Appropriate Assessment of the Callan Local Area Plan in Relation to the River Barrow and River Nore SAC

Colin Buchanan in association with Openfield Ecological Services

Kilkenny County Council

October 2008

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Summary

As per Annex 2 of EU's methodology (Oxford Brooke University, 2001)

Assessment of the effects of the project or plan on the integrity of the site

Describe the elements of the project or plan (alone or in combination with other projects or plans) that are likely to give rise to significant effects on the site (taken from the screening assessment)	1. Discharge of surface water run-off and poorly treated domestic effluent from new developments could contribute to water pollution in the King's river 2. Further loss of hedgerows that connect the SAC to the surrounding countryside could lead to a small but cumulative impact on the populations of species of conservation importance
Set out the conservation objectives of the site	Conservation objectives are not defined for the site but can be taken as: 1. Maintain the area of key habitats within the sites 2. Maintain or achieve high standards of water quality 3. Maintain the populations of key species within the sites
Describe how the project or plan will effect key species and key habitats. Acknowledge uncertainties and any gaps in information.	Impacts of the Local Area Plan are ultimately dependant on the design and location of developments that arise from it. The precautionary principle is therefore employed and these impacts represent the worst case scenario: 1. Ingress of pollutants could further deteriorate water quality and impact upon water dependant species for which the site is designated (e.g. Otter and Salmon) 2. Continued loss of hedgerow habitat serves to isolate the SAC from the surrounding countryside and this has impacts (albeit unquantifiable) on the health of important species within the site.

Describe how the integrity of the site (determined by structure and function and conservation objectives) is likely to be affected by the project or plan (e.g. loss of habitat, disturbance, disruption, chemical changes, hydrological changes and geological changes, etc.). Acknowledge uncertainties and any gaps in information.	1. Pollution from domestic wastewater and surface water run-off has cumulative impacts on water quality. Many aquatic species are pollution sensitive and their populations may decline, or fail to recover, because of this. 2. Very difficult to quantify the impact to biodiversity in general through the loss of connectivity but this is cumulative and may lead to lower populations of key species.
Describe what mitigation measures are to be introduced to avoid, reduce or remedy the adverse effects on the integrity of the site. Acknowledge uncertainties and any gaps in information.	Five recommendations are made: 1. Ensure that the Appropriate Assessment process is employed for any development within the SAC. Incorporating biodiversity here could lead to significant benefits for conservation aspects of the SAC 2. Ensure that all new developments are required to preserve existing hedgerows and to compensate for loss where this is unavoidable. 3. Ensure that the wastewater treatment plant at Callan has sufficient capacity to properly treat domestic wastewater to Salmonid water quality 4. Integrate Sustainable Drainage Systems (SUDS) into all new developments in the town 5. Where new developments are to take place along the riparian margin, ensure that vegetated buffer zones are created and the invasive Indian (Himalayan) balsam is controlled.

Results of Consultation

Agency contacted	Response

NPWS	Mr Jimi Conroy, Wildlife Ranger with NPWS was consulted from the early stages of the screening process. He was particularly keen to make the following points: 1. The SAC should stand out from the plan as an area of international conservation importance and not merely be included with other designated zonings. This does not preclude all development within the SAC. 2. An opportunity exists for the creation of wetland habitat that could effectively treat pollution from surface water run-off from a number of developments. This would avoid the need for separate attenuation measures for each individual project. 3. Poor water quality in Callan is the paramount issue in relation to the conservation status of the SAC. In this regard the upgrading of capacity at the municipal wastewater treatment plant is a priority.
Southern Regional Fisheries Board	no response

1. Introduction

1.1.1 This report was prepared for Kilkenny County Council by OPENFIELD Ecological Services and Colin Buchanan in accordance with Article 6 of the Habitat Directive. It follows completion of Step 1 of the process, a Screening Statement which determines what impacts are likely on European Sites. The screening report for the Draft Callan LAP was prepared in July 2008 and, in consultation with the National Parks and Wildlife Service, found that significant impacts may be likely to arise. This assessment triggered the need for Step 2: Appropriate Assessment. This report is the Appropriate Assessment with respect to the Draft Castlecomer Local Area Plan.

1.2 European Court of Justice Ruling

1.2.1 A recent European Court of Justice Ruling against Ireland (Case 418/04 EC Commission v Ireland) relates to Ireland's transposition and implementation of the Birds Directive 79/409/EEC, as well as its implementation of relevant articles of the Habitats Directive 92/43/EEC.

1.2.2 The findings of the Court have major implications for the way in which Ireland protects areas important for birds, both designated and undesignated, and by implication, habitats requiring protection under EU law. The ruling requires a more robust and thorough application by all consent authorities, including planning authorities, of the requirement to do an appropriate assessment of the ecological implications of any plan or project, whether within or outside a designated site, which does not directly relate to the management of the site but may impact upon its conservation objectives.

1.2.3 The ruling among other things clarifies that Ireland has not correctly transposed Article 6(3) and (4) of the Habitats Directive 92/43/EEC by not providing explicitly for appropriate assessment of land use plans, as opposed to projects.

1.3 Background to the Habitats Directive

1.3.1 The continuing deterioration of natural habitats and the threats posed to certain species are one of the main concerns of EU environment policy. To tackle these threats the European Community, in 1992, adopted Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive').

1.3.2 The main aim of the Habitats Directive is to promote the maintenance of biodiversity by defining a common framework for the conservation of wild plants and animals and habitats of community interest. Member States are obliged to take measures to maintain or restore natural habitats and wild species at a favourable conservation status and introduce robust protection for those habitats and species of European importance.

1.3.3 The Directive establishes a European ecological network known as "Natura 2000" which comprises special areas of conservation (SAC) which applies to Habitats and species other than birds, and special protection areas (SPA) classified pursuant to Directive 79/409/EEC on the conservation of wild birds (the 'Birds Directive').

1.3.4 Included in Annexes I (Natural habitat types of Community interest) and II (Animal and plant species of Community interest) of the Habitats Directive are

the lists of habitats and species whose conservation requires the designation of SACs. Some of them are defined as "priority" habitats or species (in danger of disappearing). Annex IV lists animal and plant species in need of particularly strict protection. There are 189 habitats in Annex I of the Directive and 788 species in Annex II. Member States must take all necessary measures to guarantee the conservation of habitats in SACs.

1.3.5 The application of the Habitats Directive involves the precautionary principle; that is that plans and projects can only be permitted having ascertained no adverse effect on the integrity of the site. Plans and projects may still, however, be permitted if there are no alternatives, and there are imperative reasons of overriding public interest as to why they should go ahead. In such cases compensatory measures will be necessary to ensure the overall integrity of network of sites.

1.4 Articles 6(3) and 6(4) of the Habitats Directive

1.4.1 Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans or projects affecting Natura 2000 sites and states 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. 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.

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… the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected.'

1.5 The process

1.5.1 Appropriate Assessment is an assessment of the potential effects of a proposed plan - 'in combination' with other plans and projects on one or more European sites. Key stages of the process are set out in Table 1.1. Stages 1 and 2 relate to Article 6(3) of the Habitats Directive, and Stages 3 and 4 relate to Article 6(4).

Table 1.1: Habitats Regulations Assessment Process

Article 6(3)	**Stage 1:**	**Screening** Determining whether the plan - 'in combination' with other plans and projects – is likely to have an adverse effect on a European site.
	Stage 2:	**Appropriate Assessment** Determining whether, in view of the site's conservation objectives, the plan - 'in combination' with other plans and projects – would have an adverse effect (or risk of this) on the integrity of the site (s). If it doesn't, the plan can proceed.

Article 6(4)	**Stage 3:**	**Assessment of alternative solutions** Where the plan is assessed as having an adverse effect (or risk of this) on the integrity of a site(s), there should be an examination of alternatives.
	Stage 4:	**Assessment where no alternative solutions remain and where adverse impacts remain** The 'IROPI test' and compensatory measures

1.5.2 This document focuses primarily on Stage 1, screening and 2, Appropriate Assessment, with the aim of avoiding the need for the more detailed, complex and expensive alternatives and IROPI stages.

1.5.3 It is an iterative process that requires undertaking of repeated rounds of mitigation and assessment of impacts as the plan emerges until any adverse effects on European sites are completely avoided. Such an approach is consistent with the aims of the Habitats Directive, and is likely to minimise time delays and risks to the adoption of the plan.

Key Principles

The precautionary principle

1.5.4 The Habitats Regulations applies the precautionary approach. The precautionary principle requires authorities to act prudently to avoid the possibility of irreversible environmental damage in situations where the scientific evidence is inconclusive but the potential damage could be significant. The precautionary principle applies in all cases when judging the significance of adverse impacts. If information or evidence is lacking, then adverse effects should be assumed.

Hierarchy of Avoidance, Mitigation and Compensation

1.5.5 The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures – see Figure 1.1.

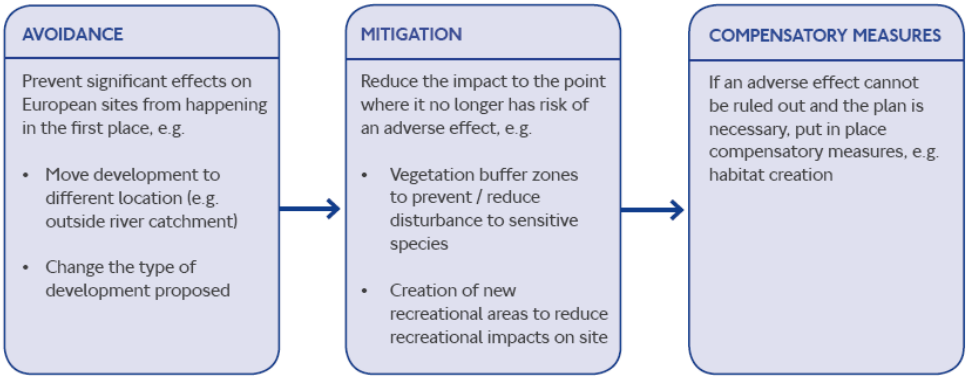

Figure 1.1: Hierarchy of Avoidance, Mitigation and Compensation (Scott Wilson et al., 2006)

2. Stage 1: Screening

2.1.1 A section of the River Barrow and River Nore SAC is situated within the boundary of the Plan. SACs form part of the European Union's (EU) Natura 2000 network of conservation sites and are of international importance (NRA, 2006) . These sites are designated under the EU's Habitats Directive (EC, 1992) and member states are required to maintain them in 'good conservation status'.

2.1.2 The methodology for screening stage referred to the 'Assessment of plans and projects significantly affecting Natura 2000 sites, Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC' (Oxford Brookes University, 2001). In accordance with this guidance, the following methodology was used to compile the screening statement:

1. Management of the Site: determining whether the plan is necessary for the conservation management of the site in question.
2. Description of the Plan: describing the aspects of the plan that may have an impact on the Natura 2000 site.
3. Characteristics of the Site: identifies the conservation aspects of the site and determines whether negative impacts can be expected as a result of the plan. This is done through a literature survey and consultation with relevant stakeholders – particularly the National Parks and Wildlife Service and the Southern Regional Fisheries Board. Using the precautionary principle, and through consultation and a review of published data, it is normally possible to conclude at this point whether potential impacts are likely.
4. Assessment of Significance: Assessing whether an impact is significant or not is dependant on the ecological receptors in question in combination with the scale of the predicted impact. Guidance in this regard is available through the National Road Authority's 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA, 2006) and is best done in consultation with key stakeholders.

2.1.3 Since no field work was carried out to inform this screening study, the analysis is based on a combination of literature review and consultation. A full list of literature sources that have been consulted for this study is given in the **references** section to this report.

2.2 Consultation

2.2.1 The primary stakeholders on this site were judged to be: the National Parks and Wildlife Service (NPWS); the Southern Regional Fisheries Board. Consultation was consequently sought from the following people:

	Stakeholder (name/organisation)	**Form of Consultation**
1	NPWS Development Application Unit	Letter
2	Southern Regional Fisheries Board	Letter/email
3	Mr Jimi Conroy, Wildlife Ranger, NPWS	Phone conversation

Consultation outcomes

2.2.2 Discussions with the Mr Jimi Conroy, Wildlife Ranger with NPWS, highlighted the potential threat to river water quality from surface run-off from additional paved surfaces. Otherwise he believed that the content of the screening document was comprehensive. He paid a visit to the area of SAC within the town and reported that the islands within the river are pasture grassland and do not represent important wetland habitats. He has nevertheless recommended that the full appropriate assessment be carried out for the LAP.

2.2.3 Following further consultation with Mr Conroy at the full Appropriate Assessment stage, he confirmed that capacity problems exist at the Callan municipal wastewater treatment plant and that this is impacting on water quality in the King's river. Therefore, as a priority, he believes that further expansion of the town should not take place without first addressing this issue.

