

**Roscommon Town Waste Water Discharge Licence at Golf Links
Road, Ballinagard townland, Roscommon town, County
Roscommon.**

**STAGE 1: SCREENING FOR APPROPRIATE ASSESSMENT
STAGE 2: NATURA IMPACT STATEMENT**



Prepared by:

**Roscommon County Council
Water Services Section
November 2013**

STAGE 1: SCREENING FOR APPROPRIATE ASSESSMENT
STAGE 2: NATURA IMPACT STATEMENT

Agglomeration Name: Roscommon Town Waste Water Treatment Plant & Agglomeration

Licence Type: Waste Water Discharge Licence (Discharges from Agglomerations with a population equivalent of between 2,001 and 10,000)

Licensee: Roscommon County Council

Licence Register Number: D0116-01

Prepared by: Philip Fleming, BEng, CEng. – Executive Engineer

Approved by: Majella Hunt - Director of Services
Kieran Madden - Senior Engineer
Vincent Walsh – Acting Senior Executive Engineer

Version: V1.0 Draft 13th November 2013
V2.0 Final 29th November 2013

© Roscommon County Council
Water Services Department
The Courthouse,
Roscommon,
County Roscommon

*For inspection purposes only.
Consent of copyright owner required for any other use.*

TABLE OF CONTENTS

1.0	Introduction	1
1.1	Background.....	1
1.2	Local Authority Policy in Relation to the Site	2
1.3	Screening for Appropriate Assessment.....	3
2.0	Methodology	3
3.0	Stage 1 Screening for AA:- Description of Roscommon Agglomeration	4
4.0	Stage 1 Screening for AA:- Identification of Natura 2000 Sites	7
4.1	Ballinturly Turlough SAC (Site Code 000588).....	8
4.2	Corbo Bog SAC (Site Code 002349)	9
4.3	Lisduff Turlough SAC (Site Code 000609).....	9
4.4	Lough Ree SAC (Site Code 000440)	9
4.5	Lough Funshinagh SAC (Site Code 000611)	9
4.6	Four Roads Turlough SAC (Site Code 001637)	10
4.7	Lough Croan Turlough SAC (Site Code 002349).....	10
4.8	Suck River Callows SPA (Site Code 004097)	12
4.9	Lough Ree SPA (Site Code 004064)	12
4.10	Four Roads Turlough SPA (Site Code 004140)	13
4.11	Lough Croan Turlough SPA (Site Code 004139)	13
5.0	Stage 1 Screening for AA:- Identification of Potential Impacts to Natura 2000 Sites & Assessment of likely effects – direct, indirect and cumulative	13
5.1	Receiving surface water – the Hind River	13
5.2	Roscommon WWTP Agglomeration	16
5.3	Effluent standard from Roscommon WWTP	17
5.4	Assessment of Likely Significant Effects	17
6	Screening Conclusion and Statement	19
7	Stage 2:- NATURA IMPACT STATEMENT	21
7.1	Introduction.....	21
7.2	Conservation Objectives.....	21
7.3	Describe How the Integrity of the Natura 2000 site is likely to be effected by Roscommon Town Agglomeration	21
7.4	Describe Mitigation Measures that are to be introduced to Avoid, Reduce or Remedy the adverse Effects on the Integrity of Natura 2000 site	24
7.5	Natura Impact Statement Conclusion.....	25
	REFERENCES	26
	Appendix A – NATURA 2000 Site Synopsis	27

1.0 Introduction

Roscommon County Council Water Services Department has undertaken a “Screening for Appropriate Assessment” and a “Natura Impact Statement” in Support of an EPA Roscommon Town Waste Water Discharge License.

The purpose of this report is to make a statement of the likely and possible impacts from the Roscommon town agglomeration on Natura 2000 Sites. This report comprises a comprehensive ecological impact assessment of the Roscommon town agglomeration; it examines the direct and indirect impacts on Natura 2000 sites.

The Natura 2000 Network of sites, are the prime wildlife conservation area in the country, considered to be important on a European as well as Irish level. The Habitats Directive (Council Directive 92/43/EEC) requires that all plans and projects must be initially screened for potential impact on Special Areas of Conservation (SAC’s) or Special Protection Areas (SPA’s). This process aims to establish whether a full Appropriate Assessment as required by Article 6 of the Directive is required in any particular case.

Sites designated under the Habitats Directive are called Special Areas of Conservation (SAC) and Special Protection Areas (SPA) under the Birds Directive and are legally protected under various legislation, regulation, and policy at European, National, Regional and County Level.

This report presents a Stage 1:- “Screening for Appropriate Assessment” & Stage 2:- “Natura Impact Statement” for the Waste Water Discharge License at Golf Links Road, Ballinagard Td; Roscommon town, County Roscommon and will assess whether effects to the Natura 2000 network are likely to occur.

The Screening process considered the potential significant effects from the agglomeration on the 7 cSAC’s and 4 SPA within a 15km radius of the Roscommon waste water treatment plant. The primary effluent discharge from the WWTP and the agglomeration itself are not located within any Natura 2000 sites. The closest Natura 2000 site downstream of agglomeration is Lough Ree (cSAC / SPA) (approximately 10.4 km to the east of the agglomeration boundary).

1.1 Background

The Habitats Directive of 1992 and the Birds Directive of 1979 is the main legislative instrument for the protection and conservation of biodiversity in the EU. Under these Directives member states are required to designate areas of their territory as either Special Areas of Conservation (SAC’s) and Special Protection Areas (SPA’s). Collectively they form a network of sites across the European Union known as Natura 2000. The Habitats Directive sets out a unified system for the protection and management of SAC’s. It is the responsibility of the competent national authority to ensure that good conservation status exists for their SPA’s and SAC’s. Article 6(3) and 6(4) of the Habitats Directive set out key elements of the system of protection including

the requirements for Appropriate Assessment of any plan or project. Article 6(3) requires that an ‘appropriate assessment’ (AA) be carried out for these sites where projects, plans or proposals are likely to have an effect. As a consequence of the recent ECJ ruling against Ireland there is now a requirement for screening and possible appropriate assessment of plans and projects that may negatively impact areas designated as Natura 2000 sites (SAC’s and SPA’s).

The 4 Stages in the Appropriate Assessment process:-

There are 4 stages in the Appropriate Assessment process as outlined in the European Commission Guidance document (2001). These stages can be summarised as:-

Stage 1 – Screening for Appropriate Assessment: This stage assesses the likely effects of a project wither alone or in combination with other projects, is likely to have significant effects on a Natura 2000 site in view of its conservation objectives. If the screening process deemed that the effect is significant, potentially significant or uncertain then the process must proceed to Stage 2 Appropriate Assessment.

Stage 2 – Appropriate Assessment: In this stage, the adverse impact of the project on the integrity of the Natura 2000 site is considered with respect to conservation objectives of the site. A statement of the likely and possible impacts of the plan or project on a Natura 2000 site is prepared and is called a “Natura Impact Statement” (NIS). If the NIS predicts adverse effects on the integrity of a site cannot be excluded, then the process must proceed to Stage 4, or the plan or project should be abandoned.

Stage 3 – Assessment of Alternative Solutions: If the Appropriate Assessment determine that adverse impacts are likely upon a Natura 2000 site, this stage examines alternative ways of implementing the project without adverse effects on the integrity of a Natura 2000 site. The process must to return to Stage 2 as alternative solution will require appropriate assessment in order to proceed. When all reasonable alternatives have been assessed and the least damaging option has been determined, then the process must proceed to Stage 4.

Stage 4 – Imperative Reasons of Overriding Public Interest (IROPI)/Derogation: This is the main derogation process of Article 6(4) which examines imperative reasons of overriding public interest (IROPI) where no alternative solutions exist and where adverse impacts remain.

1.2 Local Authority Policy in Relation to the Site

Roscommon County Development Plan 2008 – 2014 (Chapter 8: Natural Heritage and Landscape Character Assessment) states that *‘It is a strategic aim of Roscommon County Council to:*

- *Protect, conserve and enhance the biodiversity and natural heritage of County Roscommon.*
- *Identify, protect and conserve sites of natural heritage importance, in co-operation with the relevant statutory authorities*

It is also Policy 261 of Roscommon County Council 'to protect proposed and designated Special Areas of Conservation'.

Objectives for Designated Sites are as follows:

Objective 246 -Ensure that development in or near or likely to effect a designated site should avoid any significant adverse impact on the features for which the site has been designated.

Objective 247 -Require an appropriate assessment of any development as described in Objective 246 above.

1.3 Screening for Appropriate Assessment

Screening has been undertaken in fulfillment of the requirements of the Habitats Directive and taking into account the Department of the Environment, Community and Local Government's Guidance on Appropriate Assessment and Departmental Circular L8/08 which provides an outline of the screening and assessment processes for Water Services projects.

All Natura 2000 sites entirely or partially within a 15km buffer from the Roscommon WWTP have been considered in this assessment, this buffer is considered ample for application to the subject assessment and is considered to be an appropriate buffer in section 3.2.3 of *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities December 2009*.

2.0 Methodology

The methodology for this screening statement has been undertaken in accordance with the European Commissions Guidance on Appropriate Assessment (European Commission, 2001) which comprises the following steps:

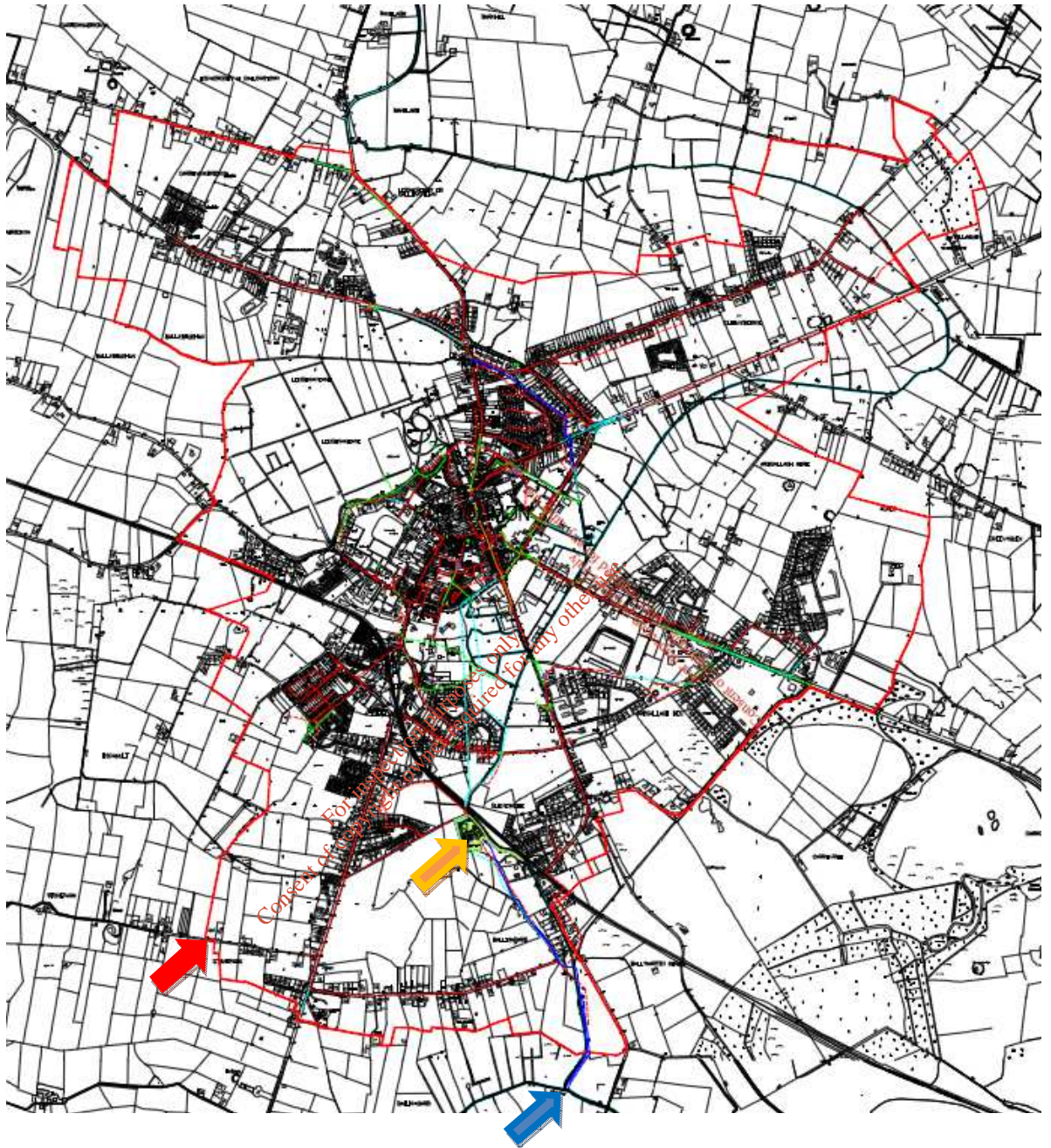
- Description of plan or project, and local site or plan characteristics
- Identification of relevant Natura 2000 sites, and compilation of their qualifying interests and conservation objectives
- Assessment of likely effects-direct, indirect and cumulative-undertaken on the basis of available information as a desk study or field survey or primary research as necessary
- Screening statement with conclusions

