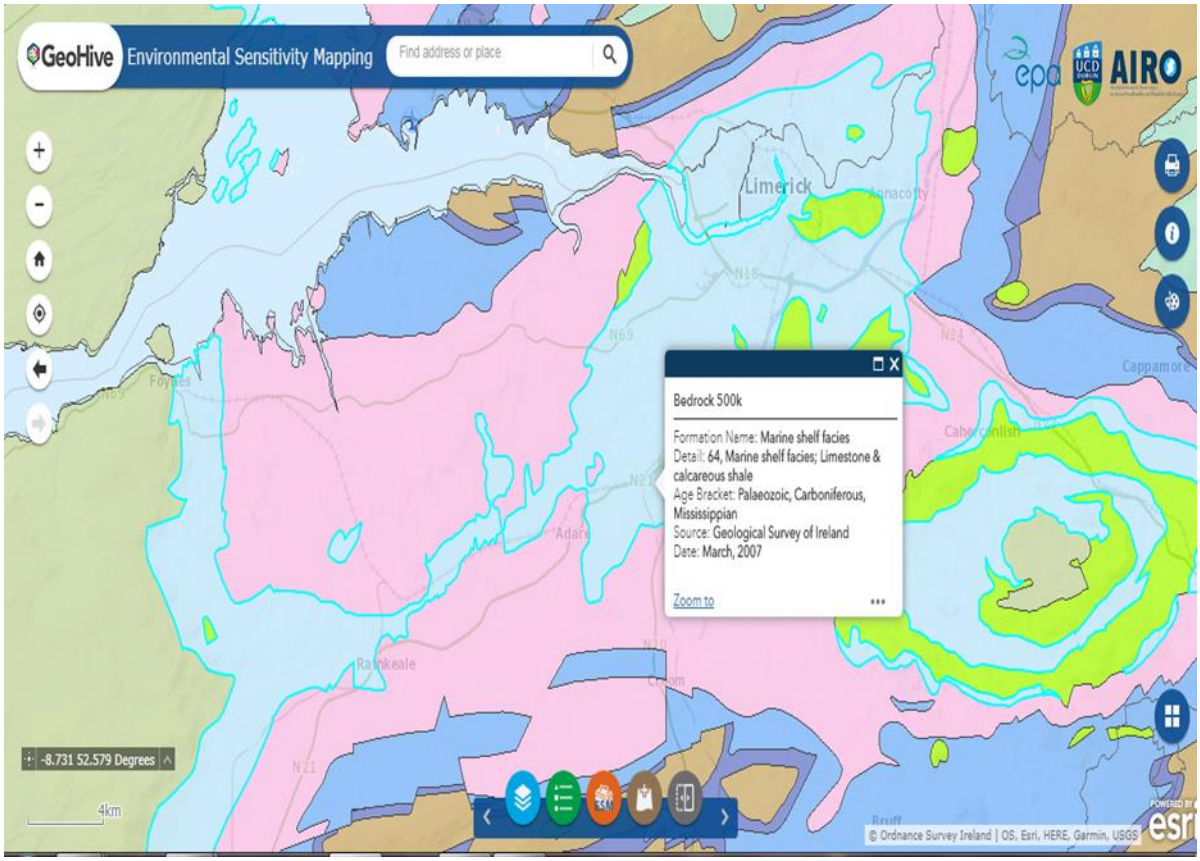

Figure 2: Taken from the AIRO SEA mapping tool this shows the light blue area as being limestone based. The pink areas around it are also derived from Limestone.

2.0 Designated sites in the plan area

The River Shannon and the Ballinacurra Creek waterways provide the setting for a range of wildlife habitats and species and are important local amenities. Both are part of the Lower River Shannon SAC site. Ballinacurra Creek is part of the Lower River Shannon SAC site, is in the east of the plan area. One reason for its ecological importance is the presence of Lesser Bulrush (*Typha angustifolia*) and Summer Snowflake (*Leucojum aestivum*). Two other species, the Opposite Leaved Pondweed and the Triangular Club rush, both Flora Protection Order species, are also in this area.

The River Shannon and Fergus Estuaries Special Protection Area lies to the north of the Plan area and follows the main river channel. The eastern most part of Bunlicky Lake, a manmade lake resulting from excavations over the years, is also part of the River Fergus and Shannon Estuary SPA. It is home to a colony of cormorants, a species that is one of the qualifying interests of the Special Protection Area (see Table 3 below).

Figure 3: Looking at Bunlicky Lake from the north. The location of the Cormorant nesting site is indicated by the red arrow. Source: Roadbridge.

At least two turloughs exist within the Southern Environs area. One is the Loughmore Common, which is a turlough or seasonal lake. Closely associated with the turlough itself are species, which depend on the shallow flooding patterns that are a feature of this site. Recent surveys have indicated that the wintering birds, which had been feature of the site in the past, are now much diminished. Such a site is of course also of interest to the Common Frog, while in the drier portions of the site migrants such as fieldfares also frequent its hedgerows in the winter months.

The plant communities of the turlough are more typical of those of marsh than other turloughs, and this is one of the reasons for the ecological importance of the site. This site is a relatively small and lies entirely within the boundaries of the Southern Environs area.

The main danger to ecological sites in the plan area is the gradual encroachment of housing and other development. For turloughs this can bring changes in hydrology. The functioning of their hydrological regime is poorly understood and for this reason caution in terms of development in close proximity to these sites is advised. Loughmore Common status as a Proposed Natural Heritage area is reflected in the zoning. Some on site flora in this location are dependent on salt in the water feeding the turlough, which reaches the site from the tidal movements of the River Shannon, itself a Special Area of Conservation. This emphasises the interconnected nature of the hydrology of the Southern Environs. The second Turlough in the area is located to the rear of St Oliver Plunkett Church in Mungret Village, local sources indicate that that Monteen turlough is connected with Loughmore Common. Therefore, additional disturbance to Loughmore Common and the Monteen Turlough and associated hydrology should be avoided.