Table 2.1: Stakeholder Consultation

	Stakeholder (Name/Organisation)	**Form Of Consultation**
1	NPWS Development Application Unit	Letter (dated 14th May 2008)
2	Southern Regional Fisheries Board	Letter/email dated 14th May 2008)
3	Jimi Conroy, Wildlife Ranger, NPWS	Phone conversation
4	Environmental Protection Agency Regional Inspectorate, Kilkenny	(letter dated 13th May 2008).

Development Applications Unit

2.2.4 Correspondence received from the Department of Environment, Heritage and Local Government stated that amenity uses close to/or within the River Barrow River Nore cSAC have the potential to impact negatively on its conservation interests, in particular through disturbance to sensitive species and damage to riparian vegetation. Bat species and otters are likely to be present and are strictly protected under the Habitats Directive.

2.2.5 The response refers to policy NH1 and NH2 which provides for protection of the cSAC while policy OS1 provides for open space and amenity uses providing they have no adverse impact on the cSAC. It further acknowledges that extra development also has the potential to lead to a decrease in water quality within the cSAC and Policy IN2 states that the Council will endeavour to upgrade the existing waste water treatment plant to accommodate development as proposed in the LAP. It also notes that the SEA Environmental Report identifies that an improvement in water quality is dependent on the provision of addition waste water treatment facilities and where development is in close proximity to the Kings River it may impact on the cSAC. The response refers to the potential for cumulative impacts as similar LAPs are being prepared at other locations adjacent to the River Barrow and River Nore SAC.

2.2.6 The response acknowledges the conclusions drawn in the screening statement which highlights potential impacts arising from

1. Direct loss and disturbance of habitat;
2. Cumulative impacts from loss of ecological corridors; and
3. Deterioration in water quality.

Conclusions

2.2.7 In consultation with NPWS personnel, the screening stage concluded with the recommendation to proceed to Stage 2: Appropriate Assessment stage in order to fully assess the nature of the following impacts, and to establish avoidance or mitigation measures.

Direct habitat loss and disturbance.

2.2.8 There are two large, open green areas to the north of the town centre that are sandwiched between two channels of the river. It is unclear as to the precise reason for these areas' inclusion in the SAC but it must be assumed that it is due to the presence of an important habitat or species. The LAP proposes opening up the larger of these two areas to the public as an amenity area.

2.2.9 Buffer zones have been zoned as 'open space' along waterways to ensure that habitat loss will not occur through the removal of riparian vegetation.

Cumulative impacts from loss of ecological corridors

2.2.10 A stream runs to the north of the LAP boundary and joins the King's river approximately 3 km further downstream. The area around the stream has been zoned 'residential' and no buffer zone has been marked in to protect riparian vegetation. The loss of this habitat, even along a short stretch of waterway, can disrupt ecological corridors and in doing so can break the connectivity of the SAC with associated habitats.

2.2.11 Similarly, an area of agricultural grassland to the south east of the town currently contains approximately 6 km of hedgerow. It is proposed to zone the area in the LAP as a combination of residential, industrial and mixed use. The loss of this hedgerow would further remove ecological corridors in the region and serve to isolate the SAC from the surrounding countryside.

Comment: How was this measured? It seems a lot

2.2.12 These habitats are also important in regulating surface water flows, attenuating pollutants before entering rivers and in preventing soil erosion.

Water quality.

2.2.13 Changes in land use within the catchment area can impact negatively on water quality in three ways:

1. Increased direct discharges of industrial and domestic wastewater that are inadequately treated;
2. Increased abstraction of river water for domestic and industrial use; and
3. Increased surface water run-off from paved surfaces.

2.2.14 Each of these activities have the potential to increase the concentration of pollutants in the receiving waters if they are not adequately addressed at source. This impact can act in combination with the development of other towns in the Nore catchment area such as Castlecomer, Kilkenny and Thomastown (See

Section 3.21). An analysis of the treatment of waste water[1] for all agglomerations with a population equivalent over 500 during 2004 and 2005 highlighted that current discharges from the Callan local wastewater treatment plant are not meeting the appropriate standards.

[1] Urban Waste Water Discharges in Ireland (EPA, 2007)

3. Stage 2: Appropriate Assessment

3.1.1 Appropriate assessment was carried out in accordance with the following methodologies and guidelines:

1. 'Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'. Annex 2 of this document sets out an assessment template that is used in this report.
2. The 'Guidelines for Ecological Impact Assessment in the United Kingdom' by the Institute of Ecology and Environmental Management (IEEM, 2006).

3.1.2 The Appropriate Assessment must determine whether significant impacts on this status are likely, are if this is deemed to be the case, recommend avoidance or mitigation measures.

- **Stage 2A** – analyse the site(s) and the reasons for its designation, and the underlying trends affecting it.
- **Stage 2B** – analyse the plan, including its key components and how it would be implemented in practice.
- **Stage 2C** - analyse other plans and projects that could contribute to 'in combination' effects.
- **Stage 2D** - analyse how the plan – in combination with other plans and projects - and the site will 'interact' come plan implementation, i.e. Appropriate Assessment.
- **Stage 2E** – where applicable, propose and assess mitigation measures for addressing adverse effects.

3.2 Stage 2A – Analysis of the site and the reasons for its designation, and the underlying trends affecting it.

3.3 The River Barrow and River Nore SAC

3.3.1 As part of the screening study a comprehensive literature review was carried out to gather existing data. Information regarding the site is available through a site synopsis report which is reproduced as an appendix to this report. To date, a management plan has not been published for the River Barrow and River Nore SAC.

3.3.2 The conservation objectives of the site are not explicitly detailed through a management plan however it can be assumed that achieving, or maintaining, 'good ecological status' for each of the conservation aspects will be vital. This includes maintaining the area of important habitats, good water quality and the populations of important species.

3.3.3 The River Barrow and River Nore SAC (site code: 2162) is a large site consisting predominantly of river channel but also encompassing important areas of riparian and woodland habitats. These habitats support a number of species of conservation concern. Only a small portion of this site is contained within the boundary of the LAP. Table 3.1 details the conservation aspects of the SAC.

Figure 3.1: King's River traversing the centre of Callan

3.4 Trends

3.4.1 In the absence of the LAP the fragmentation of habitats may continue through piecemeal developments and the continued removal of hedgerows. The presence of Indian Balsam, if left unchecked, will ultimately denude the areas of river bank in which it is present and may colonise new areas.

3.4.2 Water quality in the King's river may improve with the implementation of the Water Framework Directive and the forthcoming Program of Measures from the South Eastern River Basin District. However continued built development within the town, and the cumulative removal of biodiversity features, diminishes the capacity of the land to treat pollutants in surface water run-off. This can lead to a decrease in overall river water quality. If, as suspected, the main channel of the King's river has been artificially altered, then recovery to the original ecological state is not possible without human intervention.

3.5 Stage 2B – analysis of the plan, including its key components

3.5.1 The Callan Local Area Plan 2008-2014 provides the written statement and accompanying maps that will manage the development and growth of Callan the six year plan period.

3.5.2 The Callan Local Area Plan 2008-2014 (the Plan) has been prepared in accordance with the requirements of the Planning and Development Act 2000 (as amended 2002 and 2006) and sets out an overall strategy for the proper planning and sustainable development of the town.

3.5.3 The Plan will comprise the statutory land use plan for the town in the promotion and regulation of development and therefore provides a clear vision for Callan, reflecting the needs of the existing and future population. It will provide for the development of Callan by setting out zoning and other objectives for the proper planning and sustainable development of the town, considering the needs of the

town, and informing and coordinating decisions on planning applications. The Plan plays a key role in translating overarching County Development Plan policies and objectives at the local level.

3.6 Zone of Influence of the Plan

3.6.1 The zone of influence of the LAP is shown in figure 1. The SAC is a large site, only a small part of which runs through Callan. While the water is the main feature of the site, there is significant riparian vegetation that falls within the site boundary. Some terrestrial portions exist in the town itself however the reasons for the inclusion of these areas were not know prior to this study.

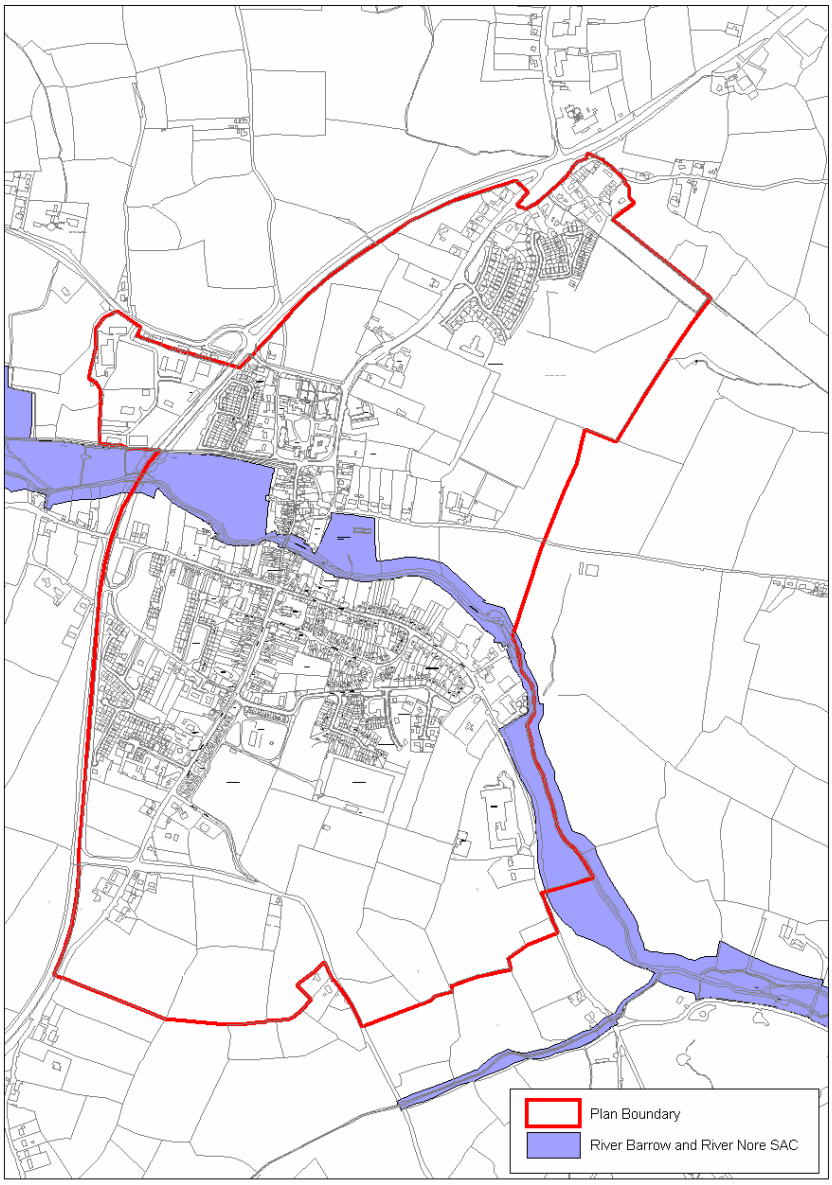

Figure 3.1: Zone of Influence of the Plan with respect to the SAC

Plan Objectives

3.6.2 The following Plan objectives have been generated through analysis and reflection of the general and strategic context of the study area. These plan objectives provide the framework for the future development of Callan:

1. To support town centre vitality and viability by highlighting a number of opportunity sites for retail development in the town centre;

2. To provide high quality new residential areas with good quality connections to open spaces and community and retail facilities;
3. To address deficits with respect to retail facilities;
4. To protect and enhance the character and integrity of existing natural and historic built environments;
5. To facilitate sustainable economic development;
6. To improve linkages within the town; and
7. Support the re use of land and buildings, particularly though backland development

3.7 Strategic Vision

By 2020, Callan will be a vibrant town of between 4,000 and 5,000 persons supported by a growth in retail services, jobs, tourism and community facilities. Connections within the town will be improved though the additional road infrastructure to the south east and improvements to pedestrian and cycle links. Additional retail development and associated town centre improvements have improved vitality of the town and helped to regenerate a number of properties on Bridge street. A phased and masterplanned approach to newly developed areas at Cannafahy and Bolton has helped to match demand for new housing and employment development with supply and create sustainable areas of high quality urban design which reflects and respects the existing character of the built and natural environment.

3.8 Draft Plan Zoning

3.8.1 The proposed amendments to the zoning with respect to the previous plan are set out in **Table 3.2** and indicated on the zoning map that accompanies this Plan. The Plan includes a number of zoning amendments.