3.0 Stage 1 Screening for AA:- Description of Roscommon Agglomeration

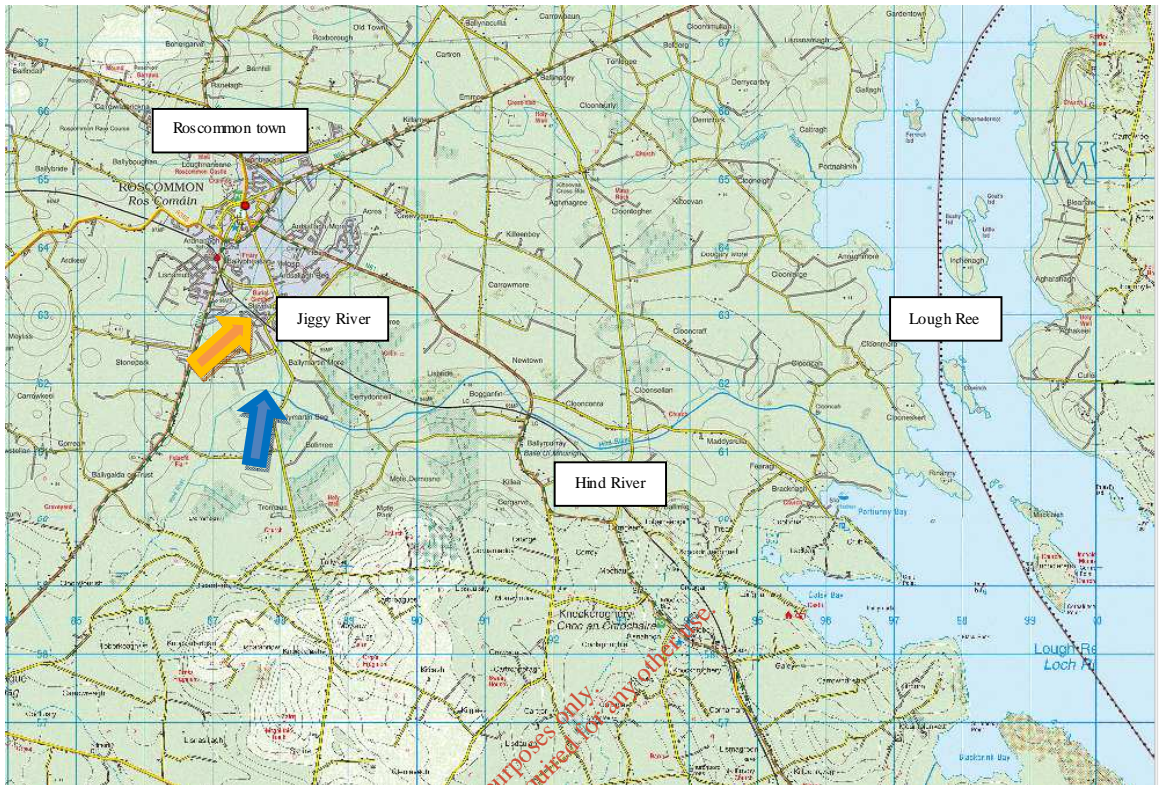
The main elements of Roscommon town Waste Water Treatment Plant (WWTP) and agglomeration are as follows:

- WWTP Design capacity is 9,550 Population Equivalent
- 1.2km treated effluent discharge pipe from the WWTP to River Hind. This pipe diverts treated effluent from the River Jiggy to the River Hind.
- Pump stations & 5 storm water overflows, Preliminary Treatment and storm water tank
- Aeration and Settlement tanks
- Control Building with SCADA, Programmable Logic Controller (PLC), PC and Human Machine Interface (HMI)
- Picket Fence Thickener tank and dewater unit.
- Phosphorous removal chemical dosing unit – Medium Density Polyethylene IBC unit with bund
- Tertiary treatment unit
- Effluent Discharge standard to receiving waters the Hind River:- BOD 10mg/l, Suspended Solids 10mg/l, Total P 2mg/l, total N 15mg/l and Nitrate N 8mg/l.
- The influent load to the WWTP is predominantly domestic from residential properties and a low Institutional/commercial/industrial load. The WWTP also treats a low volume of Leachate from the existing landfill site.

For inspection purposes only. Consent of copyright owner required for any other use.



Drawing 1:- Outline of Roscommon town waste water Agglomeration. Orange arrow shows WWTP. Red arrow shows red agglomeration boundary line. Blue arrow shows discharge of treated effluent from the WWTP at the confluence of the River Jiggy and Hind.



Drawing 2:- Overview of Waste Water Treatment Plant, piped treated effluent discharge point and Lough Ree. Orange arrow shows WWTP. Blue arrow shows the 1.2km piped discharge location of treated effluent at the confluence of the River Jiggy and Hind from the WWTP.



Drawing 3:- Overview of piped treated effluent discharge point to confluence of River Jiggy and Hind. The Hind flows to into Lough Ree. Orange arrow shows WWTP. Blue arrow shows the 1.2km piped discharge location of treated effluent at the confluence of the River Jiggy and Hind from the WWTP.

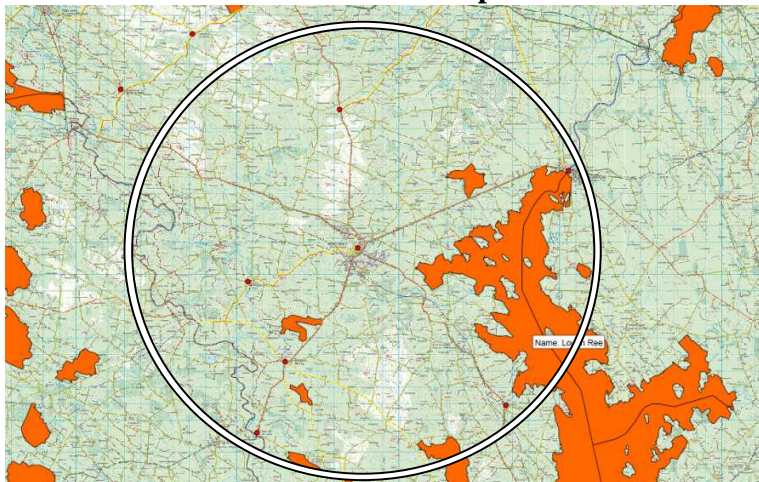
4.0 Stage 1 Screening for AA:- Identification of Natura 2000 Sites

The land on which the wwtp and Roscommon Town agglomeration is located is not designated Natura 2000 site. The following Natura 2000 sites were considered within 15km of the Roscommon town agglomeration:

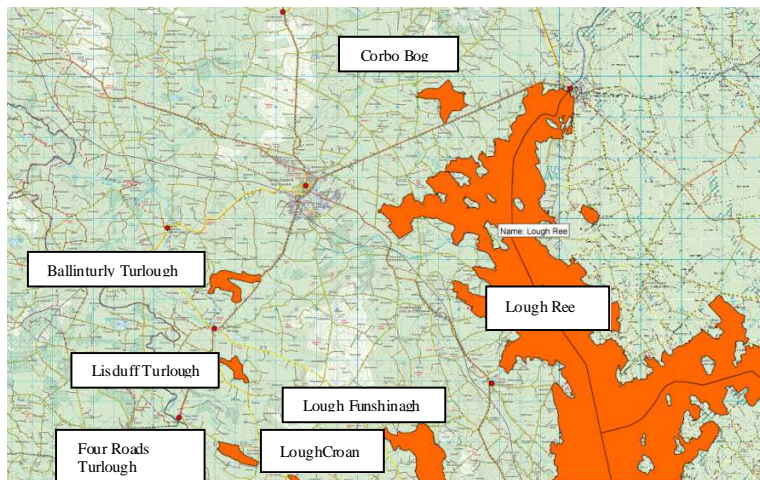
Special Areas of Conservation (SACs)

Site	Principal Habitat
Ballinturly Turlough (Site Code 000588) – 5.15km upstream of WWTP	Turlough
Corbo Bog (Site Code 002349) – 7.4 km upstream of WWTP	Active Raised Bog
Lisduff turlough (Site Code 000609) – 9.07km upstream of WWTP	Turlough
Lough Ree (Site Code 000440) – 10.4km downstream of WWTP	Natural eutrophic lake, degraded raised bog, alkaline fens, Bog woodlands, endangered fish species Pollan (<i>Coregonus autumnalis</i>), Otters around the lake. This species is listed in the Red Data Book as being threatened in Europe and is protected under Annex II of the European Habitats Directive. St John's Wood -Bog woodland is of particular conservation importance and is listed with priority status on the EU Habitats Directive
Lough Funshinagh (Site Code 000611) – 13.2km upstream of WWTP	Turlough
Four Roads Turlough (Site Code 001637)- 13.3km upstream of WWTP	Turlough
Lough Croan Turlough (Site Code 002349) – 14.9km upstream of WWTP	Turlough

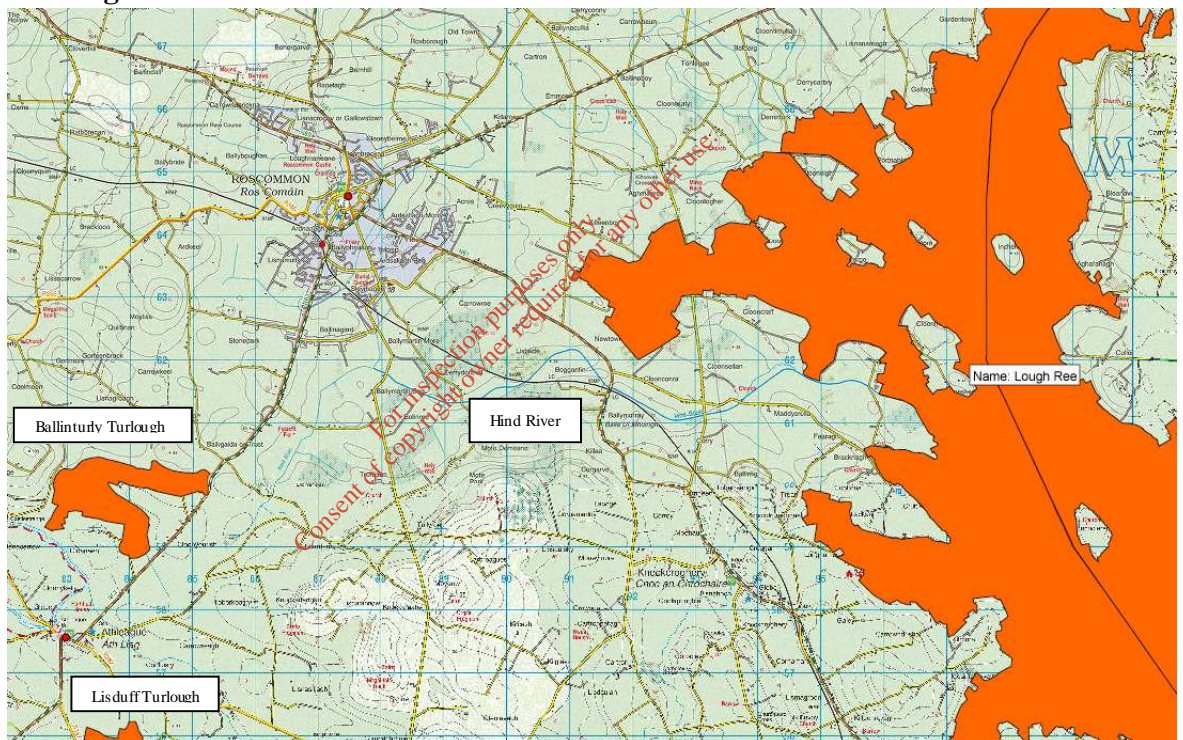
Table1: Candidate Special Areas of Conservation within a 15km radius of Roscommon waste water treatment plant



Drawing 4:- SAC Natura 2000 sites considered within 15km of the Roscommon town Agglomeration.