Table 1: Designated sites in the Southern Environs Local Area Plan Area:

NPWS Code	Name
SAC 002165	 Lower River Shannon
SPA 004077	 River Shannon and River Fergus Estuaries
pNHAs 000438 002048 000435	 Loughmore Common Fergus Estuary and Inner Shannon North Shore Inner Shannon Estuary South Shore (these have been included in the SPA designation)

Source: Limerick City Development Plan 2010 – 2016 (as extended) - Chapter 11 and SELAP 2011 – 2017 (as extended)

Figure 3: Location of Lower River Shannon SAC site

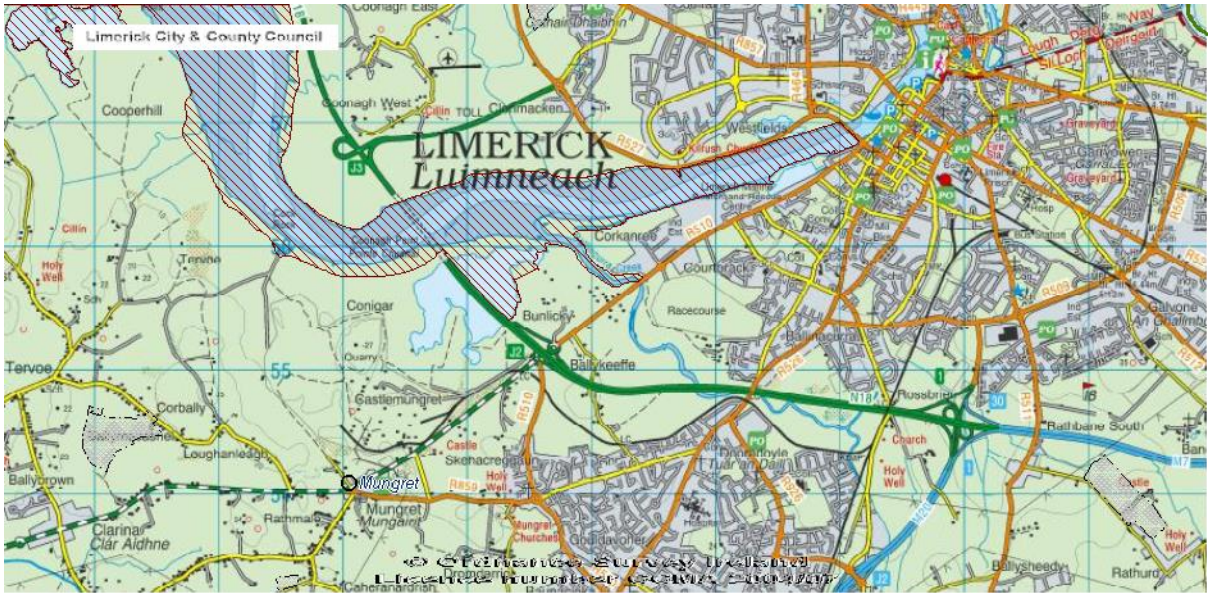

Figure 4: Location of River Shannon and Fergus Estuaries SPA

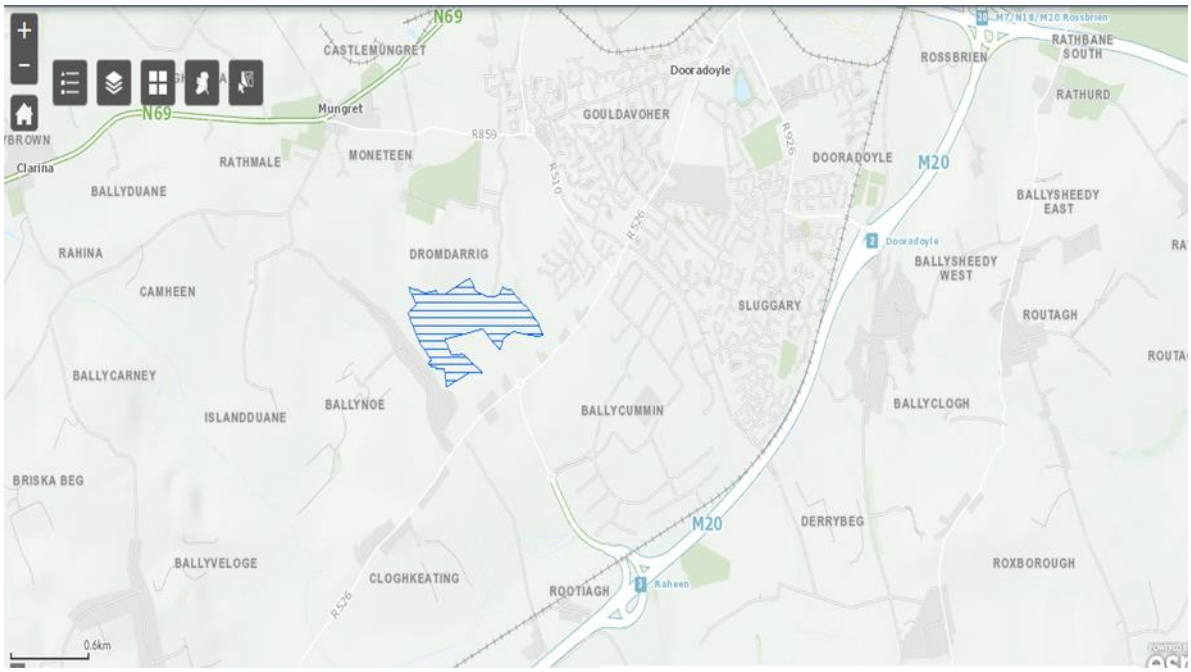

Figure 5: Location of Loughmore Common pNHA

While the main focus of the appropriate assessment process as a whole is on the Natura 2000 site network, consideration needs to be given to species mobility. Many of the birds of conservation interest in the SPA will of course not be bound by the site boundaries but will be found in suitable locations throughout the plan area. The same is true of plant and animal species of conservation interest in the SAC, which will range outside of that site.

3.0 Need for Natura Impact Report

Articles 6(3) and 6(4) of the Habitats Directive require an Appropriate Assessment be undertaken on proposed plans, or projects which are not necessary for the management of designated sites, but which are likely to have a significant effect on a Natura 2000 site, either individually or accumulatively with other plans or projects. It is considered that given the proximity of both the Lower River Shannon Special Area of Conservation Site (2165) and River Shannon and Fergus Special Protection Area (4077), that a Natura Impact Report should be prepared. This should be read in conjunction with the draft LAP and the associated Environmental Report, in particular the Environment and Heritage sections and zoning maps.