Table 3.2: Proposed Zoning Capacity (hectares)

	Previous	Proposed	Remaining Capacity (proposed zoning)
Residential	103.19	101.21	34.29 (ex. capacity in mixed use areas)
Industrial	30.22	24.20	12.55
Open Space	14.68	12.60	-
General Business	11.23	13.03	3.79
Community	12.94	14.31	-
Agricultural	1.38	16.8	
Mixed Use	0	7.69	7.69
Total	**176.33**	**187.85**	

3.9 Stage 2C: Determining whether, in view of the site's conservation objectives, the plan, 'in combination' with other plans and projects, would have an adverse effect on the integrity of the site.

3.9.1 Information regarding the site is available through a site synopsis report which has been reproduced as an appendix to this report. To date, no management plan has not been published for the River Barrow and River Nore SAC.

3.9.2 The River Barrow and River Nore SAC (site code: 2162) is a large site consisting predominantly of river channel but also encompassing important areas of riparian and woodland habitats. These habitats support a number of species of conservation concern. Only a small portion of this site is contained within the boundary of the LAP. **Table 3.3** details the conservation aspects of the SAC which are relevant to the zone of influence of the Plan. Relevance is interpreted as meaning the likely presence of the habitat/species in the study area and is taken from relevant literature sources. The likelihood of impact is based on the potential presence of habitats from aerial photography and presence of suitable habitats for different species.

3.9.3 Consideration of relevance and the presence of suitable habitats, the table details the aspects of the Plan that are likely to cause impacts.

Table 3.3: Conservation aspects of the River Barrow and River Nore SAC

Aspect	Level of Protection	Relevant[2]	Likelihood of potential impacts[3]	Aspect of LAP likely to cause impact
Alluvial wet woodland (code: 91E0)	Habitats Directive Annex I priority	Possible	Possible	habitat loss/disturbance due to 'open space' zoning
Petrifying springs with tufa formation (code: 7220)		Possible	Possible	
Atlantic salt meadows (code: 1330)	Habitats Directive Annex I	No	None	-
Mediterranean salt meadows (code: 1410)		No	None	-
Old oak woodlands (code: 91A0)		Possible	Possible	habitat loss/disturbance due to 'open space' zoning
Eutrophic tall herbs (code: 6430)		Possible	Possible	
Floating river vegetation (code: 3260)		Possible	Possible	water pollution from increased population
Estuary (code: 1130)		No	None	-
Salicornia mudflats (code: 1310)		No	None	-
Dry heath (code: 4030)		Possible	Possible	habitat loss/disturbance due to 'open space' zoning
Tidal mudflats (code: 1140)		No	None	
Sea Lamprey *Petromyzon marinus*	Habitats Directive Annex II	Yes	Possible	water pollution from increased population
Brook Lamprey *Lampetra planeri*		Yes	Possible	
Semi-aquatic snail *Vertigo moulinsiana*		No	None	-
River Lamprey *Lampetra fluviatilis*	Habitats Directive	Yes	Possible	water pollution from increased

[2] Relevance is interpreted as meaning the likely presence of the habitat/species in the study area and is taken from relevant literature sources
[3] The likelihood of impact is based on the potential presence of habitats from aerial photography and presence of suitable habitats for different species

Aspect	Level of Protection	Relevant[2]	Likelihood of potential impacts[3]	Aspect of LAP likely to cause impact
Freshwater Pearl Mussel *Margaritifera margaritifera*	Annex II, V	Yes - downstream	Possible	population
Freshwater Crayfish *Austropotamobium pallipes*		Yes	Possible	
Twaite Shad *Alosa fallax fallax*		Yes	Possible	
Atlantic Salmon *Salmo salar*		Yes	Possible	
Otter *Lutra lutra*		Yes	Possible	habitat loss/disturbance due to 'open space' zoning
Killarney fern *Trichomanes speciosum*	Habitats Directive Annex II, IV; Flora Protection Order, 1999	No	None	-
Daubenton's bat *Myotis daubentoni*	Habitats Directive Annex IV; Wildlife Act, 2000	Yes	Possible	habitat loss/disturbance due to 'open space' zoning
Irish hare *Lepus timidus hibernicus*	Habitats Directive Annex V; Wildlife Act, 2000	Yes	Possible	
Common frog *Rana temporaria*		Yes	Possible	
Badger *Meles meles*	Wildlife Act, 2000	Yes	Possible	
Pygmy shrew *Sorex minutus*		Yes	Possible	
Greenland white-fronted goose *Anser albifrons flavirostris*	Birds Directive Annex I; Wildlife Act 2000	No	None	-
Golden plover *Pluvialis apricaria*		Possible	Unlikely	-
Whooper swan *Cygnus cygnus*		No	None	-

Aspect	Level of Protection	Relevant[2]	Likelihood of potential impacts[3]	Aspect of LAP likely to cause impact
Kingfisher *Alcedo atthis*		Possible	Possible	habitat loss/disturbance due to 'open space' zoning
Perigrine *Falco perigrinus*		Possible	Possible	
Bewick's swan *Cygnus columbianus bewickii*		No	None	-
Bar-tailed godwit *Limosa lapponica*	-	No	None	-
Smelt *Osmerus eperlanus*	-	Yes	Possible	water pollution from increased population
Meadow Barley *Hordeum secalinum*	Flora Protection Order, 1999	No	None	-
Divided sedge *Carex divisa*		No	None	-
Clustered clover *Trfolium glomeratum*		No	None	-
Basil-thyme *Acinos arvensis*		No	None	-
Narrow-leaved hemp nettle *Galeopsis angustifolia*		No	None	-
Borrer's saltmarsh-grass *Puccinellia fasciculata*		No	None	-
Opposite-leaved pondweed *Groenlandia densa*	Flora Protection Order, 1999	No	None	-
Autumn crocus *Colchicum autumnale*		No	None	-
Wild sage *Salvia verbenaca*		No	None	-
Nettle-leaved bellflower *Campanula trachelium*		No	None	-

Blue fleabane *Erigeron acer*		No	None	-
Greater broomrape *Orobanche rapum-genistae*		No	None	-
Bird cherry *Prunus padus*	-	Yes	Possible	habitat loss/disturbance due to 'open space' zoning
Rare lichens	-	unknown	unknown	
Thin-spiked wood-sedge *Carex strigosa*	-	Yes	Possible	
Fly orchid *Orphys insectifera*	-	No	None	-
Field garlic *Allium oleroceum*	-	No	None	-
Summer snowflake *Leucojum aestivum*	-	No	None	-
Saw-wort *Serratula tinctoria*	-	No	None	
Duck mussel *Anodonta anatina*	-	No	None	
Swan mussel *Anodonta cygnea*	-	No	None	

3.10 Impact Assessment

3.11 Scope of Site Survey

3.11.1 The screening study identified three potential impacts on the SAC as a result of the LAP. These are:

1. Direct loss and disturbance of habitat;
2. Cumulative impacts from loss of ecological corridors; and
3. Deterioration in water quality.

3.11.2 The site survey was therefore focussed on areas of SAC that fell within the 'open space' designation as well as potential wildlife corridors that are associated with it. In addition, macroinvertebrate samples were taken at three locations along the King's river to assess current water quality.

Methodology

3.11.3 Two site visits were carried out during August 2008. The site was surveyed in accordance with the Heritage Council's draft Habitat Survey guidelines (Heritage Council, 2002) and the 'Guidelines for Baseline Ecological Assessment' from the Institute of Environmental Assessment (IEA, 1995). Habitats were identified in

accordance with Fossitt's 'Guide to Habitats in Ireland' (Fossitt, 2000). A species list for each habitat was compiled and target notes were made. Targets notes and location information were taken with a *Garmin GPS 60*. Data were then uploaded to the *ArcView 9.2* GIS software suite.

3.11.4 The macroinvertebrate samples were taken in accordance with I.S. EN ISO 5667-3:2004: Water Quality – Sampling – Part 3: Guidance on the Preservation and Handling of Water Samples and ISO 7828: Water Quality – Methods of biological sampling – Guidance on Handnet sampling of aquatic benthic macro-invertebrates. A 2-minute kick sample was taken with stone washing and the sample was preserved in 70% iso-propanol. The sample was subsequently analysed following the EPA's Q-Value methodology (Toner et al., 2005).

Constraints

3.11.5 The month of August lies well within the optimal season for habitat survey (NRA, 2006).

3.11.6 It is important to note that a baseline survey does not attempt to catalogue all the species that are either present on the site or that may use the site for essential resources (foraging, roosting etc.). Whole groups of species such as invertebrates or bats may therefore go unrecorded. However, this need not necessarily be an obstacle to a full ecological assessment. A baseline survey uses a group of indicator species, vascular plants, to determine the extent and conservation status of individual land parcels. It is therefore not necessary to identify species of other taxonomic groups. Target notes are taken where important features are noted during the survey and where the presence of a protected species is revealed, further studies may be required.

3.11.7 Heavy rain during the month of August meant that levels in the King's river were exceptionally high. As a result it was not possible to survey for Otters (these animals habitually defecate on rocks and stony ledges and this is the principle indicator of Otter presence. High water levels submerge these features and wash away older droppings).

3.11.8 The channel of the King's river as it runs through Callan is deep and fast moving, and the banks tend to be steep and show signs of erosion. These tend to be features of a river on which drainage works have been carried out. The Southern Regional Fisheries Board were contacted to confirm if this is the case but a response was not received.

3.12 Flora

3.12.1 The full length of the King's river, within the boundary of the LAP, was surveyed. In total five habitats were identified. This classification follows Fossitt's system (Fossitt, 2000) and as with any means of classification, habitats do not always fit neatly within defined limits. Features of more than one habitat may be present, particularly at the boundary between one habitat and the next. However these limitations can be addressed through full descriptions of each of the habitat parcels. Full species lists for each of the habitats can be found in Appendix 2 of this report.

3.12.2 These habitats are shown in figure 2 and are described below.

Depositing/Lowland Rivers – FW2

3.12.3 This area includes the main channel of the King's river. As mentioned previously, it is believed that the river has been artificially deepened, probably to reduce the risk of flooding. This is in evidence because the depth of the water is excessive given the narrow width of the river. This is known as 'arterial drainage' and is not uncommon in Ireland. Works of this type impact on the ecology of the habitat as it removes substrate and creates uniformity – effectively eliminating habitats and spawning places for Salmonid fish (Atlantic salmon *Salmo salar* and Trout *Salmo trutta*). Where riparian vegetation exists this can stabilise the banks but along much of the river this vegetation has been removed. The banks here are very vulnerable to erosion and much evidence of this is in existance. Where cattle have access to the water, for instance in farmland to the east of the town, this can exacerbate the problem.

3.12.4 Where the river bank is vegetated the margin tends to be narrow, with a single line of trees, typically Willow *Salix sp*. or Alder *Alnus glutinosa*. While it may broaden in some places, at no stage would it qualify as Riparian woodland (an important habitat type). Much in evidence is the invasive weed, Indian (Himalayan) balsam *Impatiens glandulifera* which has been identified as "one of the highest risk (most unwanted) non-native invasive species in Ireland" (Kelly et al., 2008). This species is problematic in protected areas because its profuse growth out-competes native flora where it exists. Upon dying back in winter, it leaves behind bare banks which are susceptible to erosion.

3.12.5 Within the water itself, most stretches are too deep to harbour in-stream plants. Where the water is shallow enough there are luxuriant mats of Water cress *Nasturtium officinale*.

(Mixed) Broadleaved woodland – WD1

3.12.6 This small woodland occupies the *motte*[4] in the field to the west of the town centre. It is mostly wooded, with a mixture of native and non-native species such as Sycamore *Acer pseudoplatanus*, Ash *Fraxinus excelsior* and Scots pine *Pinus sylvestris*. It is situated on a hill, the eastern facing side of which is not wooded but is more characteristic of a nutrient poor grassland community. Species here include Field scabious *Knautia arvensis*, Crested dog's-tail *Cynosurus cristatus*, and emerging saplings of Blackthorn *Prunus spinosa*.

3.12.7 This woodland is more of archaeological than ecological interest. Its small size limits the number of woodland specialists that may be present and there is a large proportion of the non-native Sycamore.

Drainage ditches – FW4

3.12.8 This is a stretch of temporary waterway that runs to the north of the field with the *motte*. From the screening study it was though that this was a separate channel of the King's river but inspections on both days of field survey indicated that this is not the case. While water was present on August 19th, following a prolonged period of heavy rain, on August 26th, following a relatively drier period, all sign of

[4] This term refers to a common form of Anglo-Norman fortification which is a form of castle (Mitchell & Ryan, 2007)

water had disappeared. This feature is reflected in the floral composition where there is a mixture of wetland species (e.g. Wild angelica *Angelica sylvestris*, Horsetails *Equisetum sp.*, and Butterbur *Petasites hydridus*) and species typical of rough grassland (e.g. Cock's-foot *Dactylis glomerata*, Great willowherb *Epilobium angustifolium* and Hedge bindweed *Calystegia sepium*).