Drawing 5:- Overview of SAC



Drawing 6:- Close up of SAC near the Roscommon Agglomeration

4.1 Ballinturly Turlough SAC (Site Code 000588)

Ballinturly Turlough is the fourth largest active turlough still extant. It is an exceptional site which contains a wide range of habitat types, vegetation communities and plant species. A special feature of the site is that despite a seasonal connection with the River Suck the groundwater is oligotrophic (nutrient-poor) enough to support normally calcifuge plants. The site is little damaged by grazing, which occurs over most of it, and there is little internal drainage. Areas formerly cut for peat are largely re-generating and support a diversity of vegetation types. Overall, human impact on the site is generally low. Turloughs are listed, with priority status, on Annex I of the

EU Habitats Directive and, as such, are of considerable conservation significance. The large wintering bird population adds substantially to the importance of the site.

The full National Parks and Wildlife Service's Site Synopsis for Ballinturly Turlough SAC (Site Code 000588) is included in Appendix A.

4.2 Corbo Bog SAC (Site Code 002349)

Corbo Bog is a site of considerable conservation significance comprising as it does a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats, including hummock/hollow complexes, pools and flushes. Active raised bog is listed as a priority habitat on Annex I of the E.U. Habitats Directive. Priority status is given to habitats and species that are threatened throughout the E.U. Ireland has a high proportion of the total E.U. resource of this habitat type (over 60%) and so has a special responsibility for its conservation at an international level.

The full National Parks and Wildlife Service's Site Synopsis for Corbo Bog SAC (Site Code 002349) is included in Appendix A.

4.3 Lisduff Turlough SAC (Site Code 000609)

Lisduff Turlough has a good zonation of oligotrophic vegetation, including some vegetation communities that are rare in turloughs. It is of high ecological value as one of the few turloughs in pristine condition and, while it is subject to low grazing pressure, it gives a good idea of what many other turloughs would formerly have been like. Turloughs are listed, with priority status, on Annex I of the EU Habitats Directive and, as such, are of considerable conservation significance. The birdlife of the site adds significantly to its importance.

The full National Parks and Wildlife Service's Site Synopsis for Lisduff Turlough SAC (Site Code 000609) is included in Appendix A.

4.4 Lough Ree SAC (Site Code 000440)

Lough Ree and its adjacent habitats are of major ecological significance. Some of the woodlands around the lake are of excellent quality and include some of the best examples of this habitat in Ireland. St. John's Wood is particularly important; it is considered to be one of the very few candidates for ancient woodland in Ireland. The lake itself is an excellent example of a mesotrophic to moderate-eutrophic system, supporting a rare fish species and a good diversity of breeding and wintering birds.

The full National Parks and Wildlife Service's Site Synopsis for Lough Ree SAC (Site Code 000440) is included in Appendix A.

4.5 Lough Funshinagh SAC (Site Code 000611)

Lough Funshinagh is of major ecological importance, both from a vegetational and ornithological viewpoint. Turloughs are listed as priority habitat on Annex I of the

European Habitats Directive. Lough Funshinagh is a unique and atypical example of this habitat, and has a particular value in being relatively unmodified by grazing and modern agriculture.

The full National Parks and Wildlife Service's Site Synopsis for Lough Funshinagh SAC (Site Code 000611) is included in Appendix A.

4.6 Four Roads Turlough SAC (Site Code 001637)

The uniformity of the turlough basin and the fertilization of its eastern half means that there is little interest in the vegetation. However, turloughs are listed, with priority status, on Annex I of the EU Habitats Directive and, as such, are of considerable conservation significance. The site is very important as a refuge or feeding area for wildfowl and waders, some of which occur in numbers of national importance.

The full National Parks and Wildlife Service's Site Synopsis for Four Roads Turlough SAC (Site Code 001637) is included in Appendix A.

4.7 Lough Croan Turlough SAC (Site Code 002349)

Lough Croan Turlough SPA is of high ornithological importance, primarily for its Greenland White-fronted Goose population, but also because of its nationally important Shoveler and Golden Plover populations. The presence of Greenland White-fronted Goose, Golden Plover and Whooper Swan is of particular note as these are listed on Annex I of the E.U. Birds Directive. Part of the site is a Wildfowl Sanctuary.

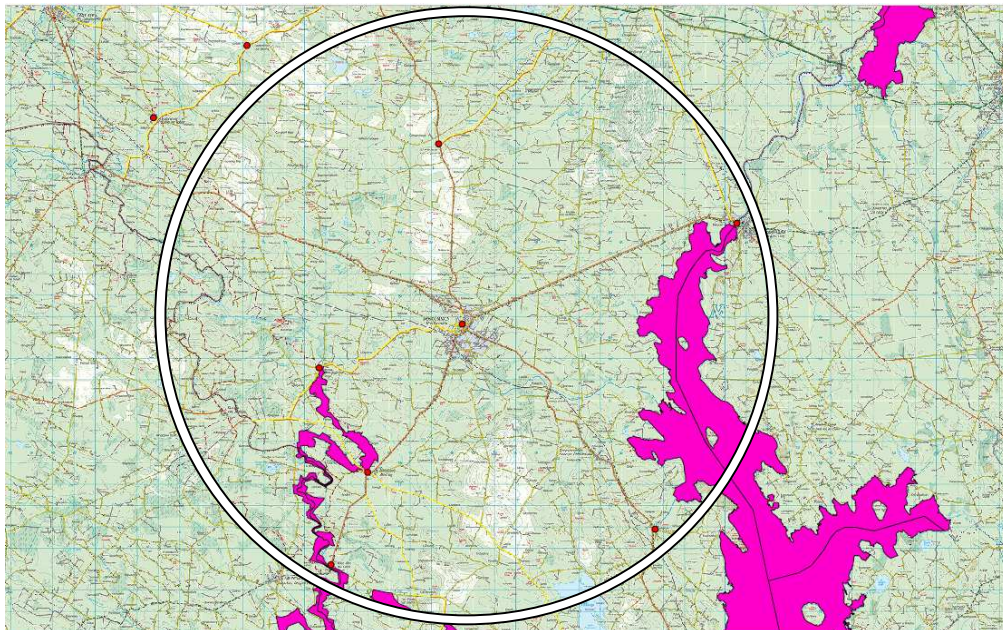
The full National Parks and Wildlife Service's Site Synopsis for Lough Croan Turlough SAC (Site Code 002349) is included in Appendix A.

Special Protection Areas (SPAs)

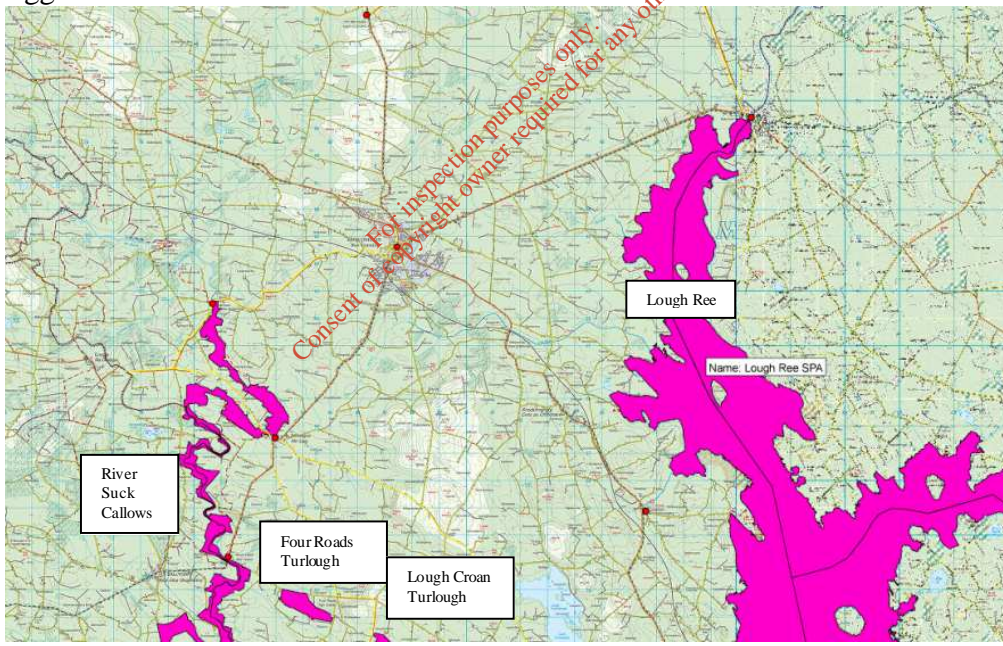
The SPAs within 15km of the WWTP and Roscommon town agglomeration are listed in the Table 2 below.

Site	Principal Species
Suck River Callows SPA (Site Code 004097) 7.3km upstream of WWTP	Whooper Swan, Wigeon, Golden Plover, Lapwing, Greenland white-fronted Goose, Wetlands & Waterbirds
Lough Ree SPA (Site Code 004064) 10.4km downstream of WWTP	Whopper swan, Greenland Whitefronted & Common Tern listed in Annex I of the E.U. Birds Directive. Goose Wigeon, , Mallard, Shoveler, Golden Eye, golden Plover, Teal.
Four Roads Turlough SPA (Site Code 004140) 13.3km upstream of WWTP Lough Croan Turlough SPA (Site Code 004139) 14.9km upstream of WWTP	Golden Plover, Greenland White-fronted goose, Wetlands and waterbirds. Shoveler, Golden Plover, Greenland White-fronted Goose, Wetland & waterbirds.

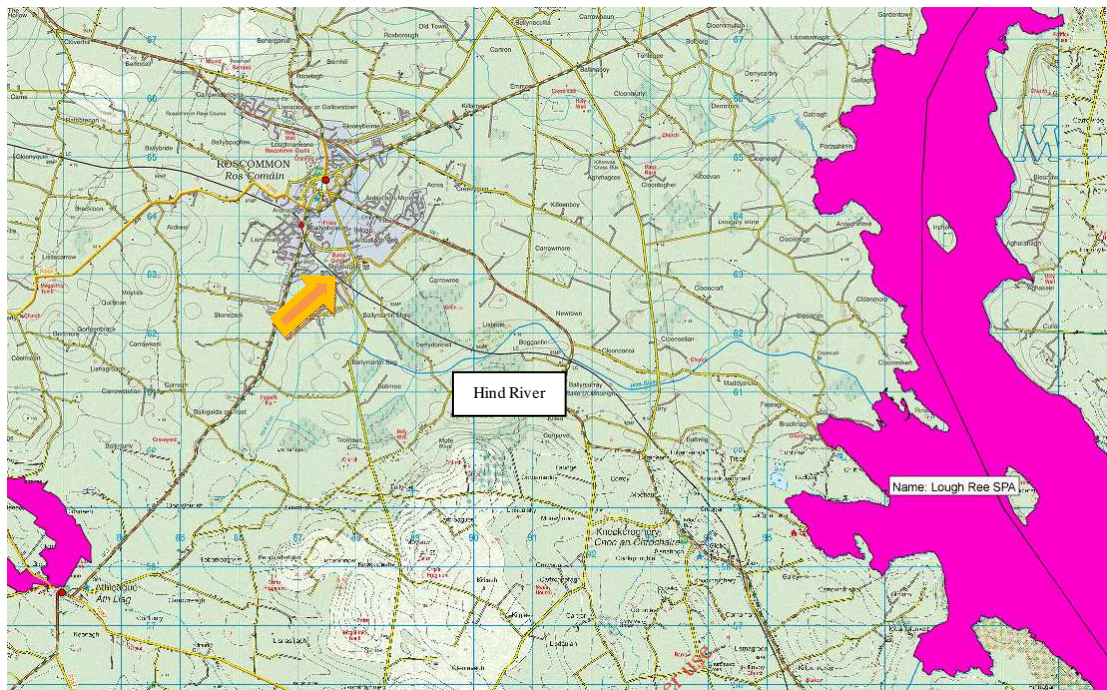
Table 2: Special Protection Area within a 15km radius of Roscommon waste water treatment plant



Drawing 7:- SPA Natura 2000 sites considered within 15km of the Roscommon town Agglomeration.