Though not Natura 2000 sites, areas such Loughmore Common and other non-designated turlough sites also lie within the LAP area. The eastern part of Bunlicky Lake has also been notified as part of the proposed River Shannon and River Fergus Estuaries Special Protection Area (4077). Given the limestone base of much of the area, and the interconnected nature of hydrology, environmental effects associated with the LAP, could be transmitted to the designated sites as aforementioned. This adds to the sensitivity of this plan area from an ecological perspective. The possibility of ex-situ effects is another factor in helping to determine that an NIR is necessary. Indirect and cumulative effects can affect the ecology of water based habitats. The Department of the Environment Heritage and Local Government has raised this as an issue in correspondence in relation to the County Development Plan 2010 - 2016 (17th February 2010) mentioning the "need to protect aquifers, Natura 2000 sites etc."

4.0 Assessing the Impacts

The Lower Shannon SAC site depends on good water quality and is important for bird life. Disturbance and direct habitat loss is a major concern. Thus, the issue of encroachment on the sites, with consequent disturbance is an important one. Listed below are the main factors that would threaten the sites:

(a) Encroachment on the sites, either directly onto the site areas through themselves being zoned, or unsympathetic neighbouring zoning.

(b) Alterations in local hydrology, altering flooding patterns having upstream or downstream effects on water levels. This would be caused by development in flood plains or perhaps in flood benefiting areas. Development proposals might also contribute to this by not incorporating adequate Sustainable Urban Drainage Measures (SUDS).

(c) For listed species in the plan area outside designated sites, there is a risk that development proposals would be unaware of their existence.

(d) Removal of non-designated habitats such as trees of interest or hedgerows.

Much debate centres on the issue of wildlife corridors between habitats and their utility. However, regardless of their utility they can provide sheltered conditions for bat species to forage and can provide seeds and berries for birds and smaller

mammals. The EPA has noted in some of its recommendations the need to take Article 10 of the Habitats directive into account. The purpose of Article 10 is to "improve the ecological coherence of Natura 2000 network by maintaining, and where appropriate developing, features of the landscape which are of major importance for wild fauna and flora". Closely connected with Article 10 is Article 3, of which Paragraph 3 mentions the need to "endeavour, where they consider it necessary, in their land-use planning and development policies, and in particular, with a view to improving the ecological coherence of the Natura 2000 Network, to encourage the management of features of the landscape which are of major importance for wild fauna and flora" as referred to in Article 10, namely "Such features are those which, by virtue of their linear and continuous structure (such as rivers with their banks or the traditional systems for marking field boundaries) or their function as stepping stones (such as ponds or small woods), are essential for the migration, dispersal and genetic exchange of wild species.

(e) Decline in water quality due to the inadequacy of wastewater infrastructure.

The Lower River Shannon SAC site is the most extensive of the sites in the LAP area and is most likely to be affected. While the estuary itself has been described as being a robust ecosystem and its trophic status generally satisfactory, the status of some of its tributaries is not as good. The assimilative capacity of rivers has been a source of concern to the DEHLG and this has been reflected in a series of submissions to planning documents since 2005. In this regard, the capacity of the wastewater treatment plant (WWTP), operated by Limerick City and County Council, at Bunlicky is of crucial importance. Over the last ten years, the plant has been substantially upgraded. Large diameter interceptor sewers have been installed. The WWTP comprises preliminary (screening and grit removal), primary (settlement and biological aeration tanks), and secondary treatment (settlements and clarifiers). The WWTP has a storm water capacity of 7,500m^3 that allows it, during periods of heavy rainfall, to retain the excess effluent and pump it back for treatment when conditions allow. The Plant has a design capacity of 130,000 population equivlent and is currently serving the needs of an area with a population of 110,000 people. Based on the above and the population increase envisaged by the draft LAP it is considered that sufficient spare capacity remains in the plant to cater for population increases in the Southern Environs and the other areas served by the plant.

5.0 Qualifying interests

One of best ways of assessing effects on any Natura 2000 sites, whether SAC or SPA is examining the possible effects of the plan on their qualifying interests. They are either habitat types listed in Annex I or species listed in Annex II of the Habitats Directive. The qualifying interests for the Lower River Shannon SAC site are shown in Table 2 below.

Table 2: Qualifying interests of the Lower River Shannon SAC site:

Qualifying Interests	Present in plan area	Comments	Policy Response
Mudflats and sandflats not covered by seawater at low tide [1140]	Present	Outside the flood defence embankments. There is no encroachment on these areas.	NH02 and Section 2.2
Reefs [1170]	Not present	None	NH02
Salicornia and other annuals colonising mud and sand [1310]	Further downstream, Foynes, and Glin being locations (Reynolds, 2012 pp.289-90)	There are some mud flats at low tide but no sign of these species observed in the plan area.	NH02
Estuaries[1130]	Present	Effects on water quality would be the most likely effects in that the plan shows no expansion of boundaries and hence no direct encroachment onto the SAC site.	NH02, KI05
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]	Present	Floating river vegetation of this type observed in the Ballinacurra Creek, this would be vulnerable to changes in water quality.	NH02, KI05
Margaritifera margaritifera (Freshwater Pearl Mussel) [1029]	In the upper reaches of the Cloon River Co. Clare, no hydrological linkage.	See comment above re water quality. KI05 with its emphasis on ensuring adequate capacity of wastewater infrastructure is relevant here, but as the species is in the upper reaches of the Cloon River, which drains to the River Shannon, a link is not possible.	NH02, KI05, Section 2.2
Lampetra fluviatilis (River Lamprey) [1099]	Present	Likely in all the rivers of the plan area. The buffer provided for in NH09 is relevant here.	NH02 NH09 (provides a buffer)
Salmo salar (Salmon) [1106]	Present, particularly in main river Channel.	Water quality and temperature is critical.	NH02 KI05
Lutra lutra (Otter) [1355]	Present- traces found on main river channel but would also be present in	Found on the River Shannon and in Ballinacurra Creek.	NH09, NH02, NH06.