Improved agricultural grassland – GA1

3.12.9 Grassland that has been 'improved' through the intensive application of industrial fertilisers has a very low level of floral diversity and is consequently of little conservation value. This habitat type includes areas within the boundary of the SAC such as the field with the *motte* and the 'Abbey meadow' to the east of the town. It is not known why these areas are a part of the designation. Only a small number of grasses and persistent weeds can be found here, including Curled dock *Rumex crispus*, Nettle *Urtica dioica*, Common couch *Elymus repens* and Thistles *Cirsium sp*.

Hedgerow – WL1

3.12.10 Hedgerows are woodland remnants that form field boundaries and are typical of the Irish landscape. They are hugely important ecological features for harbouring a range of woodland flora and fauna, maintaining soil porosity, pollination, carbon sequestration and as landscape features. They are critical ecological corridors that allow for the migration and genetic mixing of species and in this way can help maintain the health of protected conservation areas. Hedgerows are particularly vulnerable to cumulative impacts such as where they are removed for developments and not replaced.

3.12.11 In Callan a number of hedgerows remain and are characterised by native Irish species such as Ash, Hazel *Corylus avellana*, and Hawthorn *Crataegus monogyna*, with a field layer that includes Square-stemmed St. John's wort *Hypericum tetrapterum*, Honeysuckle *Lonicera periclymenum*, Meadowsweet *Filipendula ulmaria* and Yarrow *Achillea millefolium*.

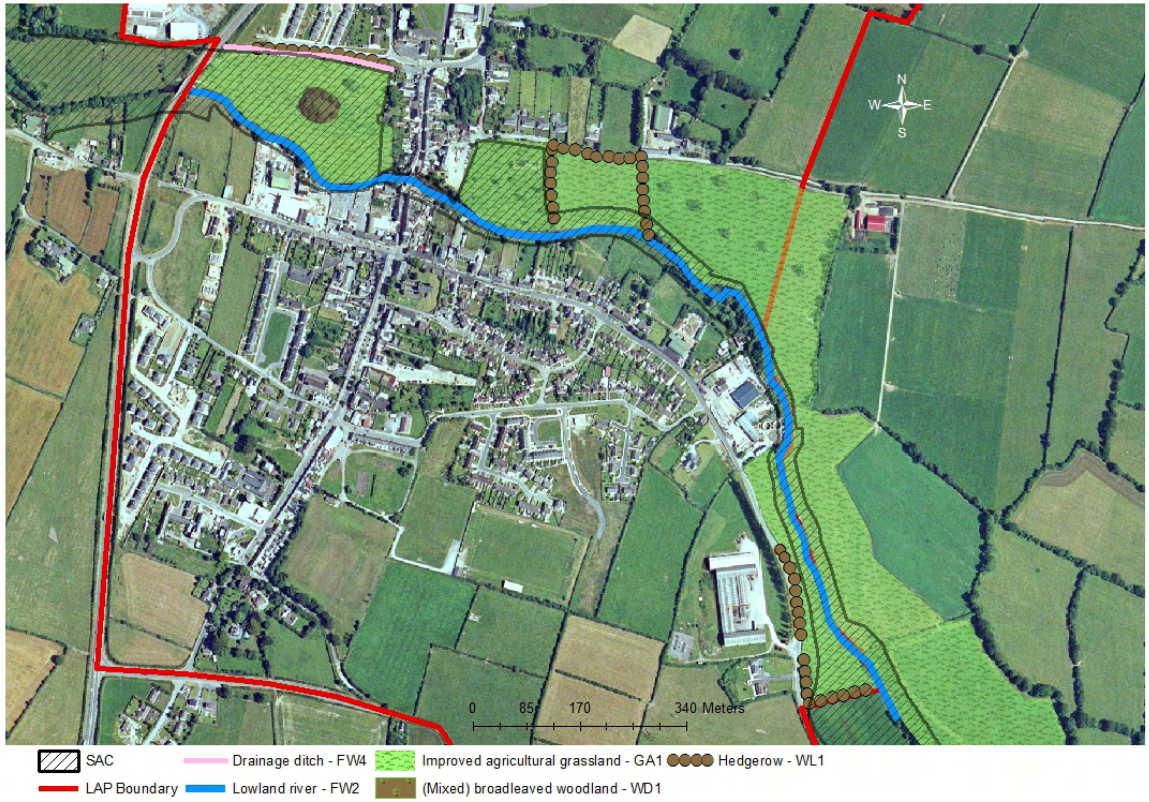

Figure 3.2: Habitats associated with the Kings River

3.12.12 In **Figure 3.3** the SAC can be seen to encompass a sizable terrestrial portion of land to the east of the industrial buildings. It is not clear why this area has been included in the designation. The aerial photograph shows that it was probably cultivated land but the lower two fields have now been extensively developed and land has been cleared right up to the riparian margin.

3.12.13 The remaining hedgerow has been damaged to the south and centre as vegetation has been removed and gaps have appeared. To the north it is intact and is characterised by mature Ash, Hawthorn and occasional Oak *Quercus sp.*

3.13 Fauna

Mammals

3.13.2 Since a dedicated fauna survey was not carried out, the presence of various species is deduced from the presence of suitable habitat and this is shown in Table 3.3. Otter *Lutra lutra* would be expected along the King's river although a search for spraint (droppings) was not permitted due to the high water levels (see section 2.2).

Birds

3.13.3 Incidental recordings of birds were made and include many typical countryside species: Robin *Erithacus rubecula*; Swallow *Hirundo rustica*, Moorhen *Gallinula chloropus,* Grey wagtail *Motacilla citreola* and Chaffinch *Fringilla coelebs*. No dedicated bird survey was carried out and so this list not from exhaustive. The Swallow is listed in BirdWatch Ireland's Amber list of birds of conservation concern in Ireland (Lynas et al., 2007). This is due to a decline in their population across Europe.

Amphibians

3.13.4 No direct records of amphibians were made during the field surveys. Common frog *Rana temporaria* and Smooth newt *Triturus vulgaris* are both are protected under the Wildlife (Amendment) Act, 2000 while the frog is also protected under Annex V of the Habitats Directive. These species require wet areas, and breed in slow moving and/or shallow water. They do not colonise rivers as fish predate extensively on them. There are no areas of suitable habitat for amphibians in the study area with the exception of the drainage ditch which may harbour Common frog and could provide potential spawning sites in Spring.

Fish

3.13.5 The King's river catchment is known to provide habitat to species of conservation importance including Salmon, Sea Lamprey *Petromyzon marinus*, River lamprey *Lampetra fluviatilis* and Brook lamprey *L. planeri*, all of which are protected under Annex II of the Habitats Directive. These species require clean, well oxygenated gravel substrates for spawning (Hendry K & Cragg-Hine D, 2003; Maitland PS,

2003) and this feature is not present in the study area. Nevertheless, adults of these species are likely to pass through during migration to their spawning grounds.

Invertebrates

3.13.6 A large number of invertebrate species are likely to be present in the area and all habitats present are suitable for a wide range of species. It is unlikely that protected species are present on the site but this is more to do with the limited number of protected invertebrates in Ireland and a similarly poor level of data.

Table 3.3: Mammals known from the area and for there is suitable habitat (Mitchell-Jones et al., 1999)

Species	Level of Protection	Habitat
Otter *Lutra lutra*	Annex II & IV Habitats Directive; Wildlife (Amendment) Act, 2000	Rivers and wetlands
Whiskered bat *Myotis mystacinus*	Annex IV Habitats Directive; Wildlife (Amendment) Act, 2000	Gardens, parks and riparian habitats
Leisler's bat *Nyctalus leisleri*		Open areas roosting in attics
Common pipistrelle *Pipistrellus pipistrellus*		Farmland, woodland and urban areas
Daubenton's bat *Myotis daubentonii*		Woodlands and bridges associated with open water
Hedgehog *Erinaceus europaeus*	Wildlife (Amendment) Act, 2000	Woodlands and hedgerows
Irish stoat *Mustela erminea hibernica*		Wide range of habitats
Badger *Meles meles*		Farmland, woodland and urban areas

3.14 Water Quality

3.14.1 Water quality can be determined through analysing macro-invertebrates (i.e. those organisms that are visible to the naked eye) as these act as indicator species for the health of the river ecosystem. In Ireland, the EPA have developed a detailed methodology for this and is known as the Q-Value. Q-Values vary from Q1: Seriously polluted, through to Q5: Unpolluted (Toner et al., 2005). The EPA conduct regular monitoring throughout the country and one monitoring station exists in Callan where the King's river was most recently assessed as Q3: Moderately polluted (2005). To the south of the town there appears to be some improvement where the Q-Value is 3-4: Slightly polluted. There are no monitoring stations upstream of the town. Full details of the Q-Value assessments are given in Appendix 4

3.14.2 For this study, three macro-invertebrate kick samples were taken and the location of these is shown in **Figure 3.3**. The water at a fourth location to the west of the town was too deep to safely sample. This is unfortunate as it would be useful to know what conditions exist upstream of the town. **Figure 3.3** shows the locations and status of macroinvertebrate sampling from both the EPA and this study.

3.14.3 What was thought to be a river running to the north of the LAP area was found, upon inspection, to be a drainage ditch that disappears underground upon crossing the main N76 (see **Figure 3.3**).

Figure 3.3: Ecological Water Quality in the Callan Area

3.14.4 The flow of water in this figure is from east to west. As can be seen the quality of water is poor over all with no change from Q3 status until well downstream. It is not possible to fully ascertain the causes of this poor status as it is not necessarily a result of direct, or indirect, pollution sources. The three most likely causes include:

- Artificial alteration of the channel which can result in diminished ecological status (Toner et al., 2005; O'Grady, 2006) however no arterial drainage seems to have taken place.
- The location of Callan in a low lying area and at some distance downstream of the headwaters which means that it is susceptible to pollution from nutrient run-off from a large catchment area.

- wastewater is not being treated to a sufficiently high standard in the municipal plant, which has been confirm through data collected by the EPA. (EPA, 2007)

Whilst all these factors work in combination to result in poor quality water, the treatment of wastewater is the most relevant to the Local Area Plan.

3.15 Determination of Value

3.15.1 Appendix 3 of the NRA guidelines (NRA, 2006) outlines a 'site evaluation scheme' that is designed to assign value to ecological features. Table 3.5 lists the habitats that were recorded and their associated value.

Table 3.4: Valuation of habitats with reference to Appendix 3 of the NRA guidance

Habitat	Rating	Criteria
Any area within the SAC (Drainage Ditch – FW4; Improved Agricultural Grassland – GA1; (Mixed) Broadleaved Woodland (WD1))	A – Internationally important	Sites designated as SAC under the EU's Habitats Directive
Hedgerow – WL1	D – Moderate value, locally important	Sites containing some semi-natural habitat or locally important for wildlife.

Comment: This is known as the Mill Race

3.16 Impact prediction

3.16.1 A number of potential impacts arising from the plan are unquantifiable, particularly with respect to the detailed design of development. This makes it impossible to accurately quantify some impacts that may occur as a result of planning decisions arising from the plan. It is therefore appropriate to apply the precautionary principle and so the impacts described below represent a worst case scenario.

3.16.2 The potential impacts as identified in the screening statement (and reiterated in section 1.8) are examined here in further detail.

Direct loss of habitat and disturbance

3.16.3 Areas of SAC have been zoned as 'open space' and this can lead to proposals for amenity development within protected areas. In this case the open, terrestrial areas are of low conservation value, being predominantly Improved agricultural grassland. They are unlikely to provide resources for species detailed in **Table 3.3** and do no represent a semi-natural habitat type. There is therefore potential to enhance this area for biodiversity as well as amenity, for instance through habitat creation.

3.16.4 The zoning of the river and its banks as 'open space' may result in the loss of riparian vegetation. However, the impact is likely to be insignificant as the banks of the King's river were found to be poorly vegetated and devoid of vegetation in

places. A significant infestation of the invasive alien Indian (Himalayan) Balsam, may mean there is scope for enhancement.

Loss of ecological corridors

3.16.5 The stream to the north that was identified as a potentially important corridor was subsequently discovered to be a drainage ditch that runs underground (either naturally or by culverting) where it intersects with the LAP area. Zoning in this area can therefore not further disrupt ecological corridors since none exist.

Comment: If this is the mill race, then it directly connects to the site at the bottom of the abbey meadow.

3.16.6 As relatively little of hedgerow habitat is physically connected to the SAC, the loss of hedgerow is not likely to be significant in the context of the integrity of the designated site. However, this does not discount the value and significance of hedgerows elsewhere in the plan area.