Drawing 8:- Identification of SPA



Drawing 9:- Close up of SPA near the Roscommon Agglomeration

4.8 Suck River Callows SPA (Site Code 004097)

This site is of considerable ornithological importance on account of the Greenland White-fronted Goose population which is of international significance and which is one of the largest in the country outside of the Wexford Slob. Despite poor survey data for recent years, it is known to support nationally important populations of at least three species, i.e. Whooper Swan, Wigeon and Lapwing. Detailed survey is likely to show that other species also occur in substantial numbers. Of note is that two of the species which occur regularly, Greenland White-fronted Goose and Whooper Swan, are listed on Annex I of the E.U. Birds Directive.

The full National Parks and Wildlife Service's Site Synopsis for Suck River Callows SPA (Site Code 004097) is included in Appendix A.

4.9 Lough Ree SPA (Site Code 004064)

Lough Ree is of high ornithological importance for both wintering and breeding birds. It supports nationally important populations of seven wintering waterfowl species, as well as other important species including Whooper Swan and Greenland Whitefronted Goose (both of which are listed on Annex I of E.U. Birds Directive). The site has a range of breeding waterfowl, notably nationally important populations of Common Scoter, Great Crested Grebe and Tufted Duck. It also has a colony of Common Tern, another species listed on Annex I of the E.U. Birds Directive.

The full National Parks and Wildlife Service's Site Synopsis for Lough Ree SPA (Site Code 004064) is included in Appendix A.

4.10 Four Roads Turlough SPA (Site Code 004140)

Four Roads Turlough SPA is of ornithological importance because it is regularly utilised by the nationally important River Suck Greenland White-fronted Goose flock. A nationally important population of Golden Plover also occurs at the site. The regular occurrence of these two species, which are listed on Annex I of the E.U. Birds Directive, is of note.

The full National Parks and Wildlife Service's Site Synopsis for Four Roads Turlough SPA (Site Code 004140) is included in Appendix A.

4.11 Lough Croan Turlough SPA (Site Code 004139)

Lough Croan Turlough SPA is of high ornithological importance, primarily for its Greenland White-fronted Goose population, but also because of its nationally important Shoveler and Golden Plover populations. The presence of Greenland White-fronted Goose, Golden Plover and Whooper Swan is of particular note as these are listed on Annex I of the E.U. Birds Directive. Part of the site is a Wildfowl Sanctuary.

The full National Parks and Wildlife Service's Site Synopsis for Lough Croan Turlough SPA (Site Code 004139) is included in Appendix A.

5.0 Stage 1 Screening for AA:- Identification of Potential Impacts to Natura 2000 Sites & Assessment of likely effects – direct, indirect and cumulative

5.1 Receiving surface water – the Hind River

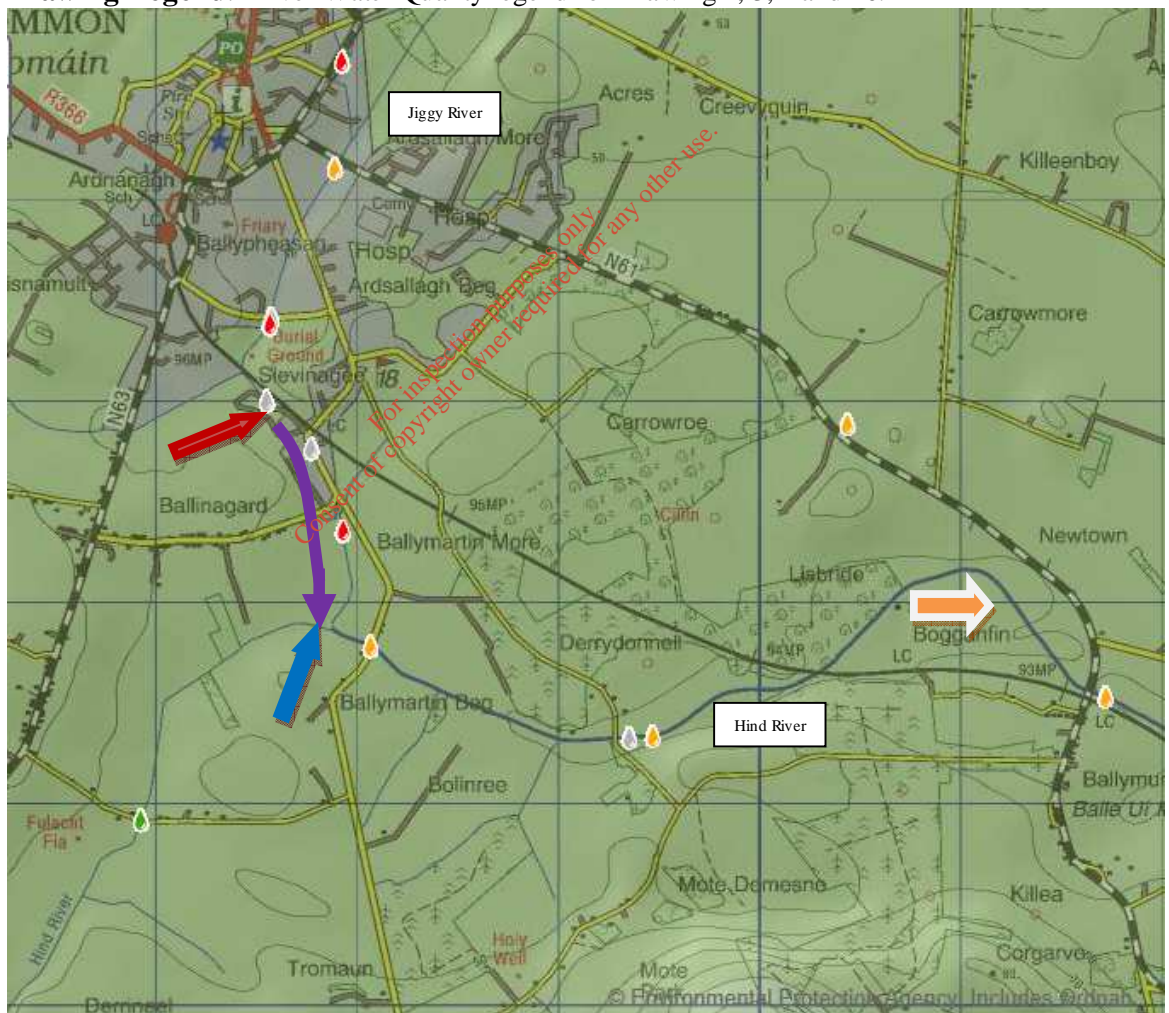
Direct Impact: - the construction of the WWTP or any future agglomeration upgrade work will have no direct impact on Natura 2000 sites as no loss of habitat, trees or shrubs is possible. The Roscommon town agglomeration or treated effluent outfall pipe does not encroach on any Natura 2000 sites.

Indirect Impact: - there is potential low risk for indirect negative impact to water quality from the Roscommon town agglomeration storm water overflows on Lough Ree Natura site. There is no indirect impact from the Roscommon Town agglomeration in terms of noise, vibration, loss of habitat area, fragmentation, and water resource to the bird or fish population of Lough Ree. No impact with regard to disturbance to bird populations at Lough Ree during construction upgrade or operation of WWTP/agglomeration; all construction activities will be land based and the agglomeration is 10.4km downstream of the WWTP/agglomeration.

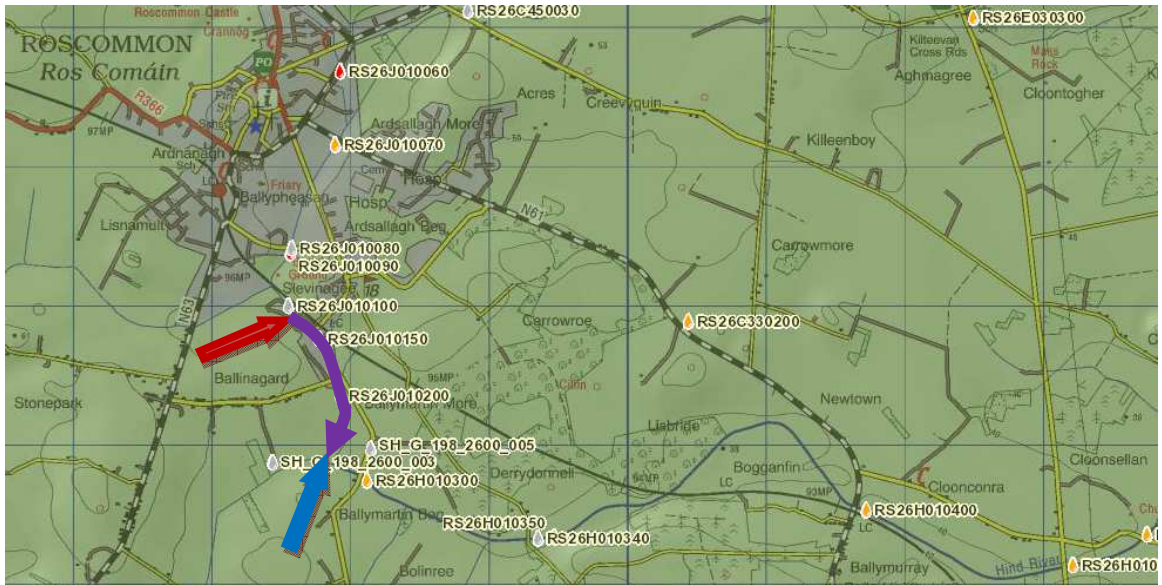
Cumulative: - The assessment process also considered the WWTP and agglomeration in the context of the above Natura 2000 sites in terms of loss or reduction of habitat area, habitat or species fragmentation, disturbance to key species, reduction in species density, changes in key indicators of conservation value and climate change. The process concluded that the Roscommon town agglomeration is not considered to have a significant impact upon any Natura 2000 sites. However, storm water overflows from the agglomeration wastewater network can have a negative impact on the water quality of the River Jiggy.

- ▲ Q4-5, Q5 - High Status
- ▲ Q4 - Good Status
- ▲ Q3-4 - Moderate Status
- ▲ Q2-3, Q3 - Poor Status
- ▲ Q1, Q1-2, Q2 - Bad Status
- ▲ No Q Values

Drawing Legend:- River Water Quality legend for Drawing 2, 3, 4 and 10.



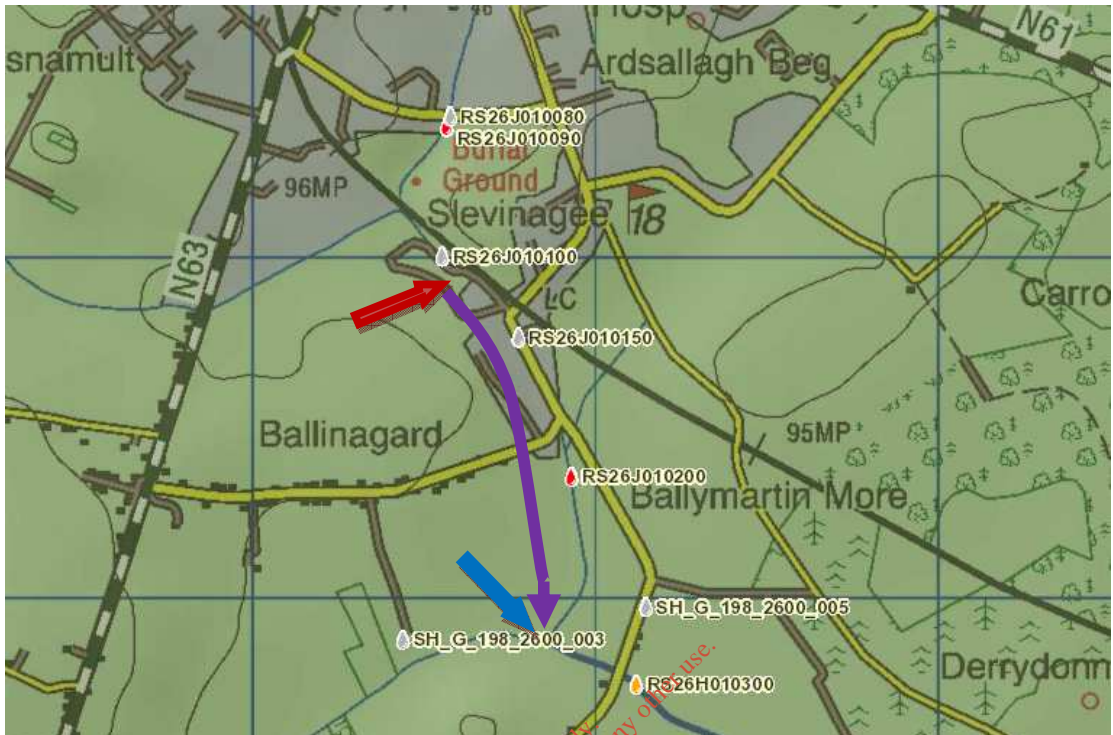
Drawing 10:- highlights the river water quality of the River Hind and Jiggy. The river Hind has “poor status - orange” and the river Jiggy has “Bad Status - red”. Red arrow indicates location of Roscommon WWTP. The blue arrow indicates location piped effluent from the WWTP enters the confluence to the river Hind and Jiggy. Magenta arrow indicates treated effluent discharge pipe from Roscommon town WWTP. The Orange arrow indicates the flow of the River Hind towards Lough Ree 10.4km away from the agglomeration.