	Ballinacurra Creek and the Barnakyle River- all in the plan area.		
Petromyzon marinus (Sea Lamprey) [1095]	Present, migrates through main river channel.	No encroachment on the main channel, which is used as a migration route and for spawning.	NH02, KI05, KI011
Coastal lagoons [1150]	Not present	See comment above re water quality. KI05 with its emphasis on ensuring adequate capacity of wastewater infrastructure is relevant here.	NH02 KI05 these would inform any proposals that would affect water quality and downstream species and habitats
Perennial vegetation of stony banks [1220]	Not present	None	NH02 KI05 these would inform any proposals that would affect water quality
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]	Not present		NH02 KI05 these would inform any proposals that would affect water quality
Large shallow inlets and bays [1160]	Smaller inlets present but not larger ones	See comment above re water quality. KI05 with its emphasis on ensuring adequate capacity of wastewater infrastructure is relevant here.	NH02 KI05 these would inform any proposals that would affect water quality and downstream species
Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	Not present	None	NH02 KI05 these would inform any proposals that would affect water quality and downstream species and habitats
Mediterranean salt meadows (Juncetalia maritimi) [1410]	Not present	None	NH02 NH09 (provides a buffer)
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	Some isolated stands of riparian woodland at scrub stage is present amongst reed beds outside flood defence embankments	The plan does not contain any measures to encroach on the River Shannon Channel	NH02 NH09 (provides a buffer)
Lampetra planeri (Brook Lamprey) [1096]	Present	Buffers to prevent encroachment or deterioration of water quality would be useful in this case.	NH02 NH09 (provides a buffer)

Tursiops truncatus (Common Bottlenose Dolphin) [1349]	Not present, further downstream in the lower estuary.	KI05 with its emphasis on ensuring adequate capacity of wastewater infrastructure is relevant here.	NH02 KI05 these would inform any proposals that would affect water quality and downstream species and habitats

Source: Adapted from NPWS 2012

The qualifying habitats include estuaries, tidal mudflats and sandflats and vegetation of flowing waters. The other habitats are located at a significant distance downstream of the project site within the middle to outer Shannon estuary or are terrestrial in nature and are thus not considered to occur within the zone of influence of the project. As indicated in Table 2, these downstream habitats could be affected by declines of water quality. The Plan is, of course a policy document, and has specific policies to ensure that that infrastructure provision keeps pace with development - see objective KI05 in Chapter 10 of the plan.

Otter habitat occurs along the River Shannon. Juvenile lamprey habitat is likely to occur along the non-tidal sections of the Ballinacurra Creek and stretches of the Barnakyle River. Bottle-nosed dolphin habitat is located in the middle to outer Shannon Estuary at a significant distance downstream and because of this is not likely to be affected. Atlantic salmon are likely to occur in the Shannon Estuary during the summer-autumn return migration to spawning grounds upstream. Freshwater pearl mussel are restricted to the Cloon River sub-catchment of the SAC and are not hydrologically connected to the plan area, this has been noted in Table 2 above.

Of the qualifying interests of the SAC those that occur close to the plan areas include estuaries; tidal mudflats and sandflats; vegetation of flowing waters; lamprey species; Atlantic salmon; and otters.

These qualifying interests of the SAC are described below:

Otters

These mammals are known to range widely throughout the River Shannon catchment and it is likely that they use all of the rivers within the plan area. They can frequently use manmade structures as resting areas. One anecdotal report from the Fire Service of Limerick City and County Council indicates that otters use the mooring pontoon for one of their rescue boats at Shannon Bridge, which is approximately 1.8km east and upstream of the plan area. In past submissions the Development Applications Unit have indicated concerns with otters and development plans. Otter territories are linear (Fairley, 2001) and as such can be expected along any of the water courses of the plan area. The territories can cover considerable lengths of river. They can often use a number of resting locations (holts) along a stretch of river so for this reason an undisturbed river bank area is important. As noted above NHO7 which seeks to maintain "river bank vegetation along water courses and ensure the protection of a 20m riparian buffer zone on green field sites" would be useful in maintaining otter habitat.

Estuaries

This qualifying habitat supports up to 7 different community types within the Lower River Shannon SAC. The nearest estuarine community of this qualifying habitat is located on the northern plan boundary and is representative of the community "Estuarine subtidal muddy

sand to mixed sediment with gammarids community complex". This community complex occurs in water depths between approximately 2.5 and 7m. The sediment of this community complex is that of varying elements of muddy sand and gravel. In an estuarine environment, there is considerable mixing of salt and fresh water and this leads to a complex series of biological processes (Fossitt 2000). In terms of threats in the plan area apart from direct encroachment, the maintenance of good water quality is important in retaining habitat quality.

Lamprey Species

There are three species of Lamprey to consider Sea Lamprey, River Lamprey and Brook Lamprey. Of the three species brook lamprey spend all of their lives in freshwater and because of this would not use the stretch of the River Shannon which forms the northern boundary of the plan area. Unlike the other two species, they do not feed as adults. This is tidal and as such is subject to the influences of salt water - see comments on estuaries above.

Sea Lamprey enter estuaries from the sea and migrate upstream generally between late March and June to spawn in the freshwater reaches of the River Shannon catchment. Water temperature is a factor in this migration. The Mulkear River 10km upstream from the plan area is an important site, with known spawning sites in stretches of that river bordering the National Technology Park in Castletroy and further upstream in Annacotty village. The ammocoetes (lamprey larvae) live in marginal silty areas, often in riverbanks, where they gradually develop over several years (Kunz and Costello, 1999). They then begin to metamorphose to adults, starting in late July. This takes about 3 months after which they migrate to the lower estuary in about October.

The upstream migration of River Lamprey is less well defined than Sea Lamprey and is thought to commence in late summer and continue through the winter months. The spawning season occurs in spring with two peaks in migration occurring, first in the August-November period and then a second in spring (March-April). Following metamorphosis, young adults begin their downstream migration over an extended period from late winter to early summer. Downstream migration by both Sea Lamprey and River Lamprey is mostly nocturnal.

In summary, the River Shannon is an important migration route for both river and sea lamprey, and the upper freshwater reaches are important spawning sites. The freshwater reaches of the River Shannon and freshwater rivers in the plan area are home to the River Lamprey. Again the maintenance of water quality and avoidance of direct encroachment on the rivers are important factors in the conservation of this species.

European Eel

The European eel, once common an all-Irish freshwaters, to which it could gain access, has undergone a dramatic decline. Though not listed amongst the qualifying interests it's conservation status merits inclusion. It spawns in the Gulf of Mexico and returns to freshwaters. It is this recruitment from the spawning grounds that has declined dramatically with numbers running at less than 7% of those that made the journey prior to the 1980s. Some suggested causes of this decline include climate change and shift in ocean currents, overfishing, habitat loss in the freshwater range, mortality in hydropower plants, disease and parasites, and chemical contamination affecting reproductive ability (King et al 2011, pp. 39-

40). Though long-lived, the lack of returning eels from the spawning grounds will have long term implications for the eel population as a whole**.** Many of the issues that affect the lamprey species, mentioned previously, also affect the eel. It is important that no obstacles to migration, or declines in water quality result from the policies in the plan.