Water Quality

3.16.7 Through historic monitoring from the EPA, as well as analysis carried out for this study, the quality of water in the Callan vicinity is known to be moderately polluted, or of poor status. This is likely to be the result of poorly treated domestic wastewater discharging to the river and diffuse run-off of agricultural nutrients from throughout the catchment.

3.16.8 With no upgrade works for the wastewater treatment plant planned, continued development of the town will lead to further deterioration of water quality – a prime conservation aspect of the SAC. This will be further compounded by surface water run-off from hard surfaces that have the potential to pollute waterways, especially with hydrocarbons (oil residues) and particulate matter.

3.17 Nature of predicted impacts

3.17.1 The purpose of this section is to quantify and determine the significance of three potential impacts from this plan.

1. **Direct loss of habitat and disturbance** within the SAC through designation of land as ‘open space’.
2. **Loss of ecological corridors** that are near to, or leading to indirect impacts on the health of populations of important species listed in Tables 3.2 and 3.3.
3. **Deterioration of water quality** stemming discharge of pollutants, particularly particulate matter and hydrocarbons, to the river Dinin from surface water run-off as a result of new built developments adjacent to the river.

3.18 The Nature of Predicted Impacts

3.18.1 The nature of the impacts can be summarised in a table as follows:

Table 3.5: Nature of Predicted Impacts

Table 3.6: Insert Table Title

Impact	Direct/ Indirect	Cumulative	Permanent/ Temporary [5]	Positive/ Negative	Reversible ?
1 Direct loss of habitat and disturbance	Direct	No	Permanent	Negative	Yes
2 Loss of ecological corridors	Indirect	Yes	Permanent	Negative	No
3 Deterioration of water quality	Direct & Indirect	Yes	Permanent	Negative	Yes

3.19 Scale and likelihood of predicted impacts

3.19.1 Impacts are quantified where possible, both in absolute terms and as an impact of the whole resource.

[5] The NRA guidelines (2006) define 'permanent' as an impact lasting over 60 years

Table 3.7: Scale and Likelihood of Predicted Impacts

Impact	Magnitude	As Proportion Of Resource	Likelihood
1 Direct loss of habitat and disturbance	The field with the motte is ~4 ha including the small woodland There is ~1 km of river that may be impacted stretching from the 'Abbey meadow' to the point where the King's river leaves the LAP area	Represents one of two similar areas in the town (the other being the Abbey meadows, ~1.7 ha ~60% of the total river length through the LAP area	Possible. Depends on whether biodiversity is integrated into the plans for the site Possible depending on development proposals in this area
2 Loss of ecological corridors	~6.6 km of hedgerow under threat	~26% of the total resource within the LAP boundary	Likely
3 Deterioration of water quality	Not possible to determine due to insufficient data	Water quality already poor, indicates little capacity to deal with further pollutant	Likely

3.20 Assessment of impact significance

3.20.1 Appendix 4 of the NRA guidelines (NRA, 2006) provides guidance on assessing impact significance. This is done by combining the magnitude of the impact (from **sections 3.2 and 3.3)** with the value of the ecological resource as assessed in **section 2.7.** The 'site' that is referred to is the overall area and not necessarily the designated site.

3.20.2 **Table 3.8: Impact Significance**

Impact	Significance
1 Direct loss of habitat and disturbance	Moderate negative – however potential for beneficial impacts on a small part of a site depending on development
2 Loss of ecological corridors	Moderate negative – Permanent impacts on a large part of a category D site
3 Deterioration of water quality	Severe negative – Extensive[6], medium-term[7] impacts on a category A site

[6] Defined as an impact measurable more than 250m from the impact source (NRA, 2006)
[7] Defined as an impact of 7-15 years duration

3.20.3 Overall, the following statements can be made:

- **Severe Negative** impacts may occur as a result of additional pollutant impacts and ecological deterioration of the King's river. This will result from direct discharges of poorly treated wastewater and surface run-off from concreted, or hard surfaces.
- **Moderate Negative** impacts may occur through the continued removal of hedgerows that connect the SAC with the surrounding countryside.
- **Negative** impacts may occur through the development of riparian and amenity area.

3.20.4 The NRA guidelines do not specify at what point an impact becomes 'significant'. The IEEM guidelines suggest that an impact is 'significant at levels of 'severe negative' and above. Following this criteria, the impact of surface water run-off is significant, while that of hedgerow removal is not.

3.20.5 Mitigation is required where significant impacts are predicted however, it is desirable to mitigate for all impacts so that the Plan results in zero negative impacts on the integrity of the SAC. These issues are addressed in section 4.

4. Stage 2D – analysis of 'in combination' effects

Introduction

The Habitats Directive requires competent authorities to make an appropriate assessment of any plan or project which is likely to have a significant effect either alone or in combination with other plans and projects. As identified in Section 3.20, the Plan is likely to give rise to the following impacts on the River Nore and River Barrow SAC:

- Direct Loss and Disturbance
- Loss of undesignated Habitats
- Deterioration of Water Quality

4.1.2 Habitats Regulations Assessment / Appropriate Assessment, should be 'appropriate' in terms of the level detail and fit for purpose particularly in terms of the consideration of in combination effects.

4.1.3 The consideration of in combination effects has been limited to the issue of water quality as it is considered that loss of habitats and loss of non designated habitats are localised effects that can be dealt with through appropriate measures within the plan.

4.1.4 The consideration of the in combination effect on water quality has been considered through an analysis of other plans where Appropriate Assessment is currently underway. The following plans have been therefore been considered:

- South Eastern River Basin District Management Plan
- The Kilkenny County Development Plan
- Kilkenny City and Environs Development Plan
- Castlecomer Waste Water Treatment Upgrade
- Castlecomer Draft Local Area Plan
- Ferrybank – Belview Local Area Plan
- Graiguenamanagh Draft Local Area Plan
- Bennettsbridge Local Area Plan
- Thomastown Draft Local Area Plan

4.1.5 The location of the settlements to which these apply are highlighted in the **Figure 3.5.**

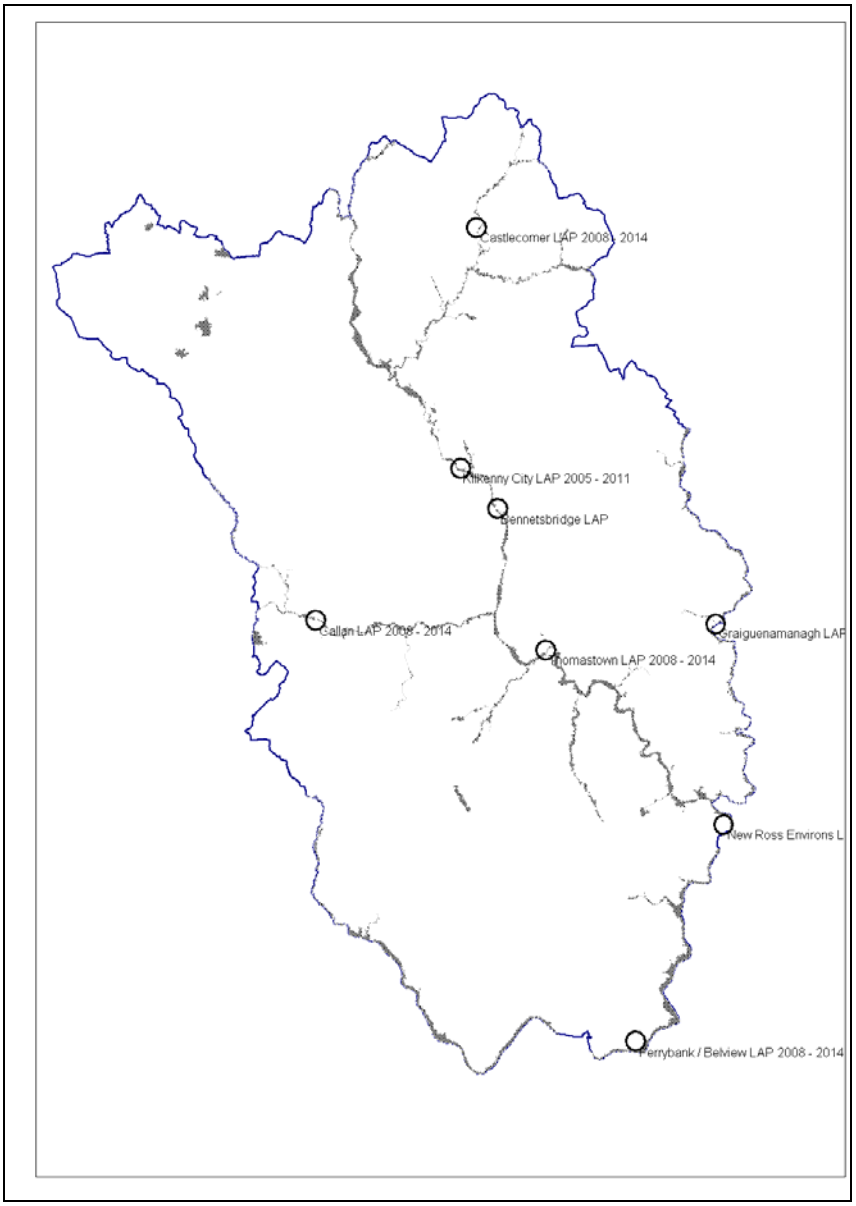

Figure 4.1: Location of other plans

South Eastern River Basin District Management Plan

4.1.6 Under the Water Framework Directive (Directive 2000/60/EC) all Irish waters must achieve 'good ecological status' by 2015. The South Eastern River Basin District encompasses all of county Kilkenny and the report, 'Water Matters' (SERBD, 2007) was recently published. In 2008 a program of measures will be published that will aim meet the targets of the Directive.

Kilkenny County Development Plan 2008 – 2014

4.1.7 The Kilkenny County Development Plan is the overarching planning documents for the County and includes the core policies about which the Local area plans are required to produce more detailed policies.

4.1.8 Chapter 8 of the plan focuses on protection of the natural heritage. Section 8.2.1 and 8.2.2 discuss sites and species respectively that are designated under National and European legislation. Of particular relevance to this study is section 8.2.1 entitled ' Designated Natural Heritage Sites of International and National Importance'. This discusses the role of the county council in protecting designated sites, in conjunction with NPWS. The following policy is stated:

- To protect natural heritage sites designated in National and European legislation. This includes sites proposed to be designated or designated as Special Areas of Conservation (SAC), Natural Heritage Areas (NHA), Nature Reserves and Wildfowl Sanctuaries. This protection will extend to any additions or alterations to sites that may arise during the lifetime of this plan.
- To assess all proposed developments (individually or in combination with other proposals, as appropriate) which are likely to impact on designated natural heritage sites or those sites proposed to be designated.
- To consult with the prescribed bodies and relevant government agencies when assessing developments which are likely to impact on designated natural heritage sites or those sites proposed to be designated.
- To ensure that any development in or near a designated natural heritage site will avoid any significant adverse impact on the features for which the site has been designated.
- To require an appropriate environmental assessment in respect of any proposed development likely to have an impact on a designated natural heritage site, or those sites proposed to be designated.

4.1.9 The Plan has therefore been formulated to ensure that uses, developments and effects arising from permissions based upon this Plan (either individually or in combination with other plans or projects) shall not give rise to significant adverse impacts on the integrity of any Natura 2000 sites, having regard to their conservation objectives and as such does not need to be assessed for 'in combination' effects.

4.1.10 The Appropriate Assessment Screening concludes that Kilkenny County Development Plan will not give rise to significant adverse direct, indirect or secondary impacts on the integrity of any Natura 2000 sites having regard to their conservation objectives, or their key features arising from their proximity shall be permitted on the basis of this Plan (either individually or in combination with other plans or projects.

Kilkenny City and Environs Development Plan

4.1.11 The Kilkenny City and Environs Development Plan is intended to provide for the proper planning and sustainable development for Kilkenny City and Environs for a duration of six years from the date on which it is adopted. It consists of a written statement and accompanying maps and includes policies, strategies and actions for the City and Environs. The Plan's vision is to develop Kilkenny City as a centre of excellence for creativity in all sectors whilst ensuring the continued protection and enhancement of the city's magnificent built and natural heritage, its thriving cultural and artistic base and its strong and dynamic services economy. This will ensure that the city will be a vibrant and attractive place for

people to visit, work and live in as it fulfils its role as a Hub for the South East Region.

4.1.12 The Appropriate Assessment Screening concludes that Kilkenny County Development Plan will not give rise to significant adverse direct, indirect or secondary impacts on the integrity of any Natura 2000 sites having regard to their conservation objectives, or their key features arising from their proximity shall be permitted on the basis of this Plan (either individually or in combination with other plans or projects.

Castlecomer Waste Water Treatment Upgrade

4.1.13 Waste Water Treatment in Castlecomer is presently provided for by secondary treatment which is a combined system that deals with both sewage and overflow resulting from periods of heavy rain.