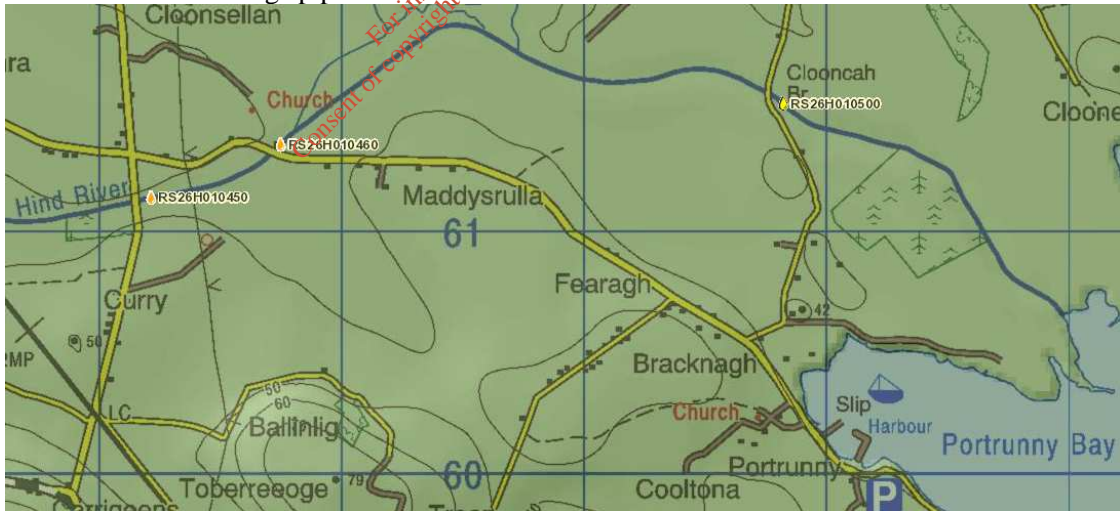
Drawing 11:- highlights the river water quality of the River Hind and Jiggy. The river Hind has “poor status - orange” and the river Jiggy has “Bad Status - red”. Red arrow indicates location of Roscommon WWTP. The blue arrow indicates location piped effluent from the WWTP enters the confluence to the river Hind and Jiggy. Magenta arrow indicates treated effluent discharge pipe from Roscommon town WWTP.



Drawing 12:- highlights the river water quality of the River Jiggy. The river Jiggy has “Bad Status - red”. Red arrow indicates location of Roscommon WWTP.



Drawing 13:- highlights the river water quality of the confluence of the River Jiggy and Hind. The river Hind has “poor status - orange” and the river Jiggy has “Bad Status - red”. Red arrow indicates location of Roscommon WWTP. The blue arrow indicates location piped effluent from the WWTP enters the confluence to the river Hind and Jiggy. Magenta arrow indicates treated effluent discharge pipe.



Drawing 14:- highlights the improving river water quality of the confluence of the River Hind and Lough Ree. The river Hind has “moderate status - yellow” at this location.

5.2 Roscommon WWTP Agglomeration

The Roscommon WWTP is located in the townland of Ballinagard townland and provides wastewater influent treatment generated by the agglomeration (drawing 1). The incoming untreated influent entering the works is consistent with a predominantly

domestic source. The current 2012 population equivalent for Roscommon WWTP is 8,312. The WWTP has adequate capacity at 9,550pe.

5.3 Effluent standard from Roscommon WWTP

The WWTP produces effluent to the following standard to the receiving water the River Hind, BOD 10mg/l, Suspended Solids 10mg/l, Total P 2mg/l, total N 15mg/l and Nitrate N 8mg/l. There is adequate assimilative capacity in the receiving water, the river Hind.

5.4 Assessment of Likely Significant Effects

Assessment of Likely Significant Effects	
(The purpose of this is to identify if the effect(s) identified could be significant – if uncertain assume the effect(s) are significant).	
If the answer is 'yes' to any of the questions below, then the effect is significant. (Please justify your answer, 'Yes' / 'No' alone is insufficient)	
<p>Would there be... any impact on an Annex 1 habitat? (Annex 1 habitats are listed in Appendix 1 of AA Guidance)</p>	<p>No-The agglomeration of Roscommon is not within the boundaries of any of the cSAC's or SPA listed below and no interconnectivity exists. The proposed project will not increase/decrease the hydrology of the area, so water dependent habitats will not be effected.</p> <p>Ballinturly Turlough (Site Code 000588)– No Corbo Bog (Site Code 002349) -No Lisduff Turlough (Site Code 000609)-No Lough Ree (Site Code 000440)-No Lough Funshinagh (Site Code 000611)– No Four Roads Turlough (Site Code 001637)– No Lough Croan Turlough (Site Code 002349)- No Suck River Callows (Site Code 004097) -No Lough Ree SPA (Site Code 004064) -No Four Roads Turlough (Site Code 004140)-No Lough Croan Turlough (Site Code 004139) - No</p>
<p>.... a reduction in Habitat area on a Natura 2000 site?</p>	<p>No-The agglomeration is not within the boundaries of any of the cSAC's or SPA listed below and no interconnectivity exists.</p> <p>Ballinturly Turlough (Site Code 000588)– No Corbo Bog (Site Code 002349) -No Lisduff Turlough (Site Code 000609)-No Lough Ree (Site Code 000440)-No Lough Funshinagh (Site Code 000611)– No Four Roads Turlough (Site Code 001637)– No Lough Croan Turlough (Site Code 002349)- No Suck River Callows (Site Code 004097) -No</p>

	Lough Ree SPA (Site Code 004064) -No Four Roads Turlough (Site Code 004140)-No Lough Croan Turlough (Site Code 004139) – No
... direct / indirect damage to the physical quality of the environment (e.g water quality and supply, soil compaction) in the Natura 2000 site?	No-As the agglomeration is not within the boundaries of any of the cSAC's or SPA listed below and as no interconnectivity exists there will be no damage to the physical quality of the environment. Ballinturly Turlough (Site Code 000588)– No Corbo Bog (Site Code 002349)) -No Lisduff Turlough (Site Code 000609)-No Lough Ree (Site Code 000440)-Yes (Low) Lough Funshinagh (Site Code 000611)– No Four Roads Turlough (Site Code 001637)– No Lough Croan Turlough (Site Code 002349)- No Suck River Callows (Site Code 004097) -No Lough Ree SPA (Site Code 004064) –Yes (Low) Four Roads Turlough (Site Code 004140)-No Lough Croan Turlough (Site Code 004139) - No
... Serious / ongoing disturbance to species / habitats for which the Natura 2000 site is selected (e.g because of increased noise, illumination and human activity)?	No-As the proposed project is 10.4km downstream from the nearest cSAC's or SPA there will be no disturbance to the species/habitats for which the site is selected. Ballinturly Turlough (Site Code 000588)– No Corbo Bog (Site Code 002349)) -No Lisduff Turlough (Site Code 000609)-No Lough Ree (Site Code 000440)-No Lough Funshinagh (Site Code 000611)– No Four Roads Turlough (Site Code 001637)– No Lough Croan Turlough (Site Code 002349)- No Suck River Callows (Site Code 004097) -No Lough Ree SPA (Site Code 004064) -No Four Roads Turlough (Site Code 004140)-No Lough Croan Turlough (Site Code 004139) - No
... Direct / indirect damage to the size, characteristics or reproductive ability of populations on the Natura 2000 site?	No-As the proposed project is 10.4km downstream from the nearest SAC or SPA there will be no damage to the size, characteristics or reproductive ability of populations on the sites listed below. Ballinturly Turlough (Site Code 000588)– No Corbo Bog (Site Code 002349)) -No Lisduff Turlough (Site Code 000609)-No Lough Ree (Site Code 000440)-No Lough Funshinagh (Site Code 000611)– No Four Roads Turlough (Site Code 001637)– No

	Lough Croan Turlough (Site Code 002349)- No Suck River Callows (Site Code 004097) -No Lough Ree SPA (Site Code 004064) -No Four Roads Turlough (Site Code 004140)-No Lough Croan Turlough (Site Code 004139) - No
Would the project interfere with mitigation measures put in place for other plans / projects. [Look at in-combination effects with completed, approved but not completed, and proposed plans /projects. Look at projects / plans within and adjacent to Natura 2000 sites and identify them].Simply stating that there are no cumulative impacts is insufficient.	The existing other plans for the Roscommon area form part of a hierarchy of National, regional and county level planning framework and policy documents, specifically the Roscommon Area Plan, the Roscommon County Development Plan, the National Spatial Strategy and the Regional Planning Guidelines. The main environmental objectives of all these policies and strategies are to protect the environment and to maintain a sustainable environment. The waste water treatment plant at Roscommon supports the sustainable development of the area and it's use shall not give rise to significant adverse impacts on the integrity of any Natura 2000 sites. Ballinturly Turlough (Site Code 000588)- No Corbo Bog (Site Code 002349) -No Lisduff Turlough (Site Code 000609)-No Lough Ree (Site Code 000440)-No Lough Funshinagh (Site Code 000611)- No Four Roads Turlough (Site Code 001637)- No Lough Croan Turlough (Site Code 002349)- No Suck River Callows (Site Code 004097) -No Lough Ree SPA (Site Code 004064) -No Four Roads Turlough (Site Code 004140)-No Lough Croan Turlough (Site Code 004139) - No

Table 3:- Assessment of Likely Significant Effects

6 Screening Conclusion and Statement

The only likely impact of the Roscommon agglomeration on the Natura 2000 sites conservation objectives assessed in this report is indirect water quality from the storm water overflows from river Jiggy/Hind on the aquatic species/annexed bird species in Lough Ree. The Lough contains one of only two populations of the endangered fish species, Pollan (*Coregonus autumnalis*), which is genetically different from Continental European stock. The shrimp (Crustacean) *Mysis relicta* occurs in this lake and is a relict of the glacial period in Ireland.

Therefore, the Roscommon agglomeration must proceed to Stage 2 Natura Impact Statement for Natura 2000 sites listed in table 4.

As already outlined the proposed site is not within a Natura 2000 site and the closest is Lough Ree, approximately 10.4km to the east of the WWTP boundary. Roscommon County Council has put in place policies and objectives to protect the Natura 2000 sites. Developments in close proximity to these areas will be subject to environmental impact assessment and these assessments will assess the impacts of the development on the Natura 2000 sites, and list any mitigation measures to be employed by a developer to eliminate/mitigate against any impacts.

It has been concluded that there will be no risk of significant negative effects on the SAC's and SPA listed below either alone or in combination with other plans or projects, and therefore, no adverse effect on the integrity of these Natura 2000 sites or on their conservation objectives as a result of the proposed works as these sites are located upstream of effluent discharge point and the confluence of the river Jiggy/Hind.