Salmon

Similar to Lamprey, the Atlantic salmon uses the River Shannon as a migratory route to spawning areas upstream. No suitable salmon spawning habitat occurs in the stretch of the River Shannon in the plan area. This species does not spawn or feed in the section of the channel at or downstream of the Shannon's confluence with the River Groody, which itself supports a small salmon population. The nearest spawning sites to the plan area is upstream at Castleconnell, Doonass, Plassey and Corbally.

Given the main river channels importance as a route to spawning for salmon, it is important to ensure that any of the plan policies do not permit encroachment into the channel itself or to allow any obstruction to fish passage to take place.

Floating River Vegetation

The Lower River Shannon site synopsis (NPWS, 2012) mentions the following floating vegetation species: "floating river vegetation characterised by species of water-crowfoot (*Ranunculus spp*.), pondweeds (*Potamogeton* spp.) and the moss Fontinalius antipyretica are present throughout the major river systems within the site". In the area of the Southern Environs, one of the most important of these species is the Opposite Leaved Pond Weed. (*Groenlandia densa*). Reynolds (2012, pp.409-410) describes it as "locally abundant around Limerick City", but specifically mentions its presence in Loughmore Common and in the Doordoyle area and the tidal stretches of the Ballynaclough River and "adjacent ditches". This species is the subject of a Flora Protection Order. The Opposite Leaved Pond Weed is considered to be sensitive to elevated nutrient levels so the maintenance of water quality is of great importance.

Figure 6: Triangular Club Rush (Source: BEC consultants)

Though not part of the floating river vegetation species assemblage, the Triangular Club Rush (*Scirpus triqueter*), another species which is the subject of Flora Protection Order (1999) is present in the plan area. Reynolds (2012 p.441) mentions that it is "in the Ballinacurra Creek, with many plants in channels near the Creek Mouth" Both Reynolds (2012) and Parnell and Curtis (2012, p.77) acknowledge the limited Irish distribution of this plant with it being present along the "banks of the River Shannon in Limerick City and for some distance downstream". Relocation of this plant was one of the mitigation measures associated with the construction of the Shannon Tunnel.

The other Natura 2000 site to consider in the plan area is the River Shannon and Fergus Estuaries Special Protection Area. The NPWS site synopsis notes the following, "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. It is also of special conservation interest for holding an assemblage of over 20,000 wintering water-birds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated water-birds are of special conservation interest for Wetland & Water-birds. 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".

Below are listed the qualifying interests of the River Shannon and Fergus Estuaries Special Protection Area (004077).

Table 3: Qualifying interests (Species) of River Shannon and Fergus Estuaries SPA:

Cormorant (Phalacrocorax carbo) [A017] (Roosting in Bunlickey Lake)	Shoveler (Anas clypeata) [A056]	Dunlin (Calidris alpina) [A149]
Whooper Swan (Cygnus cygnus) [A038]	Scaup (Aythya marila) [A062]	Black-tailed Godwit (Limosa limosa) [A156]
Light-bellied Brent Goose (Branta bernicla hrota) [A046]	Ringed Plover (Charadrius hiaticula) [A137]	Bar-tailed Godwit (Limosa lapponica) [A157]
Shelduck (Tadorna tadorna) [A048]	Golden Plover (Pluvialis apricaria) [A140]	Curlew (Numenius arquata) [A160]
Wigeon (Anas penelope) [A050]	Grey Plover (Pluvialis squatarola) [A141]	Redshank (Tringa totanus) [A162]
Teal (Anas crecca) [A052]	Lapwing (Vanellus vanellus) [A142]	Greenshank (Tringa nebularia) [A164]
Pintail (Anas acuta) [A054]	Knot (Calidris canutus) [A143]	Dunlin (Calidris alpina) [A149]
Black-headed Gull (Chroicocephalus ridibundus) [A179]	Wetland and Waterbirds [A999]	**Comments**: Open space areas and wetlands within the plan area are important resting and feeding areas away from the main river channel

Source: Adapted from Doherty 2020 and NPWS 2012

Many of these species depend on wetlands for foraging and roosting. Of the species listed, the nearest rooting site for a qualifying species is Cormorant colony in the eastern part of Bunlicky Lake. There are other wetlands sites outside, but close to the plan area, such as the Coonagh wetlands to the northeast and the Westfields wetland complex close to the city centre. The Coonagh wetlands resulted from the excavations associated from the construction of the Shannon tunnel. These provide a network of urban wetlands, which wildfowl species can use.

Figure 7: Cormorant Source: Bird Watch Ireland

It is not just the obvious wetlands that are important in the plan area. During the construction of the park and playground in Mungret one wet area with Juncus dominated vegetation was retained. This was retained, because during a bat survey in July 2015, waders were heard flighting into it, as the tide covered feeding areas in the estuary. From this, it will be seen that open areas generally can be important for many of the species listed in Table 3 above. Ní Lamhna *et al* in Nairn and O Halloran (2012, p.205) has mentioned species such as Teal and Tufted Duck being associated with water bodies in Dublin. Based on personal observations in Limerick city and environs, the importance of urban open spaces and green areas can be confirmed for species such as Lapwing, Snipe and various gull species including the Black headed Gull. In this regard, the policies in relation to open space such as CI015 which aims to protect existing open space by not permitting development which encroaches on such open space and protect semi-natural open space from such development is useful (Chapter 9 of the draft SELAP). Objective CC09 which promotes the delivery of green infrastructure "as a means of managing flood risk and enhancing the natural environment" is also useful. It should be remembered that any form of open space with its ability to absorb and regulate rainfall and with its potential for bird life is valuable.

Another issue which comes to mind in relation to birds and ecology generally is light and noise. In this regard, objective KI018 (Chapter 10 of the draft plan) mentions the need to protect environmental quality through the implementation of policy and legislation relating to amongst others, light pollution and noise pollution. Light has implications not just for

nocturnal wildlife such as bats but when water courses are illuminated, often unintentionally, with any bank-side lighting there are implications for marine and freshwater life, ranging from barrier effects to risk of increased predation.

6.0 Potential for Likely Significant Effects

The Plan area abuts the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA. With the zoning map as presented in the current draft it will not cause direct encroachment, which would result in habitat loss or additional disturbance to these European Sites. This report examines the potential for the project to result in likely significant effects to these European Sites by looking at possible linkages and pathways and whether these pathways have the potential to act as pollution conduits to the Natura 2000 sites. This will follow the source pathway receptor, model, with the plan area being regarded as the source, while the European sites are the receptors.