4.1.14 Current waste water treatment capacity stands at 2,500 population equivalent (PE), with present loading of 4,000 PE and discharge is made to a freshwater (river) which is defined as a sensitive area. The Upgrade, which is to be confirm by the Department of the Environment, Heritage and Local Government, will increase the capacity to 6,000 population equivalent by mid August 2009 which will provide the town with a tertiary treatment system to the standard required by the Urban Wastewater Treatment regulations. These standards require the assimilative capacity of the receiving water for nutrients (Nitrogen & Phosphorus) to be assessed (in accordance with the regulations) and the calculation of the permitted nutrient loadings in the treated effluent discharged.

Castlecomer Draft Local Area Plan

4.1.15 Appropriate Assessment has been completed in accordance with Article 6(3) of the Habitats Directive and concludes a number of potentially significant impacts:

4.1.16 Overall, the following statements can be made:

- Severe Negative impacts may occur as a result of 'open space' designations within the boundary of the SAC as well as from untreated surface water run-off from developments that discharge into the Dinin river.
- Moderate Negative impacts may occur through the continued removal of hedgerows that connect the SAC with the surrounding countryside.

4.1.17 Mitigation will be implemented with regard to the upgrade of the waste water treatment plant so that the Callan Plan does not result in these negative impacts.

Ferrybank – Belview Local Area Plan

4.1.18 The screening report for this Appropriate Assessment determined that current projects would see a net improvement of water quality in the river Suir and so this has been discounted as a potential impact of the Plan.

Graiguenamanagh Draft Local Area Plan

4.1.19 There is no information available as an Appropriate Assessment is currently underway in relation to this plan.

Bennettsbridge Local Area Plan

4.1.20 There is no information available as an Appropriate Assessment is currently underway in relation to this plan.

Thomastown Draft Local Area Plan

4.1.21 There is no information available as an Appropriate Assessment is currently underway in relation to this plan.

Conclusion

4.1.22 Significant in combination effects are likely in relation water quality. It is considered that these impacts will be mitigated as a result of appropriate upgrade of the Urban Waste Water treatment in Castlecomer and Callan.

5. Stage 2E – Impact Mitigation

5.1.1 According to accepted methodologies (EPA, 2003; IEEM, 2006) mitigation is required where there are likely, significant, negative impacts. Three likely significant impacts have been identified and it is proposed to address these through appropriate mitigation measures. The Callan LAP is predicted to result in a severe negative impact, a moderate negative impact and positive impacts on the integrity of the River Barrow and River Nore SAC. Five recommendations have been made to mitigate for these impacts and, if implemented, could ensure that the magnitude of these impacts is reduced to neutral.

Direct loss of habitat and disturbance

5.1.2 The area around the *motte* is of low conservation status amenity development within the SAC is unlikely to have a significant effect of the SAC. As a result there is significant scope to develop this area for amenity and to create habitat.

Recommendation 1:

5.1.3 Ensure that *any* proposed development within the SAC is screened for impacts in accordance with the requirements for Appropriate Assessment under the Habitats Directive. Key to this process will be consulting with the Southern Regional Fisheries Board and the National Parks and Wildlife Service to explore ways in which the conservation aspects of the SAC can be enhanced.

5.1.4 Describing areas within the SAC as 'open space' does not communicate the importance of the sites for conservation. It may also be misleading for prospective developers and members of the public. However, because of the poor condition of much of the riparian zone in Callan (lack of vegetation and invasive species) there may be scope for habitat improvement if development is proposed in this area.

Recommendation 2

5.1.5 Rezone areas within the SAC from 'open space' to a title that conveys its importance for biodiversity, e.g. 'Special Area of Conservation' or 'biodiversity conservation'. It is likely that could also be achieved through amendments to the existing zoning objective requiring the protection of biodiversity.

5.1.6 Where development proposals are made along the riparian corridor, ensure that a condition of consent is to establish a vegetated zone along the river and where possible, as it is not within the remit of the planning system, control the invasive Indian (Himalayan) balsam (further details on how to do this are available from www.invasivespeciesireland.com). The Southern Regional Fisheries Board should be consulted prior to any proposals to carry out works along the river bank.

Loss of ecological corridors

5.1.7 Whilst relatively little of hedgerow habitat is physically connected to the SAC, it should be acknowledged that loss of the remaining hedgerow connected with the site is likely to increasingly isolate the SAC from the surrounding countryside. However, the loss of hedgerow is not inevitable as careful design of projects can

Comment: If this is the mill race, then it directly connects to the site at the bottom of the abbey meadow.

successfully integrate these features. Where removing stretches is unavoidable these can be compensated for by replanting.

5.1.8 **Recommendation 3:**

5.1.9 Ensure that planning consents for all new developments in Callan include the requirement to preserve existing hedgerows. Where this is not possible, new native Irish hedgerows should be planted to replaced those that are lost. Implementing this recommendation could reduce the magnitude of the impact from potentially **moderate negative** to **neutral**.

Deterioration of Water Quality

5.1.10 Deterioration of water quality through the discharge of poorly treated domestic wastewater and surface water run-off poses a poses a significant threat to the conservation status of the SAC and is an impact that will be felt far beyond the town boundary.

Recommendation 4

5.1.11 There is no cheap and easy way of attaining good quality water. Water quality is already of poor status and this diminishes the capacity to further assimilate pollutants. To remedy the situation there is no alternative than to ensure that sufficient capacity exists, or is installed, at the Callan municipal wastewater treatment plant. This design must ensure that water will be treated to the highest relevant standards (Salmonid water quality) and has sufficient capacity to deal with projected increases in population.

Recommendation 5

5.1.12 Ensure that all new developments that will be discharging surface water to the King's river include appropriate abatement measures to ensure that final concentrations of pollutants will not result in a deterioration of water quality. This may include providing for Sustainable Drainage Systems (SUDS) which are proven to protect water quality as well alleviate flood impacts.

5.1.13 An opportunity exists to provide attenuation for new developments, particularly beneficial where this involves the creation of a constructed wetland. This is cost effective as it requires minimal maintenance, has excellent pollutant attenuation performance and can enhance the conservation objectives of the site through habitat creation.

5.1.14 These recommendations, although initially costly to implement, could reduce this **Severe negative** impact to **Neutral**.

5.2 Monitoring

5.2.1 Monitoring is required where there may be residual impacts despite implementation of mitigation measures. The EPA have a monitoring station in the town as part of their on-going programme of data collection and this is expected to highlight the impact of future projects on water quality.

5.2.2 It is not considered necessary to propose further monitoring for the impacts highlighted in this report. However, monitoring may be necessary as part of Appropriate Assessments for individual developments in the future

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Appendix 1 – NPWS Site Synopsis for River Barrow and River Nore SAC

Site SYNOPSIS: RIVER BARROW AND RIVER NORE (SITE CODE : 2162)

This site consists of the freshwater stretches of the Barrow/Nore River catchments as far upstream as the Slieve Bloom Mountains and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. The site passes through eight counties – Offaly, Kildare, Laois, Carlow, Kilkenny, Tipperary, Wexford and Waterford.

Major towns along the edge of the site include Mountmellick, Portarlington, Monasterevin, Stradbally, Athy, Carlow, Leighlinbridge, Graiguenamanagh, New Ross, Inistioge, Thomastown, Callan, Bennettsbridge, Kilkenny and Durrow. The larger of the many tributaries include the Lerr, Fushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow and the Delour, Dinin, Erkina, Owveg, Munster, Arrigle and King's Rivers on the Nore. Both rivers rise in the Old Red Sandstone of the Slieve Bloom Mountains before passing through a band of Carboniferous shales and sandstones. The Nore, for a large part of its course, traverses limestone plains and then

Old Red Sandstone for a short stretch below Thomastown. Before joining the Barrow it runs over intrusive rocks poor in silica. The upper reaches of the Barrow also runs through limestone. The middle reaches and many of the eastern tributaries, sourced in the Blackstairs Mountains, run through Leinster Granite. The southern end, like the Nore runs over intrusive rocks poor in silica. Waterford Harbour is a deep valley excavated by glacial floodwaters when the sea level was lower than today. The coast shelves quite rapidly along much of the shore.

The site is a candidate SAC selected for alluvial wet woodlands and petrifying springs, priority habitats on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for old oak woodlands, floating river vegetation, estuary, tidal mudflats, *Salicornia* mudflats, Atlantic salt meadows, Mediterranean salt meadows, dry heath and eutrophic tall herbs, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Nore Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon, Otter, *Vertigo moulinsiana* and the plant Killarney Fern.

Good examples of Alluvial Forest are seen at Rathsnagadan, Murphy's of the River, in Abbeyleix estate and along other shorter stretches of both the tidal and freshwater elements of the site. Typical species seen include Almond Willow (*Salix triandra*), White Willow (*S. alba*), Grey Willow (*S. cinerea*), Crack Willow (*S. fragilis*), Osier (*S. viminalis*), with Iris (*Iris pseudacorus*), Hemlock Water-dropwort (*Oenanthe crocata*), Angelica (*Angelica sylvestris*), Thin-spiked Wood-sedge (*Carex strigosa*), Pendulous Sedge (*C. pendula*), Meadowsweet (*Filipendula ulmaria*), Valerian (*Valeriana officinalis*) and the Red Data Book species Nettle-leaved Bellflower (*Campanula trachelium*).

Three rare invertebrates have been recorded in this habitat at Murphy's of the River. These are: *Neoascia obliqua* (Diptera: Syrphidae), *Tetanocera freyi* (Diptera: Sciomyzidae) and *Dictya umbrarum* (Diptera: Sciomyzidae).

A good example of petrifying springs with tufa formations occurs at Dysart Wood along the Nore. This is a rare habitat in Ireland and one listed with priority status on Annex I of the EU Habitats Directive. These hard water springs are characterised by lime encrustations, often associated with small waterfalls. A rich bryophyte flora is typical of the habitat and two diagnostic species, *Cratoneuron commutatum* var*. commutatum* and *Eucladium verticillatum*, have been recorded.

The best examples of old Oak woodlands are seen in the ancient Park Hill woodland in the estate at Abbeyleix; at Kyleadohir, on the Delour, Forest Wood House, Kylecorragh and Brownstown Woods on the Nore; and at Cloghristic Wood, Drummond Wood and Borris Demesne on the Barrow, though other patches occur throughout the site.

Abbeyleix Woods is a large tract of mixed deciduous woodland which is one of the only remaining true ancient woodlands in Ireland. Historical records show that Park Hill has been continuously wooded since the sixteenth century and has the most complete written record of any woodland in the country. It supports a variety of woodland habitats and an exceptional diversity of species including 22 native trees, 44 bryophytes and 92 lichens. It also contains eight indicator species of ancient woodlands. Park Hill is also the site of two rare plants, Nettle-leaved Bellflower and the moss *Leucodon sciuroides.* It has a typical bird fauna including Jay, Long-eared Owl and Raven. A rare invertebrate, *Mitostoma chrysomelas,* occurs in Abbeyleix and only two other sites in the country.

Two flies *Chrysogaster virescens* and *Hybomitra muhlfeldi* also occur. The rare Myxomycete fungus, *Licea minima* has been recorded from woodland at Abbeyleix. Oak woodland covers parts of the valley side south of Woodstock and is well developed at Brownsford where the Nore takes several sharp bends. The steep valley side is covered by Oak (*Quercus* spp.), Holly (*Ilex aquifolium*)*,* Hazel (*Corylus avellana*) and Birch (*Betula pubescens*) with some Beech (*Fagus sylvatica*) and Ash (*Fraxinus excelsior*)*.* All the trees are regenerating through a cover of Bramble (*Rubus fruticosus* agg.)*,* Foxglove (*Digitalis purpurea*) Wood Rush (*Luzula sylvatica*) and Broad Buckler-fern (*Dryopteris dilatata*)*.*

On the steeply sloping banks of the River Nore about 5 km west of New Ross, in County Kilkenny, Kylecorragh Woods form a prominent feature in the landscape. This is an excellent example of a relatively undisturbed, relict Oak woodland with a very good tree canopy. The wood is quite damp and there is a rich and varied ground flora. At Brownstown a small, mature Oak-dominant woodland occurs on a steep slope. There is younger woodland to the north and east of it. Regeneration throughout is evident. The understorey is similar to the woods at Brownsford. The ground flora of this woodland is developed on acidic, brown earth type soil and comprises a thick carpet of Bilberry (*Vaccinium myrtillus*)*,* Heather (*Calluna vulgaris*)*,* Hard Fern (*Blechnum spicant*)*,* Cowwheat (*Melampyrum* spp.) and Bracken (*Pteridium aquilinum*)*.* Borris Demesne contains a very good example of a semi-natural broad-leaved woodland in very good condition. There is quite a high degree of natural re-generation of Oak and Ash through the woodland. At the northern end of the estate Oak species predominate.