- Ballinturly Turlough (Site Code 000588) Upstream of Agglomeration
- Corbo Bog (Site Code 002349) Upstream of Agglomeration
- Lisduff Turlough (Site Code 000609) Upstream of Agglomeration
- Lough Funshinagh (Site Code 000611) Upstream of Agglomeration
- Four Roads Turlough (Site Code 001637) Upstream of Agglomeration
- Lough Croan Turlough (Site Code 002349) Upstream of Agglomeration
- Suck River Callows (Site Code 004097) Upstream of Agglomeration
- Four Roads Turlough (Site Code 004140) Upstream of Agglomeration
- Lough Croan Turlough (Site Code 004139) Upstream of Agglomeration

For inspection purposes only. Consent of copyright owner required for any other use.

7 Stage 2:- NATURA IMPACT STATEMENT

7.1 Introduction

The Stage 1 screening determined that Appropriate Assessment of the Roscommon Town waste water Agglomeration is essential to identify potential / “in combination” impacts, that may adversely affect the integrity of the Natura 2000 sites listed in table 1 below. Subsequently any adverse effects identified will require mitigation measures to reduce this impact.

Site Code	Site Name	Distance from Roscommon town agglomeration (km)
000440	Lough Ree (SAC)	10.4km downstream
004064	Lough Ree (SPA)	10.4km downstream

Table 4:- Natura 2000 sites to be included in stage 2 of the Appropriate Assessment process.

7.2 Conservation Objectives

The overall aim of the Habitats Directive is to maintain or restore the favorable conservation status of habitats and species as listed in the Habitats & Birds Directive, Special Areas of Conservation (SAC) and Special Protection Areas (SPA). These two designations (SAC & SPA) are collectively known as the Natura 2000 network.

Objectives for Designated Natura 2000 Sites are as follows in the current Roscommon County Development Plan 2008 – 2014 (Chapter 8: Natural Heritage and Landscape Character Assessment);

Objective 246 -Ensure that development in or near or likely to effect a designated site should avoid any significant adverse impact on the features for which the site has been designated.

Objective 247 -Require an appropriate assessment of any development as described in Objective 246 above.

In the case of the SPA and SAC listed in table 4, the conservation objective for the sites are:

Objective: To maintain or restore the desirable conservation condition of aquatic / annexed bird species listed as Special Conservation Interest for SAC/SPA. Where possible increase the population of rare annexed bird species listed in table 1, 2 & 4.

7.3 Describe How the Integrity of the Natura 2000 site is likely to be effected by Roscommon Town Agglomeration

The waste water agglomeration boundary of Roscommon town or treated effluent outfall pipe is not located within any Natura 2000 sites. There is potential for indirect impact on water quality to Natura 2000 sites Lough Ree (SPA & SAC) from storm water overflows in the Roscommon town agglomeration. Drawing 10 highlight the physiochemical water quality monitoring in the river Jiggy and Hind is having a local

detrimental impact on the environment, i.e. the river Jiggy. The “bad” status of the River Jiggy is due to agglomeration waste water network and associated storm water overflow discharge. The river quality improves in the river Hind, where piped treated effluent is discharge. Piped treated effluent flows 1.2km by gravity from the WWTP and enters the receiving water at the confluence of the river Hind and Jiggy. The river Jiggy / Hind is not designated a Salmonid water (under the European Communities (Quality of Salmonid Waters) Regulations, 1998). The river Hind (downstream of Roscommon Town treated wastewater outfall, to Lough Ree) is identified as sensitive water in terms of the Urban Waste Water Treatment Regulations 2001.

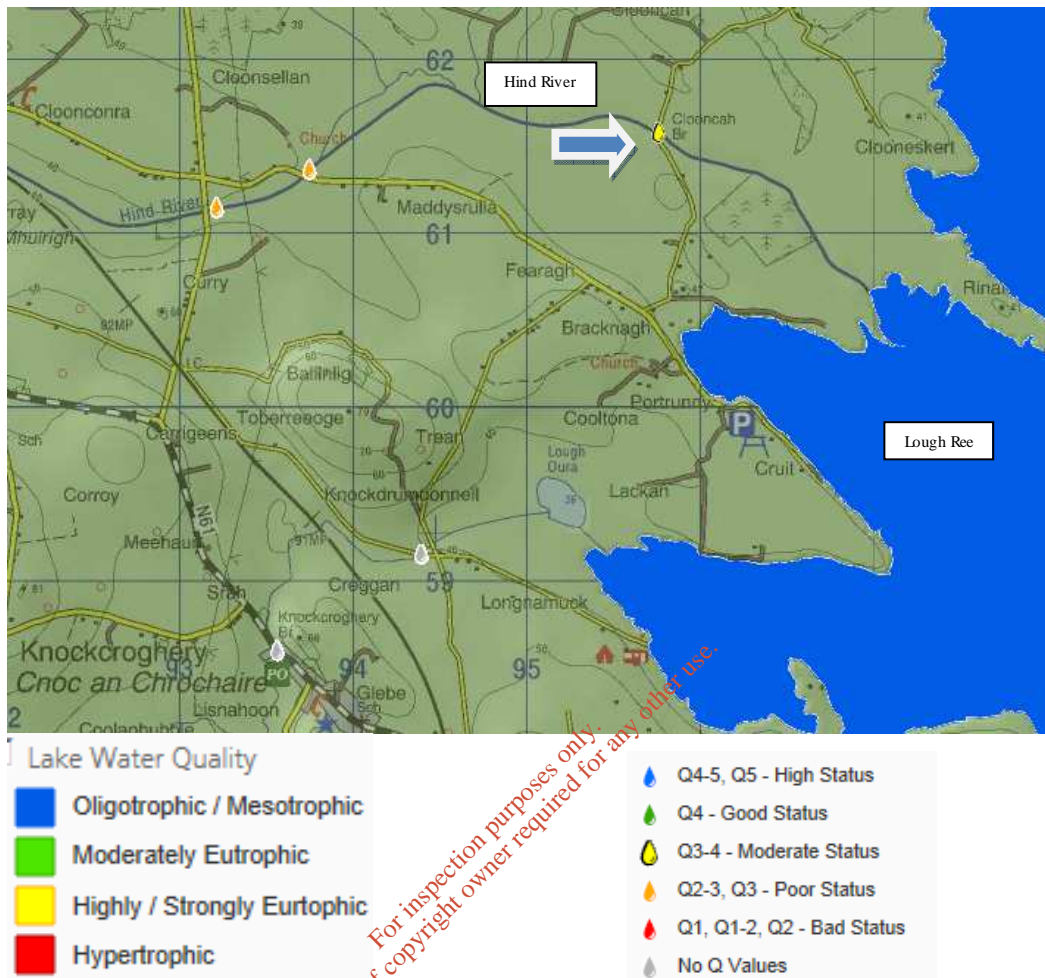
A definition of the “integrity of the site” is stated in Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities issued DoEHLG 2009, Managing Natura 2000 sites: The provisions of Article 6 of the “Habitats Directive” 92/43/EEC, European Commission, 2000 as:-

“the coherence of the sites ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified”. The guidance documents highlights that *“the decision as to whether it (integrity) is adversely effected should focus on and be limited to the site conservation objectives”*.

From this definition, the predicted impact of Roscommon Town waste water agglomeration on Natura 2000 sites (as listed in table 4) relates to the river water quality from the river Jiggy/Hind and Lough Ree. The lake itself is an excellent example of a mesotrophic to moderate-eutrophic system, supporting a rare fish species and a good diversity of breeding and wintering birds. There is a population of Otters around the lake. This species is listed in the Red Data Book as being threatened in Europe and is protected under Annex II of the European Habitats Directive.

Roscommon Town WWTP – EFFLUENT RESULTS 2013					
Date 2013	Ammonia (as N) (mg/l)	cBOD (mg/l)	COD (mg/l)	Orthophosphate (as P) (mg/l)	SS (mg/l)
05/11	0.024	3.02	68	0.51	
08/10	0.037	1	30	2.03	7
10/09	1.13	1	46	0.006	7
01/08	0.038	2.46	51	0.13	8
16/07	0.066	2.07	70	4	7
05/06	0.066	2.36	30	0.73	7
21/05	0.512	1.48	20	0.05	7
18/04	0.014	2.88	20	0.54	7
07/03	0.344	3.21	40	1.04	9.5
19/02	0.114	2.16	26	0.152	16
29/01	0.013	1.6	20	0.0193	7

Table 5:- Roscommon town wwtp Effluent results 2013



Drawing 14:- highlights the Oligotrophic / Mesotrophic condition of Lough Ree SPA & SAC.

Classification Scheme		Category Description			
Lake Trophic Category	Annual Max. Chlorophyll mg/m ³	Algal Growth	Deoxygenation in Hypolimnion	Level of Pollution	Impairment of use of Lake
Oligotrophic	<8	Low	Low	Very Low	Probably none
Mesotrophic	8<25	Moderate	Moderate	Low	Very Little

Table 6:- Modified version of the OECD scheme based on values of annual maximum chlorophyll concentration. Indications of water quality and the probability of pollution are also shown.

				Overall Trophic Status		
Lake	Location	Area km ²	Recent changes	2001 - 03	2004-06	2007-09
Ree	Roscommon	105.0	Improvement	Mesotrophic	Mesotrophic	Oligotrophic

Table 7:- Lough Ree trophic status (based on maximum chlorophyll).

The “poor - moderate” water quality of the Jiggy/Hind River is not having adverse effect on the water quality of Lough Ree. However increase inputs of phosphorus and nitrogen arising from human activity by inflowing streams, can give rise to over-

enrichment namely Eutrophication. This process commonly results in increased planktonic algal and higher plant biomass creating an undesirable disturbance to the balance of organisms in a lake and to its water quality. This form of pollution is characterized in lakes by increased phytoplankton growth and more intensive algal blooms, increased rooted plant growth, declining transparency, deoxygenation. The degree of enrichment in lakes is assessed by reference to a scheme proposed by the OECD, which sets boundaries defining the different trophic categories as shown on Drawing 14, table 6 & 7. The water quality in Lough Ree is improving.

7.4 Describe Mitigation Measures that are to be introduced to Avoid, Reduce or Remedy the adverse Effects on the Integrity of Natura 2000 site

Improve river Jiggy water quality from “bad” to at least “good” status. The following improvement works to the wastewater agglomeration network (storm water overflows) will result in “good status” for the River Jiggy & consequently the river Hind/Lough Ree. The improvement works involves a reduction in inflow, infiltration and elimination of storm water overflows discharge to river Jiggy. Refer to table 8.

MITIGATION MEASURES ROSCOMMON TOWN AGGLOMERATION	
Contract	Description
Advance Works Phase	
1	Rehabilitation works to reduce groundwater infiltration
2	New Pumping Station on Circular Road
	New twin rising main to WWTW
	New storm tank at WWTW
	New Inlet Lift Pumping Station at WWTW
	New Storm & Foul Rising Mains at WWTW
	Upgrade Works to Circular Road Pumping Station
	Civil Works to Inlet to WWTW
	Removal of SWO at WWTW
Phase 1 Works	
	New Sewer at Mart Road - Line A
	New Sewer at Circular Road - Line B
	New Sewer at Antogher Road - Line C
	New Sewer at County Home Road - Line D
	New Sewer at Circular Road - Line E
	New Pumping Station at Ballinagard
	Removal of 7 no. SWO's from Network

Table 8:- Summary of Improvement works for Roscommon town wastewater network to bring the River Jiggy to “good status” water quality.

As a consequence of these mitigation measures water quality in the river Jiggy is expected to improve significantly. It is therefore felt that the integrity of the downstream SPA & SAC Lough Ree will not be comprised (10.4km from Roscommon agglomeration to Lough Ree).

In summary, the elimination of storm water overflows to the river Jiggy from the Roscommon town waste water agglomeration will significantly increase the dilution capacity within the receiving water the Hind River and Lough Ree. Even at low flows,

to assimilate discharges from the wastewater treatment works 1.2km treated effluent discharge pipe. The WWTP is achieving compliance with effluent emission limit values as outline in table 5. The principle cause of this adverse impact on the river Jiggy/Hind is the discharge from storm water overflows and not the WWTP.

7.5 Natura Impact Statement Conclusion

The mitigation measures proposed will eliminate any likelihood of adverse impacts from the Roscommon town agglomeration on the Natura 2000 conservation objectives, there is no risk of significant effects on these sites from the agglomeration, either alone or in combination with other plans or projects.