One of the most direct pathways for pollutants to reach the River Shannon is though water courses and wetland features that have hydrological connections to the river either directly or through groundwater. These are the pathways. Hydrocarbons are particularly damaging so it is important in such areas to ensure that any potential inflows would have appropriately designed interceptors. This is a topic for the development management standards of the development plan. In terms of the existing plan, the most effective means of avoiding pollutants reaching the River Shannon would be through buffers. This is achieved in the case of the Ballinacurra Creek by zoning the undeveloped areas along the river as semi-natural open space. This was the approach taken in Bunlicky Lake. Both the Monteen Turlough and the seasonally flooded Loughmore Common have been zoned as semi-natural open space and as a proposed natural heritage area respectively. Where possible, nearby areas to the buffer were zoned for agriculture or open space purposes, see figure 8 below. This further reduces the intensity of land uses near these features.

While one policy does mention the creation of riverside walks, it does mention that these should be subject to adequate ecological assessment, which would include Article 6 assessment in the case of the SPA and SAC. This was a point raised on meeting with the NPWS on the 25th September 2020 in relation to greenways and blueways generally and the need for adequate ecological assessment of their possible effects.

7.0 Potential for in-combination effects

As the LAP is a policy document, it makes sense to consider cumulative effects of policy documents whose functional areas border that of the SELAP. These are the Limerick City Development Plan 2010 – 2016 (as extended), the County Development Plan 2010 – 2016 (as extended) and the Castletroy LAP 2019 - 2025 amongst others. The first step in assessing cumulative effects would be to consider the zoning template of these plans, particularly those zoning designations that border the SELAP.

The SELAP review has to be considered with changes to the city area, of which the Southern Environs and Castletroy will now form part. Due to Limerick's status as the regional city in the Midwest, it is necessary to consider the plan review and its effects at a larger scale. Table 4

below shows the main plans and projects ongoing in the City and SELAP area and it is these that provide the most immediate back drop to the review. These are the plans and projects that are assessed with in-combination effects in mind.

Table 4: Cumulative effects of Plans in areas adjoining SELAP

Projects and Plans	**Comments**
Regeneration areas	The closest area is that of the Southside Regeneration area. No appreciable effect on the area which is the subject of the review is anticipated as it takes place in appropriately zoned areas and does not encroach into green space or semi-natural open space areas –see Figure 7 below.
Shannon Integrated Framework Plan	It must be remembered that the SIFP operates throughout the estuary, which means that docklands which are to the east of the SELAP area, will have to be viewed in the context of other development locations in the estuary. The SIFP had its own detailed AA and SEA process carried out. Similarly when it was incorporated into the city and County development plan in 2015, a further AA/SEA process took place.
City Development Plan 2010 – 2016 (as extended)	Since the amalgamation the implementation of the city plan takes into account the issues in the wider metropolitan area. The draft LAP notes that the SELAP will eventually be incorporated into the Limerick City Development Plan, as does the Environmental Report, which should ensure greater planning policy consistency throughout the City and suburbs area. It should also be noted that the city area adjoins the SELAP and has semi-natural open space and open space areas in it, which would complement similar areas in the SELAP.
Castletroy LAP 2019 – 2025	The area of the Castletroy LAP, which adjoins the SELAP, contains the Groody River green wedge, which is an important green space for the city and environs.

Limerick City Bio-diversity Plan 2012	The plan identifies open space and green space areas which are adjacent to the SELAP and which would add to the network of open space in the plan with obvious benefits for wildfowl movement. The effects of this plan would be considered positive.
Smarter Travel (which was a demonstration project until 2018)	Designed to promote sustainable travel patterns which will promote cycling and pedestrian access throughout the city and environs.
Draft Limerick Shannon Metropolitan Area Transport Strategy	The Limerick Shannon Metropolitan Area Transport Strategy, which is currently on display, outlines a coherent transport strategy for the region. This will mean an emphasis on more efficient transport and an expansion of cycle routes.
Limerick Northern Distributor Road (LNDR)	This project to create a by-pass of the city with a route running to the north and the east would reduce the volumes of city traffic with consequent improvements in both traffic flows and the city environment. This would also assist in dealing with traffic flows on a citywide basis and complement the southern ring road, which goes through the SELAP area. The LNDR would not have direct effects on the SELAP area.
Upgrade of Bunlicky Wastewater Treatment Plant	Communications from Water Services and Irish Water indicate that a programme of works will be ongoing to ensure that capacity keeps pace with demand. This is essential for the future development of the City and environs.

Regeneration areas

The Limerick Regeneration Framework Implementation Plan includes measures for Kings Island, Moyross, Ballinacurra Weston and Southill. The framework is built around three key pillars: Social regeneration, Physical regeneration and Economic regeneration. They operate within previously zoned areas and do not encroach into any Natura 2000 site. They were subjected to both the SEA and AA processes.

Shannon Integrated Framework Plan

This plan is intended to promote the sustainable development of the estuary as a whole and operates in the functional area of Limerick City and County Council, Clare County Council and Kerry County Council. With respect to the Limerick City Development Plan it called for the zoning of the dockland area for development purposes. This area is outside the SELAP boundary but may have an effect in creating employment for its residents. However, the underlying tenet of the SIFP is to promote development of the estuary as a whole. Any increased economic activity is confined to the docks area and is not anticipated to have additional effects on the River Shannon. The Docklands for instance had been designated as a Strategic Employment Location (p.17 City development plan) in the existing 2010 – 2016 City Development Plan) and is described as an "under-utilised asset".

Limerick Economic and Spatial Plan 2030

This plan identifies seven key locations in Limerick for re-development, which will complement the SIFP in that the aims of both as they relate to Limerick are similar. Both offer detailed area based suggestions of redevelopment of selected areas**.** The Marine Energy park proposal in the 2041 SFPC Vision document is reflected in this document (p. xiii) where it mentions the need for an urban science park.

Limerick City Development Plan 2010 – 2016 (as Extended)

It is likely that the revised SELAP will be integrated into the Limerick Development Plan addressing the larger metropolitan area of Limerick City and Environs including the Southern Environs and Castletroy. The city plan has green areas adjacent to the SELAP area which would help reinforce the greenspace network in the area as a whole.