Drummond Wood, also on the Barrow, consists of three blocks of deciduous woods situated on steep slopes above the river. The deciduous trees are mostly Oak species. The woods have a well established understorey of Holly (*Ilex aquifolium*), and the herb layer is varied, with Brambles abundant. Whitebeam (*Sorbus devoniensis*) has also been recorded.

Eutrophic tall herb vegetation occurs in association with the various areas of alluvial forest and elsewhere where the flood-plain of the river is intact. Characteristic species of the habitat include Meadowsweet (*Filipendula ulmaria*), Purple Loosestrife (*Lythrum salicaria*), Marsh Ragwort (*Senecio aquaticus*), Ground Ivy (*Glechoma hederacea*) and Hedge Bindweed

(*Calystegia sepium*). Indian Balsam (*Impatiens glandulifera*), an introduced and invasive species, is abundant in places.

Floating River Vegetation is well represented in the Barrow and in the many tributaries of the site. In the Barrow the species found include Water Starworts (*Callitriche* spp.), Canadian Pondweed (*Elodea canadensis*), Bulbous Rush (*Juncus bulbosus*), Milfoil (*Myriophyllum* spp.), *Potamogeton* x *nitens,* Broad-leaved Pondweed (*P. natans*), Fennel Pondweed (*P. pectinatus*), Perfoliated Pondweed (*P. perfoliatus*) and Crowfoots (*Ranunculus* spp.). The water quality of the Barrow has improved since the vegetation survey was carried out (EPA, 1996).

Dry Heath at the site occurs in pockets along the steep valley sides of the rivers especially in the Barrow Valley and along the Barrow tributaries where they occur in the foothills of the Blackstairs Mountains. The dry heath vegetation along the slopes of the river bank consists of Bracken (*Pteridium aquilinum*) and Gorse (*Ulex europaeus*) species with patches of acidic grassland vegetation. Additional typical species include Heath Bedstraw (*Galium saxatile*), Foxglove (*Digitalis purpurea*), Common Sorrel (*Rumex acetosa*) and Bent Grass (*Agrostis stolonifera*). On the steep slopes above New Ross the Red Data Book species Greater Broomrape (*Orobanche rapum-genistae*) has been recorded.

Where rocky outcrops are shown on the maps Bilberry (*Vaccinium myrtillus*) and Wood Rush (*Luzula sylvatica*) are present. At Ballyhack a small area of dry heath is interspersed with patches of lowland dry grassland. These support a number of Clover species including the legally protected Clustered Clover (*Trifolium glomeratum*) – a species known from only one other site in Ireland. This grassland community is especially well developed on the west side of the mud-capped walls by the road. On the east of the cliffs a group of rock-dwelling species occur, i.e. English Stonecrop (*Sedum anglicum*), Sheep's-bit (*Jasione montana*) and Wild Madder (*Rubia peregrina*). These rocks also support good lichen and moss assemblages with *Ramalina subfarinacea* and *Hedwigia ciliata*.

Dry Heath at the site generally grades into wet woodland or wet swamp vegetation lower down the slopes on the river bank. Close to the Blackstairs Mountains, in the foothills associated with the Aughnabrisky, Aughavaud and Mountain Rivers there are small patches of wet heath dominated by Purple Moor-grass (*Molinia caerulea*) with Heather (*Calluna vulgaris*), Tormentil (*Potentilla erecta*), Carnation Sedge (*Carex panicea*) and Bell Heather (*Erica cinerea*).

Saltmeadows occur at the southern section of the site in old meadows where the embankment has been breached, along the tidal stretches of in-flowing rivers below Stokestown House, in a narrow band on the channel side of Common Reed (*Phragmites*) beds and in narrow fragmented strips along the open shoreline. In the larger areas of salt meadow, notably at Carrickcloney, Ballinlaw Ferry and Rochestown on the west bank; Fisherstown, Alderton and Great Island to Dunbrody on the east bank, the Atlantic and Mediterranean sub types are generally intermixed. At the upper edge of the salt meadow in the narrow ecotonal areas bordering the grasslands where there is significant percolation of salt water, the legally protected species Borrer's Saltmarsh-grass (*Puccinellia fasciculata*) and Meadow Barley (*Hordeum secalinum*) (Flora Protection Order, 1987) are found. The very rare Divided Sedge (*Carex divisa*) is also found. Sea Rush (*Juncus maritimus*) is also present. Other plants recorded and associated with salt meadows include Sea Aster (*Aster tripolium*), Sea Thrift (*Armeria maritima*), Sea Couch (*Elymus pycnanthus*), Spear-leaved Orache (*Atriplex prostrata*), Lesser Sea-spurrey (*Spergularia marina*), Sea Arrowgrass (*Triglochin maritima*) and Sea Plantain (*Plantago maritima*).

Salicornia and other annuals colonising mud and sand are found in the creeks of the saltmarshes and at the seaward edges of them. The habitat also occurs in small amounts on some stretches of the shore free of stones.

The estuary and the other Habitats Directive Annex I habitats within it form a large component of the site. Extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. Good quality intertidal sand and mudflats have developed on a linear shelf on the western side of Waterford Harbour, extending for over 6 km from north to south between Passage East and Creadaun Head, and in places are over 1 km wide. The sediments are mostly firm sands, though grade into muddy sands towards the upper shore. They have a typical macro-invertebrate fauna, characterised by polychaetes and bivalves. Common species include *Arenicola marina*, *Nephtys hombergii*, *Scoloplos armiger*, *Lanice conchilega* and *Cerastoderma edule*.

The western shore of the harbour is generally stony and backed by low cliffs of glacial drift. At Woodstown there is a sandy beach, now much influenced by recreation pressure and erosion. Behind it a lagoonal marsh has been impounded which runs westwards from Gaultiere Lodge along the course of a slow stream. An extensive reedbed occurs here. At the edges is a tall fen dominated by sedges (*Carex* spp.), Meadowsweet, Willowherb (*Epilobium* spp.) and rushes (*Juncus* spp.). Wet woodland also occurs. This area supports populations of typical waterbirds including Mallard, Snipe, Sedge Warbler and Water Rail.

The dunes which fringe the strand at Duncannon are dominated by Marram grass (*Ammophila arenaria*) towards the sea. Other species present include Wild Sage (*Salvia verbenaca*), a rare Red Data Book species. The rocks around Duncannon ford have a rich flora of seaweeds typical of a moderately exposed shore and the cliffs themselves support a number of coastal species on ledges, including Thrift (*Armeria maritima*), Rock Samphire (*Crithmum maritimum*) and Buck's-horn Plantain (*Plantago coronopus*). Other habitats which occur throughout the site include wet grassland, marsh, reed swamp, improved grassland, arable land, quarries, coniferous plantations, deciduous woodland, scrub and ponds.

Seventeen Red Data Book plant species have been recorded within the site, most in the recent past. These are Killarney Fern (*Trichomanes speciosum*), Divided Sedge (*Carex divisa*), Clustered Clover (*Trifolium glomeratum*), Basil Thyme (*Acinos arvensis*), Hemp nettle (*Galeopsis angustifolia*), Borrer's Saltmarsh Grass (*Puccinellia fasiculata*), Meadow Barley (*Hordeum secalinum*), Opposite-leaved Pondweed (*Groenlandia densa*), Autumn Crocus (*Colchicum autumnale*), Wild Sage (*Salvia verbenaca*), Nettle-leaved Bellflower (*Campanula trachelium*), Saw-wort (*Serratula tinctoria*), Bird Cherry (*Prunus padus*), Blue Fleabane (*Erigeron acer*), Fly Orchid (*Ophrys insectifera*), Broomrape (*Orobanche hederae*) and Greater Broomrape (*Orobanche rapum-genistae*). Of these the first nine are protected under the Flora Protection Order 1999. Divided Sedge (*Carex divisa*) was thought to be extinct but has been found in a few locations in the site since 1990. In addition plants which do not have a very wide distribution in the country are found in the site including Thin-spiked Wood-sedge (*Carex strigosa*), Field Garlic (*Allium oleraceum*) and Summer Snowflake (*Leucojum aestivum*). Six rare lichens, indicators of ancient woodland, are found including *Lobaria laetevirens* and *L. pulmonaria.* The rare moss *Leucodon sciuroides* also occurs.

The site is very important for the presence of a number of EU Habitats Directive Annex II animal species including Freshwater Pearl Mussel (*Margaritifera margaritifera* and *M. m. durrovensis*), Freshwater Crayfish (*Austropotamobius pallipes*), Salmon (*Salmo salar*), Twaite Shad (*Alosa fallax fallax*), three Lamprey species - Sea (*Petromyzon marinus*), Brook (*Lampetra planeri*) and River (*Lampetra fluviatilis*), the marsh snail *Vertigo moulinsiana* and Otter (*Lutra lutra*). This is the only site in the world for the hard water form of the Pearl Mussel *M. m. durrovensis* and one of only a handful of spawning grounds in the country for Twaite Shad. The freshwater stretches of the River Nore main channel is a designated salmonid

river. The Barrow/Nore is mainly a grilse fishery though spring salmon fishing is good in the vicinity of Thomastown and Inistioge on the Nore. The upper stretches of the Barrow and Nore, particularly the Owenass River, are very important for spawning. The site supports many other important animal species. Those which are listed in the Irish Red Data Book include Daubenton's Bat (*Myotis daubentoni*), Badger (*Meles meles*), Irish Hare (*Lepus timidus hibernicus*) and Frog (*Rana temporaria*). The rare Red Data Book fish species Smelt (*Osmerus eperlanus*) occurs in estuarine stretches of the site. In addition to the Freshwater Pearl Mussel, the site also supports two other freshwater Mussel species, *Anodonta anatina* and *A. cygnea*.

The site is of ornithological importance for a number of E.U. Birds Directive Annex I species including Greenland White-fronted Goose, Whooper Swan, Bewick's Swan, Bartailed Godwit, Peregrine and Kingfisher. Nationally important numbers of Golden Plover and Bar-tailed Godwit are found during the winter. Wintering flocks of migratory birds are seen in Shanahoe Marsh and the Curragh and Goul Marsh, both in Co. Laois and also along the Barrow Estuary in Waterford Harbour. There is also an extensive autumnal roosting site in the reedbeds of the Barrow Estuary used by Swallows before they leave the country.

Landuse at the site consists mainly of agricultural activities – many intensive, principally grazing and silage production. Slurry is spread over much of this area. Arable crops are also grown. The spreading of slurry and fertiliser poses a threat to the water quality of the salmonid river and to the populations of Habitats Directive Annex II animal species within the site. Many of the woodlands along the rivers belong to old estates and support many non-native species. Little active woodland management occurs. Fishing is a main tourist attraction along stretches of the main rivers and their tributaries and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. There is net fishing in the estuary and a mussel bed also. Other recreational activities such as boating, golfing and walking, particularly along the Barrow towpath are also popular. There is a golf course on the banks of the Nore at Mount Juliet and GAA pitches on the banks at Inistioge and Thomastown. There are active and disused sand and gravel pits throughout the site. Several industrial developments, which discharge into the river, border the site. New Ross is an important shipping port. Shipping to and from Waterford and Belview ports also passes through the estuary.

The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, overgrazing within the woodland areas, and invasion by non-native species, for example Cherry Laurel and Rhododendron (*Rhododendron ponticum*). The water quality of the site remains vulnerable.

Good quality water is necessary to maintain the populations of the Annex II animal species listed above. Good quality is dependent on controlling fertilisation of the grasslands, particularly along the Nore. It also requires that sewage be properly treated before discharge. Drainage activities in the catchment can lead to flash floods which can damage the many Annex II species present.

Capital and maintenance dredging within the lower reaches of the system pose a threat to migrating fish species such as lamprey and shad. Land reclamation also poses a threat to the salt meadows and the populations of legally protected species therein.

Overall, the site is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive respectively. Furthermore it is of high conservation value for the populations of bird species that use it. The occurrence of several Red Data Book plant species including three rare plants in the salt meadows and the

population of the hard water form of the Pearl Mussel which is limited to a 10 km stretch of the Nore, add further interest to this site.