There is no impact from the Roscommon Town agglomeration in terms of noise, vibration, loss of habitat area, fragmentation, and water resource to the bird or fish population on the Natura 2000 site Lough Ree. No impact with regard to disturbance to bird populations at Lough Ree during construction upgrade or operation of WTTP/agglomeration. All construction activities will be land based and the agglomeration is 10.4km downstream of the WWTP/agglomeration.

For inspection purposes only.
Consent of copyright owner required for any other use.

REFERENCES

NPWS (2009) *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities*. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government. Dublin.

Circular L8/08 Water Services Investment and Rural Water Programmes-Protection of Natural Heritage and National Monuments, Department of the Environment, Heritage and Local Government, Dublin.

EPA Water Quality in Ireland 2007 – 2009 - published 2010

NPWS (1997) *Site Synopsis for Ballinturly Turlough cSAC*.

NPWS (2002) *Site Synopsis for Corbo Bog cSAC*

NPWS (1997) *Site Synopsis for Lisduff Turlough cSAC*

NPWS (2005) *Site Synopsis for Lough Ree cSAC, SPA*

NPWS (1999) *Site Synopsis for Lough Funshingagh cSAC*.

NPWS (2010) *Site Synopsis for Four Roads Turlough cSAC, SPA*.

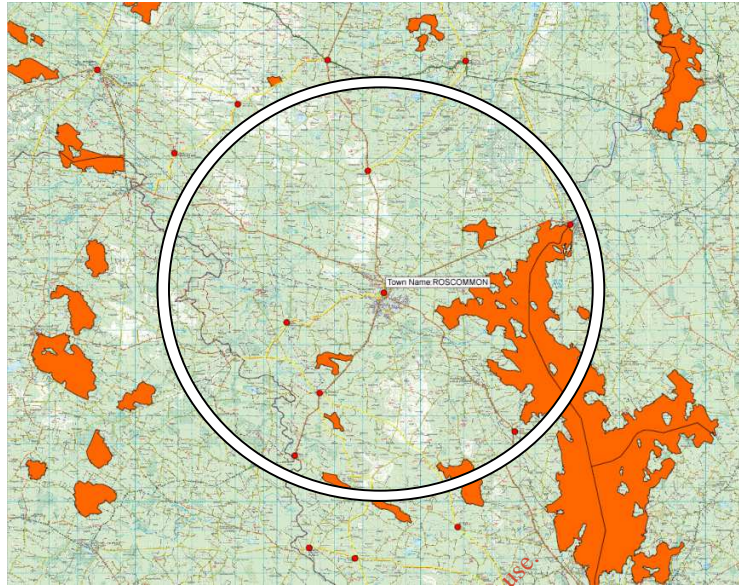
NPWS (2010) *Site Synopsis for Lough Croan Turlough cSAC*

NPWS (2005) *Site Synopsis for Suck River Callows SPA*

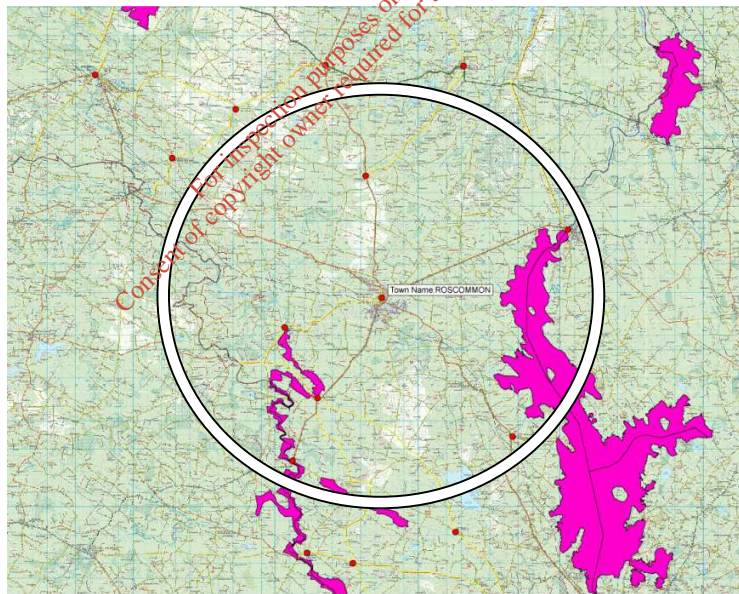
NPWS (1997) *Site Synopsis for Four Roads Turlough SPA*

NPWS (2005) *Site Synopsis for Lough Croan Turlough SPA*

Appendix A – NATURA 2000 Site Synopsis



SAC: - 15km Radius from Roscommon town



SPA: - 15km Radius from Roscommon town

SITE NAME: BALLINTURLY TURLOUGH (SAC)

SITE CODE: 000588

Ballinturly Turlough is situated in a V-shaped basin just north of Athleague on the Roscommon road. It is a very large site stretching westwards for 2.5 km from the road, and opening out at the western end over large fields. Bedrock is exposed at the north-eastern end, and elsewhere the edges of the basin are frequently strewn with loose rocks. The basin floor is mainly flat, but west of centre is a depression in which there is a shallow lake.

A multiplicity of vegetation types occurs in this turlough, which varies from wet to dry and from peaty to rocky. The main vegetation type on the floor of the turlough is dominated by a mixture of Common Sedge (*Carex nigra*) and Hairy Sedge (*C. hirta*), accompanied by Marsh Pennywort (*Hydrocotyle vulgaris*), Creeping Buttercup (*Ranunculus repens*), Lesser Spearwort (*Ranunculus flammula*) and the moss, *Drepanocladus exannulatus*. In peatier places there is some Brown Sedge (*Carex disticha*) and Tufted Hair-grass (*Deschampsia cespitosa*), whereas in places where flooding occurs more frequently Water Forget-me-not (*Myosotis scorpioides*) and Lesser Marshwort (*Apium inundatum*) are prominent. Depressions within this community, either in the central hollows or in marginal channels, are mostly lined by Amphibious Bistort (*Polygonum amphibium*), with Common Spike-rush (*Eleocharis palustris*) and Reed Canary-grass (*Phalaris arundinacea*). At its upper edge a purer Common Sedge stand occurs in the northern limb of the turlough, with damp grassland above this. In stonier parts, vegetation dominated by Purple Moor-grass (*Molinia caerulea*) and Creeping Cinquefoil (*Potentilla reptans*) is found.

The lake area consists of Great Fen sedge (*Cladium mariscus*) mixed with Fen Pondweed (*Potamogeton coloratus*), Lesser Water-plantain (*Baldellia ranunculoides*), Brookweed (*Samolus valerandi*) and Many-stalked Spike-rush (*Eleocharis multicaulis*), surrounded by extensive beds of Tufted-sedge (*Carex elata*), Common Sedge, Common Club-rush (*Scirpus lacustris*) and a little Common Reed (*Phragmites australis*), Slender Sedge (*Carex lasiocarpa*) and Slender Tufted-sedge (*Carex acuta*). On the south-west side the land rises and is covered by Tawny Sedge (*Carex hostiana*), Long-stalked Yellow-sedge (*Carex lepidocarpa*) and a little Meadow Thistle (*Cirsium dissectum*). Old areas of peat cutting are found in this area and to the west, and support a varied assemblage of plant species and communities.

The south-eastern corner of the turlough has a build-up of peat over land that was formerly flooded. Here there is a large area of poached peat with Brown Sedge, Soft Rush (*Juncus effusus*) and Meadowsweet (*Filipendula ulmaria*), and a smaller area of cutover peat dominated by Black Bog-rush (*Schoenus nigricans*), Purple Moor-grass and Meadow Thistle. Woodland is present only in the south-western part of the site, where Hawthorn (*Crataegus monogyna*) and a little Buckthorn (*Rhamnus catharticus*) is scattered on dry ground.

Lapwing and Snipe nest in the area, and the site is also used by post-breeding flocks and migrating populations of birds, i.e. Black-tailed Godwit (105), Whooper Swan (18), Greenland White-fronted Geese (71), Wigeon (899), Teal (303), Mallard (37), Pintail (49), Shoveler (24), Tufted Duck (18), Lapwing (303) and Curlew (86). Figures in

parentheses are the average of 5 counts during 2 seasons in the period 1984/85-1986/87. Pintail, Shoveler, Greenland White-fronted Goose, Whooper Swan and Black-tailed Godwit are listed in the Red Data Book and, the latter three species, on Annex I of the EU Birds Directive.

Ballinturlough is the fourth largest active turlough still extant. It is an exceptional site which contains a wide range of habitat types, vegetation communities and plant species. A special feature of the site is that despite a seasonal connection with the River Suck the groundwater is oligotrophic (nutrient-poor) enough to support normally calcifuge plants. The site is little damaged by grazing, which occurs over most of it, and there is little internal drainage. Areas formerly cut for peat are largely regenerating and support a diversity of vegetation types. Overall, human impact on the site is generally low. Turloughs are listed, with priority status, on Annex I of the EU Habitats Directive and, as such, are of considerable conservation significance. The large wintering bird population adds substantially to the importance of the site.

SITE SYNOPSIS

SITE NAME: CORBO BOG (SAC)

SITE CODE: 002349

Corbo Bog is located 7 km west of Lanesborough mainly in the townlands Corbo, Cloonageeragh, Clooncashel Beg and Coolshaghtena in Co. Roscommon. The site comprises a raised bog that includes both areas of high bog and cutover bog. The site is bounded on the south by the Lanesborough to Roscommon road - a road from this to Kilroosky forms part of the western boundary.

The site is a candidate Special Area of Conservation selected for active raised bog, degraded raised bog and Rhynchosporion, habitats that are listed on Annex I of the E.U. Habitats Directive. Active raised bog comprises areas of high bog that are wet and actively peat-forming, where the percentage cover of bog mosses (*Sphagnum* spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, *Sphagnum* lawns, flushes and soaks. Degraded raised bog corresponds to those areas of high bog whose hydrology has been adversely effected by peat cutting, drainage and other land use activities, but which are capable of regeneration. The Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (*Rhynchospora alba*) and/or Brown Beak-sedge (*R. fusca*), and at least some of the following associated species, Bog Asphodel (*Narthecium ossifragum*), Sundews (*Drosera* spp.), Deergrass (*Scirpus cespitosus*), Carnation Sedge (*Carex panicea*).

This bog is a remnant of a much larger bog that has now been mostly cutover. A long, relatively thin section of the high bog remains. There is an extensive pool-hummock system and overall moss cover is high. Much of the high bog surface, especially in the vicinity of the flushes, is very wet and quaking. There are five areas of flush found in the eastern side of the site.

The high bog has vegetation typical of a raised bog including Ling Heather (*Calluna vulgaris*) and Cross-leaved Heath (*Erica tetralix*). Low hummocks of the bog moss *Sphagnum papillosum* are common with small patches of *S. imbricatum* hummocks. In the centre of the site there are many interconnecting pools containing Great Sundew

(*Drosera anglica*), the bog moss *Sphagnum cuspidatum*, and Bogbean (*Menyanthes trifoliata*). The bog moss *S. magellanicum*, Hare's-tail Cottongrass (*Eriophorum vaginatum*) and Common Cottongrass (*E. angustifolium*) are found around the edges of the pools. There are some hummocks of the moss *Racomitrium lanuginosum* found as islands in the pools in the north-east of the site. Bog-rosemary (*Andromeda polifolia*) has been recorded as occurring throughout the site. The relatively rare Brown Beak-sedge is found in areas of the high bog. Carnation Sedge dominates disturbed and burnt margins of the bog. In the north of the site there is an area of high lichen cover (*Cladonia furcata*, *C. portentosa* and *C. uncialis*). In the west of the site Black Bog-rush (*Schoenus nigricans*), which indicates a groundwater influence, has been recorded. There are indications of habitat disturbance in the northern section of the site where Bog Asphodel is dominant and in the southern end where Deerglass is common. The five flushes in the site have similar vegetation and they are almost completely infilled with Hare's-tail Cottongrass and the bog mosses *Sphagnum cuspidatum* and *S. recurvum*. The large flush in the east of the site is dominated by extensive carpets of *S. cuspidatum* with Purple Moor-grass (*Molinia caerulea*) and Soft Rush (*Juncus effusus*) occurring at the margins. A narrow margin of old cutover dominated by Ling Heather surrounds much of the site. Downy Birch (*Betula pubescens*) is also found on much of the older areas of cutover and there is an area of birch woodland on the western margin of the site.