Smarter Travel

This initiative was designed to promote networks of cycle and pedestrian ways throughout the City and environs and was also designed to maximise the use of public transport. In this regard, it fits well with the Colbert station project (see above). This initiative is updating traffic, pedestrian and cycle movement to suit a new era in Limerick traffic management and this has helped update plan policy in this regard.

Upgrades of Bunlicky Waste Water Treatment Plant

Current and future upgrades are planned for Bunlicky. The works undertaken are as follows:

-Construction of a Chemically Enhanced Primary Treatment dosing system to allow for Alum Dosage of the influent to combat against high levels of Phosphorus discharge and to assist in sludge management.

-The installation of an Anaerobic Digester;

-The upgrade of the current odour control unit;

-The installation of a pasteurisation unit;

-The installation of a Combined Heat and Power recovery unit operating with the anaerobic digester;

These works were completed in March 2016 and will increase capacity to keep pace with industrial and residential development in the agglomeration area. Further works are planned to ensure that both technologies, work practices and capacity in the plant are maintained at a standard that can adequately deal with increased loadings from future development (Irish Water Personal Communication, July 2014). This would include measures to deal with hydraulic loadings that would have been an issue in the past. What this meant by this, is that with storm and water and foul water drains mixed, in periods of heavy rainfall large volumes of water entered the plant, which meant that it was not able to cope with the additional loadings, which lead to untreated discharges. The improvements to the plant and the pipe network leading to it, has meant that the plant now deals with contaminated waste only, while storm water is diverted elsewhere. These are not anticipated to have any effects on the nearby Special Area of Conservation or Special Protection Area.

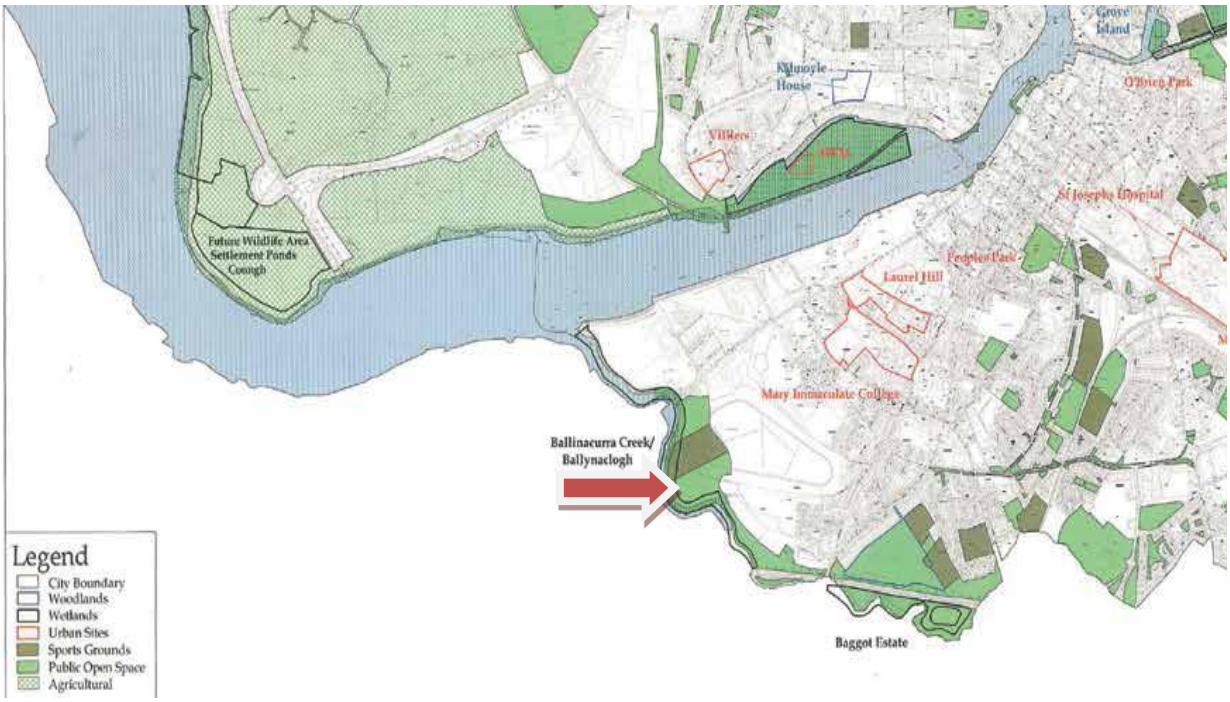

Figure 7: This extract from the Limerick city Bio-diversity plan shows green space adjacent to the SELAP boundary. This complements green space on the SELAP area to the west which as the effect of creating a partial green space corridor. This map should be viewed with the map in Figure 8 below which shows semi-natural open space zonings highlighted in the SELAP area.

8.0 Conclusions and Recommendations

The proximity of two riverine Natura 2000 sites i.e. the Lower River Shannon and River Fergus means that within the LAP area, policies and zoning patterns must reflect the sensitivity of the site. This has been implemented through zoning and the putting in place of buffer zones. The Appropriate Assessment Guidelines issued by the DEHLG (2010 p. 33) indicate that a "precautionary approach is fundamental and in cases of uncertainty it should be assumed that the effects could be significant". In the case of the Southern Environs, with low-lying areas subject to flooding, the presence of limestone drainage features such as turloughs, it is considered that the designation of areas as semi-natural open space or open space was a suitable approach to take, minimising the amount of land that might generate runoff and

providing a buffer for designated sites. Additional lands have been zoned as semi-natural open space to address these sensitivities.

NPWS concerns with individual species such as the otter, badger, bats, lamprey and protected plant species such as the Triangular Club rush, Opposite Leaved Pond Weed are reflected in the policies that now exist in the plan. The presence or absence of these species and the possible effects of the development on their conservation status should form part of the assessments which accompany any application. This is dealt with in NHO 15 Ecological Assessment which states "All residential developments over 5 housing units, industrial/commercial developments over 1000sqm, or developments below this threshold where there are species of conservation concern, will be required to submit an ecological assessment of the effects of the development on the site and nearby designated sites, suggesting appropriate mitigation measures, and establishing, in particular, the presence or absence of the following species; the otter, badger, bats, lamprey and protected plant species such as the Triangular Club Rush, Opposite Leaved Pond Weed".