Appendix 2 – Species Lists For Surveyed Habitats

Riparian Woodland - WN5

*Acer pseudoplatanus**	Sycamore
*Aegopodium podagraria**	Ground-elder
Agrostis stolonifera	Creeping bent
Alnus glutinosa	Alder
Anthriscus sylvestris	Cow parsley
Brachypodium sylvaticum	False brome
Bromus ramosus	Hairy-brome
Carex sylvatica	Wood sedge
Circaea lutetiana	Enchanter's-nightshade
Crataegus monogyna	Hawthorn
Festuca rubra	Red fescue
Filipendula ulmaria	Meadowsweet
Fraxinus excelsior	Ash
Galium aparine	Cleavers
Geranium robertianum	Herb-Robert
Geum urbanum	Wood avens
Glechoma hederacea	Ground ivy
Hedera helix	Ivy
Ilex aquifolium	Holly
Lapsana communis	Nipplewort
Phalaris arundinacea	Reed canary-grass
Phleum pratense	Timothy
Populus sp.	Poplar
Ranunculus repens	Creeping buttercup
Rubus fruticosus	Bramble
Rubus idaeus	Raspberry
Salix sp.	Willow
Sambucus nigra	Elder
Stellaria graminae	Lesser stitchwort
Ulmus glabra	Wych elm
Urtica dioica	Common nettle

(Mixed) Broadleaved Woodland - WD1

*Aesculus hipposcastanum**	Horse-chestnut
Alnus glutinosa	Alder
Carex remota	Remote sedge
Carex sylvatica	Wood sedge
*Castanea sativa**	Sweet chestnut
Circaea lutetiana	Enchanter's-nightshade
Cirsium vulgare	Spear thistle
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Elymus repens	Common couch
Epilobium hirsutum	Great willowherb
Epilobium montanum	Broad-leaved willowherb
Filipendula ulmaria	Meadowsweet
Fraxinus excelsior	Ash
Galium aparine	Cleavers
Geranium robertianum	Herb-Robert
Geum urbanum	Wood avens
Glechoma hederacea	Ground ivy
Hedera helix	Ivy
Heracleum sphondylium	Hogweed
Hyacinthoides non-scripta	Bluebell
Ilex aquifolium	Holly
Lamium album	White dead-nettle
*Larix sp.**	Larch
Petasites hydridus	Butterbur
Phyllitis scolopendrium	Hart's tongue
Picea sitchensis	Sitka spruce
Polystichum setiferum	Soft shield-fern
Primula vulgaris	Primrose
*Prunus laurocerasus**	Cherry laurel
Quercus sp.	Oak
Ranunculus repens	Creeping buttercup
Rubus fruticosus	Bramble
Rumex obtusifolius	Broad-leaved dock
Salix sp.	Willow
Sambucus nigra	Elder
Senecio jacobaea	Common ragwort
Stachys sylvatica	Hedge woundwort
*Symphoricarpos albus**	Snowberry
Taxus baccata	Yew
Trifolium repens	White clover
Urtica dioica	Common nettle
Viola riviniana	Common dog-violet

Eutrophic lakes - FL5

Angelica sylvestris	Wild angelica
*Avena strigosa**	Bristle oat
Circaea lutetiana	Enchanter's-nightshade
Cirsium vulgare	Spear thistle
Deschampsia cespitosa	Tufted hair-grass
Epilobium hirsutum	Great willowherb
Epilobium montanum	Broad-leaved willowherb
Glyceria fluitans	Floating sweet-grass
Hypericum tetrapterum	Square-stalked St. John's wort
Lotus uliginosus	Greater bird's-foot-trefoil
Myosotis scorpioides	Water forget-me-not
Nymphaea alba	White water-lily
Plantago major	Greater plantain
Prunella vulgaris	Selfheal
Scrophularia nodosa	Common figwort
Sparganium erectum	Branched bur-reed
Stachys sylvatica	Hedge woundwort
Typha latifolia	Bulrush
Urtica dioica	Common nettle

Hedgerow - WL1

Fraxinus excelsior	Ash
Crataegus monogyna	Hawthorn
Rubus fruticosus	Bramble
Vicia sepium	Buch vetch
Arrhenatherum elatius	False oat-grass
Rosa arvensis	Field-rose
Prunus spinosa	Blackthorn
Anthriscus sylvestris	Cow parsley
Calystegia sepium	Hedge bindweed
Hedera helix	Ivy
Epilobium montanum	Broad-leaved willowherb
Galium aparine	Cleavers
Corylus avellana	Hazel
Senecio jacobaea	Common ragwort
Sonchus arvensis	Perennial sow-thistle
Ilex aquifolium	Holly
Festuca rubra	Red fescue
Sambucus nigra	Elder
Ulmus glabra	Wych elm
Lapsana communis	Nipplewort
*Acer pseudoplatanus**	Sycamore
Filipendula ulmaria	Meadowsweet
Cirsium vulgare	Spear thistle
Hypericum tetrapterum	Square-stalked St. John's wort
Quercus sp.	Oak
*Avena strigosa**	Bristle oat
Plantago lanceolata	Ribwort Plantain
Holcus lanatus	Yorkshire-fog

Appendix 3 – Q-Value Assessments

Location 1: Downstream of bridge near the Discovery Park									
TAXA	Group A	TAXA	Group C	TAXA	Group D		Total Numbers	Relative Abundance, %	Abundance Category
Plecoptera		**Ephemeroptera**		**Megaloptera**		Group A	0	0	Absent
All except *Leuctra* spp.		*Baetis rhodani*	72	Sialidae					
Ephemeroptera		Caenidae		**Crustacea**		Group B	12	9	Fair Numbers
Heptageniidae		Ephemerellidae		Assellus sp.					
Siphlonuriidae		**Trichoptera**		Crangonyx sp.		Group C	121	90	Excessive
Ephemera danica		Uncased spp.		**Gastropoda**					
Lamellibranchiata		**Hemiptera**		*Lymnaea peregra*		Group D	1	1	Present
Margaritifera margaritifera		All except *A. aestivalis*		Physa sp.					
		Coleoptera	7						
TAXA	Group B	**Diptera**		**Lamellibranchiata**		Group E	0	0	Absent
Plecoptera		Chrionomidae (excl. Chironomus sp.)	1	Sphaeriidae					
Leuctra spp.	12	Simuliidae	37	**Hirudinea**		Q-Value Determination – Q3: Moderately Polluted			
Ephemeroptera		Tipulidae	3	All except Piscicola sp.	1				
Baetidae (excl. *B. rhodani*)		**Hydracarina**		TAXA	Group E				
Leptophlebidae		**Crustacea**		**Diptera**		Notes:			
Trichoptera		Gammarus spp.	1	Chrionomus sp.					

Cased spp.		*Austropotamobius pallipes*		Eristalis sp.		Substrate made up of large rocks Light/Moderate siltation No Cladophora sp. growth Moderate in-stream macrophyte growth Slime growths absent
Hemiptera		**Gastropoda**		**Oligochaeta**		
Aphelocheirus aestivalis		(all excl. L. peregra & Physa sp.)		Tubificidae		
Odonata		**Lamellibranchiata**				
		Anodonta sp.				
		Hirudinea				
		Piscicola sp.				
		Platyhelminthes				

Location 2: Main channel of Dinin, upstream of LAP area									
TAXA	Group A	TAXA	Group C	TAXA	Group D		Total Numbers	Relative Abundance, %	Abundance Category
Plecoptera		**Ephemeroptera**		**Megaloptera**		Group A	6	2	Small Numbers
All except *Leuctra* spp.		*Baetis rhodani*	92	Sialidae					
Ephemeroptera		Caenidae		**Crustacea**		Group B	9	3	Small Numbers
Heptageniidae	6	Ephemerellidae	8	Assellus sp.					
Siphlonuriidae		**Trichoptera**		Crangonyx sp.		Group C	321	95	Excessive
Ephemera danica		Uncased spp.	3	**Gastropoda**					
Lamellibranchiata		**Hemiptera**				Group D	0	0	Absent
Margaritifera margaritifera		All except *A. aestivalis*		*Lymnaea peregra*					
		Coleoptera	69	Physa sp.					
TAXA	Group B	**Diptera**		**Lamellibranchiata**		Group E	0	0	Absent
Plecoptera		Chrionomidae (excl. Chironomus sp.)		Sphaeriidae					
Leuctra spp.	9	Simuliidae	112	**Hirudinea**		Q-Value Determination – Q3-4: Slightly Polluted			
Ephemeroptera		Tipulidae	28	All except Piscicola sp.					
Baetidae (excl. *B. rhodani*)		**Hydracarina**		TAXA	Group E				
Leptophlebidae		**Crustacea**		**Diptera**		Notes: Moderate siltation and extensive erosion of river banks Cattle access in evidence No Cladophora sp. growth			
Trichoptera		Gammarus spp.	7	Chrionomus sp.					
Cased spp.		*Austropotamobius pallipes*		Eristalis sp.					
Hemiptera		**Gastropoda**		**Oligochaeta**					
Aphelocheirus		(all excl. L. peregra &		Tubificidae					

aestivalis		Physa sp.)				No in-stream macrophyte growth Slime growths present
Odonata		**Lamellibranchiata**				
		Anodonta sp.				
		Hirudinea				
		Piscicola sp.	2			
		Platyhelminthes				

Location 3: Upstream of LAP area, along tributary running to the west of the town									
TAXA	Group A	TAXA	Group C	TAXA	Group D		Total Numbers	Relative Abundance, %	Abundance Category
Plecoptera		**Ephemeroptera**		**Megaloptera**		Group A	4	5	Fair Numbers
All except *Leuctra* spp.		*Baetis rhodani*	24	Sialidae					
Ephemeroptera		Caenidae		**Crustacea**		Group B	22	29	Numerous
Heptageniidae	4	Ephemerellidae	2	Assellus sp.					
Siphlonuriidae		**Trichoptera**		Crangonyx sp.		Group C	51	66	Dominant
Ephemera danica		Uncased spp.	2	**Gastropoda**					
Lamellibranchiata		**Hemiptera**				Group D	0	0	Absent
Margaritifera margaritifera		All except *A. aestivalis*		*Lymnaea peregra*					
		Coleoptera		Physa sp.					
TAXA	Group B	**Diptera**		**Lamellibranchiata**		Group E	0	0	Absent
Plecoptera		Chrionomidae (excl. Chironomus sp.)	2	Sphaeriidae					
Leuctra spp.	22	Simuliidae	8	**Hirudinea**		Q-Value Determination – Q4: Unpolluted			
Ephemeroptera		Tipulidae	13	All except Piscicola sp.					
Baetidae (excl. *B. rhodani*)		**Hydracarina**		TAXA	Group E				
Leptophlebidae		**Crustacea**		**Diptera**		Notes: Substrate made up of rocks and stones Very light siltation No Cladophora sp. growth			
Trichoptera		Gammarus spp.		Chrionomus sp.					
Cased spp.		*Austropotamobius pallipes*		Eristalis sp.					
Hemiptera		**Gastropoda**		**Oligochaeta**					
Aphelocheirus		(all excl. L. peregra &		Tubificidae					

aestivalis		Physa sp.)				No in-stream macrophyte growth Slime growths absent
Odonata		**Lamellibranchiata**				
		Anodonta sp.				
		Hirudinea				
		Piscicola sp.				
		Platyhelminthes				

Location 4: Downstream of LAP area									
TAXA	Group A	TAXA	Group C	TAXA	Group D		Total Numbers	Relative Abundance, %	Abundance Category
Plecoptera		**Ephemeroptera**		**Megaloptera**		Group A	0	0	Absent
All except *Leuctra* spp.		*Baetis rhodani*	35	Sialidae					
Ephemeroptera		Caenidae		**Crustacea**		Group B	13	12	Common
Heptageniidae		Ephemerellidae		Assellus sp.					
Siphlonuriidae		**Trichoptera**		Crangonyx sp.		Group C	92	88	Excessive
Ephemera danica		Uncased spp.		**Gastropoda**					
Lamellibranchiata		**Hemiptera**				Group D	0	0	Absent
Margaritifera margaritifera		All except *A. aestivalis*		*Lymnaea peregra*					
		Coleoptera	1	Physa sp.					
TAXA	Group B	**Diptera**		**Lamellibranchiata**		Group E	0	0	Absent
Plecoptera		Chrionomidae (excl. Chironomus sp.)		Sphaeriidae					
Leuctra spp.	13	Simuliidae	50	**Hirudinea**		Q-Value Determination – Q3: Moderately Polluted			
Ephemeroptera		Tipulidae	4	All except Piscicola sp.					
Baetidae (excl. *B.*		**Hydracarina**		TAXA	Group				

rhodani)					E	
Leptophlebidae		**Crustacea**		**Diptera**		Notes: Substrate made up of rocks and boulders Moderate siltation No Cladophora sp. growth Luxuriant macrophyte growth, especially *Nasturtium officinale* Slime growths absent
Trichoptera		Gammarus spp.	2	Chrionomus sp.		
Cased spp.		*Austropotamobius pallipes*		Eristalis sp.		
Hemiptera		**Gastropoda**		**Oligochaeta**		
Aphelocheirus aestivalis		(all excl. L. peregra & Physa sp.)		Tubificidae		
Odonata		**Lamellibranchiata**				
		Anodonta sp.				
		Hirudinea				
		Piscicola sp.				
		Platyhelminthes				