The otter in particular can range outside the designated sites. Article 10 of the Habitats Directive has as its intent to "improve the ecological coherence of Natura 2000 by maintaining, and where appropriate developing, features of the landscape which are of major importance for wild fauna and flora". In this situation the zoning of appropriate semi-natural open spaces helps with this aim. It should be noted that agricultural zonings and open space zonings can also help in this regard. These should be retained.

What would be of further use for the purposes of Article 10 is Objective NHO 16 "Creation of New Habitats which states it is an objective of the Council to seek the creation of new habitats by encouraging wild green areas and new water features such as pools and ponds. Management plans for green areas are encouraged to use the minimum of pesticides and herbicides, while the creation of areas that are not subject to public access in order to promote wildlife use is strongly encouraged".

While the NPF and the RSES places great emphasis on reuse of existing structures and brownfield development, this can place great pressure on species that use these locations and the policy content of the draft plan has been adapted to suit this. NHO is 11 outlined below:

NHO11 Roosting or Settlement Facilities for Species It is an objective of the Council to require the provision of alternate roosting or settlement facilities for species, such as bird or bat boxes, artificial holts, or other artificially created habitats in developments, where considered appropriate. Swift boxes are one example of this in suitable locations.

This policy has been inserted in order to avoid the possible displacement of species that can co-exist with development and to help with those in endangered status such as the Swift. The creation of artificial ponds or artificial holts could help with dispersal of species from the SAC and SPA sites.

Figure 8(a): This shows an artificial otter holt under construction. Two PVC pipes serve as the entrances, while the main holt is timber framed, with an outer and inner chamber.

Figure 8(b): The finished holt, with earth and brush covering. The two PVC entry pipes can be seen leading into the water in the top right portion of the picture. **Source:** Econorth UK.

The plan-zoning template protects wetland sites of varying types, which are particularly important in an urban and peri-urban area. Both sides of Bunlicky Lake (the eastern and the undesignated western) are included. The western portion is designated as semi-natural open space and this complements areas such as the semi-natural open space along the Ballinacurra creek, which is prone to flooding. Bunlicky Lake does not have to contend with public access

and the issue of feeding of wildfowl and distorting foraging patterns. The creation of pollution, from feeding of wildfowl, does not arise in this location (Sutherland and Hill, 1995, pp 376-8), but may do in locations in the city centre, outside the plan area.

NPWS (2012) states the following "the wetland habitats contained within the River Shannon and River Fergus Estuaries SPA are identified to be of conservation importance for non-breeding (wintering) migratory waterbirds. Therefore, the wetland habitats are considered to be an additional Special Conservation Interest". This would confer an additional importance to wetland and other open space elements within the plan area that would be used by wildfowl. Reference has been made above to wildfowl dispersing from the River Shannon to wet grassland in the Mungret area as the tide covered mudflats and other feeding areas along the main river channel.

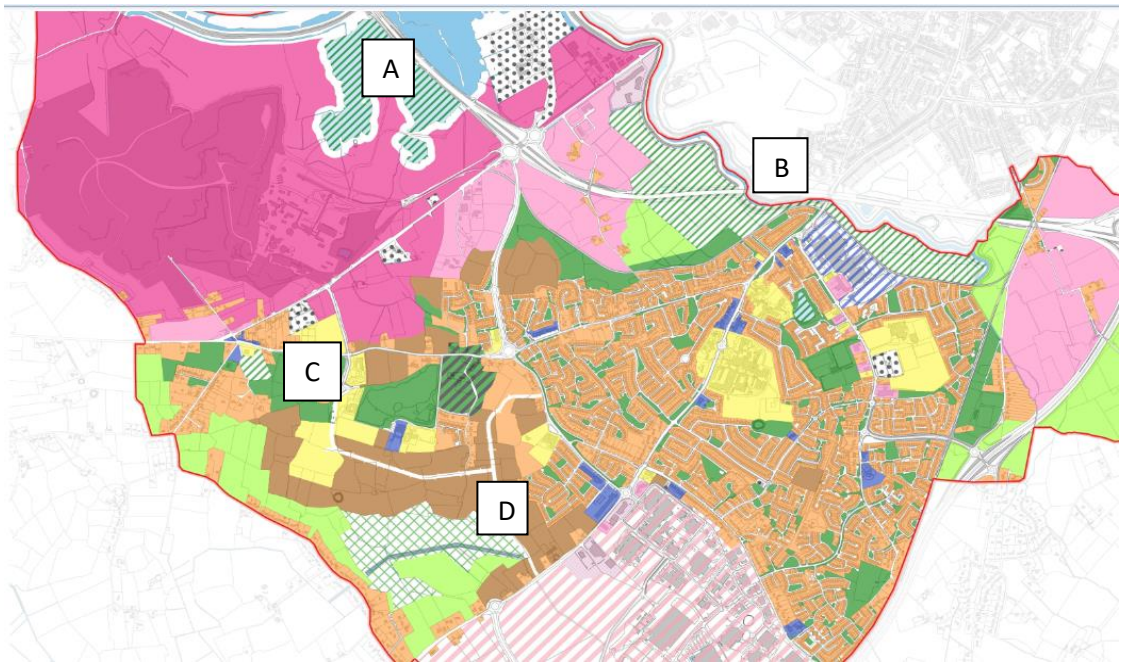

Figure 8: A to D indicate wetland, or seasonally flooded areas within the Southern Environs. A is the eastern part of Bunlicky Lake, B is the semi-natural open space running along the banks of the Ballinacurra Creek and behind the Crescent Shopping Centre. C is the Monteen Turlough behind Mungret Church, while D is the Loughmore Common pNHA.

The conclusions of the report are that, based on the policy content of the plan as presented together with its zoning template is that significant effects on the Natura 2000 sites which are beside and within the plan area is unlikely. This is based on the fact that ecological buffers have been incorporated into the plan and the sensitivities of the Natura 2000 sites have been respected by appropriate zoning.

In the proposed draft plan, there is an extensive range of objectives to protect ecology in the area, both within and outside the Natura 2000 site network. With the River Shannon forming the northern boundary of the plan area and the Ballinacurra Creek, the eastern, both designated sites, their importance is recognised in the plan objectives. However, non-designated ecological sites get equal emphasis as the Monteen Turlough and Bunlicky Lake are also included in the plan content and have protective objectives. This is important as they have hydrological links to the River Shannon and play a role in supporting species of conservation interest.

The most important points to note is that there has been no expansion of the development boundaries of the plan over the previous one. This helps to ensure that no further encroachment would take place on designated sites and lessens the chances of ecological damage.

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