Except at the far western and southern edges of the site active peat-cutting is carried out all around the high bog. There are two areas in particular where mechanised peatcutting is effecting the high bog: in the north of the site the cut face is less than 50 m from the pool systems and in the east the peat is being cut near to a flush. Damaging activities associated with these landuses include drainage and burning of the high bog. Two areas of the site in the north and north-east have recently been damaged by burning. Drains in the east of the site are also having a damaging effect. These are all activities that have resulted in the loss of habitat, damage the hydrological status of the site, and pose a continuing threat to it's viability. Finally, in the north and east of the site dumping of old cars has occurred.

Corbo Bog is a site of considerable conservation significance comprising as it does a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats, including hummock/hollow complexes, pools and flushes. Active raised bog is listed as a priority habitat on Annex I of the E.U. Habitats Directive.

Priority status is given to habitats and species that are threatened throughout the E. U. Ireland has a high proportion of the total E.U. resource of this habitat type (over 60%) and so has a special responsibility for it's conservation at an international level.

SITE SYNOPSIS

SITE NAME : LISDUFF TURLOUGH (SAC)

SITE CODE : 000609

Lisduff Turlough is located just south of Athleague, about 3 km from the River Suck, and lies in a shallow basin among low hills of glacial drift, with occasional rock

outcrops. There is a semi-permanent overground inflow from the north-west arm of the turlough and the site is relatively wet, with a few pools persisting into the summer months, and with a good development of fen peat. Ground water is highly calcareous and there is precipitation of marl. The site is little modified by grazing or drainage and there is little human influence on the site at present.

The vegetation is of the oligotrophic type but is strongly calcareous. It is dominated by sedges (*Carex* spp.), except in the hollows that occur in a line on the eastern edge which hold Amphibious Bistort (*Polygonum amphibium*). The central pools contain Shoreweed (*Littorella uniflora*), Common Sedge (*Carex nigra*), Bulbous Rush (*Juncus bulbosus*) and the moss, *Scorpidium scorpioides*, and at their edges give way to Common Sedge, Carnation Sedge (*Carex panicea*), with Jointed Rush (*Juncus articulatus*), some Purple Moor-grass (*Molinia caerulea*) and Common Spike-rush (*Eleocharis palustris*). As the ground rises further at the edge of the turlough, the vegetation grades to sedge heath, with scattered clumps of Black Bog-rush (*Schoenus nigricans*), Heath-grass (*Danthonia decumbens*) and Sea Plantain (*Plantago maritima*). Grassland dominated by Tall Fescue (*Festuca arundinacea*) is present at the southern end and the north-west corner of the turlough, while around outcropping rock in the north-east patches of calcareous grassland occur.

The site is of ornithological importance for it's waders and wintering wildfowl: Wigeon (310), Teal (97), Mallard (67), Pintail (5), Pochard (119), Golden Plover (143), Lapwing (250) and Curlew (70). The above figures are the average of 5 counts made over 3 seasons, 1984/85-1986/87. Bewick's Swan and Snipe also occur regularly at the site. Snipe, Redshank (1 pair) and Dunlin (1-5 pairs) nest at the site. Dunlin, Pintail, Pochard and Golden Plover are listed in the Red Data Book, the latter species and Bewick's Swan also on Annex I of the EU Birds Directive.

Lisduff Turlough has a good zonation of oligotrophic vegetation, including some vegetation communities that are rare in turloughs. It is of high ecological value as one of the few turloughs in pristine condition and, while it is subject to low grazing pressure, it gives a good idea of what many other turloughs would formerly have been like. Turloughs are listed, with priority status, on Annex I of the EU Habitats Directive and, as such, are of considerable conservation significance. The birdlife of the site adds significantly to it's importance.

SITE SYNOPSIS

SITE NAME: Lough REE (SAC)

SITE CODE: 000440

Lough Ree is the third largest lake in the Republic of Ireland and is situated, in an icedeepened depression in Carboniferous Limestone, on the River Shannon system between Lanesborough and Athlone. Some of it's features (including the islands) are based on glacial drift. It has a very long, indented shoreline and hence has many sheltered bays. Although the main habitat, by area, is the lake it's self, interesting shoreline, terrestrial and semi-aquatic habitats also occur.

The greater part of Lough Ree is less than 10m in depth, but there are six deep troughs running from north to south, reaching a maximum depth of about 36m just west of Inchmore. The lake has been classified as mesotrophic in quality, but the size of the system means that a range of conditions prevail depending on, for example, rock type. This gives rise to local variations in nutrient status and pH, which in turn result in variations in the phytoplankton and macrophyte flora, and species indicative of oligotrophic, mesotrophic, eutrophic and base-rich situations occur. The water of Lough Ree tends to be strongly peat-stained, restricting macrophytes to depths of less than 2m, and as a consequence, macrophytes are restricted to sheltered bays, where a typical Shannon flora occurs. Species present include Intermediate Bladderwort (*Utricularia intermedia*), Pondweeds (*Potamogeton* spp.), Quillwort (*Isoetes lacustris*), Greater Duckweed (*Spirodela polyrhiza*), Stoneworts (*Chara* spp., including *C. pedunculata*) and Arrowhead (*Sagittaria sagittifolia*). The latter is a scarce species which is almost confined to its occurrence to the Shannon Basin.

Reedbeds of Common Reed (*Phragmites australis*) are an extensive habitat in a number of more sheltered places around the lake, but single-species 'swamps' consisting of such species as Common Club-rush (*Scirpus lacustris*), Slender Sedge (*Carex lasiocarpa*), Saw Sedge (*Cladium mariscus*) and two scarce species of Sedge (*Carex appropinquata* and *C. elata*) also occur in suitable places. Some of these grade up into species-rich calcareous fen with Black Bog-rush (*Schoenus nigricans*) and Whorl-grass (*Catabrosa aquatica*), or freshwater marsh with abundant Water Dock (*Rumex hydrolapathum*) and Hemp-agrimony (*Eupatorium cannabinum*).

Lowland wet grassland is found in abundance around the shore and occurs in two types. One is 'callowland', grassland which floods in winter. This provides feeding for winter waterfowl and breeding waders. The other is an unusual community on stony wet lakeshore all around the lake, and is characterized by Water Germander (*Teucrium scordium*), a scarce plant species almost confined to this lake and Lough Derg.

Dry calcareous grassland occurs scattered around the lake shore. This supports typical species such as Yellow-wort (*Blackstonia perfoliata*), Carlina Thistle (*Carlina vulgaris*) and Quaking Grass (*Briza media*). Orchids also feature in this habitat e.g. Bee Orchid (*Ophrys apifera*) and Common Spotted-orchid (*Dactylorhiza fuchsia*).

Dry, broad-leaved, semi-natural woodland occurs in several places around the lake, most notably at St John's Wood and on Hare Island. St John's Wood is recognised as the largest and most natural woodland in the Midlands. It's canopy is dominated by Hazel (*Corylus avellana*), Pedunculate Oak (*Quercus robur*), Holly (*Ilex aquifolium*) and Ash (*Fraxinus excelsior*), but a range of other trees and shrubs occur, including Wych Elm (*Ulmus glabra*), Yew (*Taxus baccata*), Wild Cherry (*Prunus avium*) and Irish Whitebeam (*Sorbus hibernica*). The ground flora of St. John's Wood is species-rich, and is remarkable for the presence of two species, Toothwort (*Lathraea squamaria*) and Bird's-nest Orchid (*Neottia nidus-avis*), which tend to occur in sites with a long history of uninterrupted woodland cover. The tree species composition on Hare Island is similar to that in St. John's Wood, with additional non-native species such as Sycamore (*Acer pseudoplatanus*) and Beech (*Fagus sylvatica*). This wood also has

an exceptionally rich ground flora. Some of the smaller areas of woodland around Lough Ree are mixed woodland with a high percentage of exotics such as Beech. Some areas of well-developed Hazel scrub also occur.

Pockets of wet woodland occur around the lake: most of these are dominated by Willows (*Salix* spp.), Alder (*Alnus glutinosa*) and Downy Birch (*Betula pubescens*). In one such wood, at Ross Lough, the terrestrial alga, *Trentopohlia* spp, has a specialised niche on the Willow trunks, while the ground layer has a rich bryophyte flora (*Calliergon* spp. and *Sphagnum* spp.), scattered clumps of Greater Tussocksedge (*Carex paniculata*) and a good diversity of herb species, including Water Dock (*Rumex hydrolapathum*) and Fen Bedstraw (*Galium uliginosum*).

Small examples of raised bog occur, which are of interest in that they show a natural transition through wet woodland and/or swamp to lakeshore habitats. A good example of bog woodland occurs at St. John's Wood. This grows on cutaway peat and is dominated by Birch (*Betula pubescens*) and Alder Buckthorn (*Frangula alnus*). The occurrence of the latter species in such abundance is unusual in Ireland. Other examples of bog woodland occur scattered around the site. Bog woodland is of particular conservation importance and is listed with priority status on the EU Habitats Directive. Smaller lakes occur around the lakeshore, especially on the east side, and these often have the full range of wetland habitats contained within them. A number of small rivers pass through the site.

The site supports a number of rare plant species which are listed in the Irish Red Data Book, Alder Buckthorn (*Frangula alnus*) and Bird Cherry (*Prunus padus*) are woodland components at St. John's Wood and elsewhere. Narrow-leaved Helleborine (*Cephalanthera longifolia*) and Betony (*Stachys officinalis*), which is legally protected under The Flora Protection Order (1987), occur among the ground flora of Hare's Island (where the former occurs in notable abundance) and a number of other woods. The Stonewort (*Chara tomentosa*) is present in shallow water around the lake, and Marsh Pea (*Lathyrus palustris*) occurs on some of the callowland. The rare Myxomycete fungus, *Echinostelium colliculosum*, has been recorded from St John's Wood.

The lake itself contains one of only two populations of the endangered fish species, Pollan (*Coregonus autumnalis*), which is genetically different from Continental European stock. The shrimp (Crustacean) *Mysis relicta* occurs in this lake and is a relict of the glacial period in Ireland.

Small flocks of Greenland White-fronted Goose, an Annex I species on the Birds Directive, use several areas of callowland around the lake in winter. An average spring count of 92 individuals was obtained for this species over the six seasons 1988/89 to 1993/94, indicating that Lough Ree is a nationally important site for this species. The following bird counts are derived from 6 counts during the period 1984/85 to 1986/87. Nationally important populations of Golden Plover (1,350), an Annex I species, Wigeon (1,306), Teal (584), Tufted Duck (1,317) and Coot (798) occur. Other winter visitors are Whooper Swan (32), an Annex I species, Mute Swan

(91), Little Grebe (48), Cormorant (91), Mallard (362), Shoveler (40), Pochard (179), Goldeneye (97), Curlew (178), Lapwing (1,751) and Dunlin (48). The callowland is also used by Black-tailed Godwit and others on migration.

Some of the lake islands provide nesting sites for Common Tern, a species listed on Annex I of the European Birds Directive. The Lough Ree colony, 86 pairs in 1995, is estimated as one of the largest of this species on midland lakes. The lake also provides excellent breeding habitat for wildfowl, including Common Scoter (30-40 pairs), a rare breeding species listed as "Endangered" in the Red Data Book, and Tufted Duck (>200 pairs).

The woodlands and scrub around the lake and on the islands are a stronghold of the Garden Warbler (74 territories in 1997), a bird species mainly confined to the Shannon Lakes in Ireland.

There is a population of Otters around the lake. This species is listed in the Red Data Book as being threatened in Europe and is protected under Annex II of the European Habitats Directive.

Landuses within the site include recreation in the form of cruiser hire, angling, camping, picnicking and shooting. Chalet accommodation occurs at a few locations around the lake. Low-intensity grazing occurs on dry and wet grassland around the shore and some hay is made within the site. Some of these activities are damaging, but in a very localised way, and require careful planning. The main threat to the aquatic life in the lake comes from artificial enrichment of the waters by agricultural and domestic waste, and also by peat silt in suspension which is increasingly limiting the light penetration, thus restricting aquatic flora to shallower waters. At present Lough Ree is less effected by eutrophication than L. Derg. Lough Ree and it's adjacent habitats are of major ecological significance. Some of the woodlands around the lake are of excellent quality and include some of the best examples of this habitat in Ireland. St. John's Wood is particularly important; it is considered to be one of the very few candidates for ancient woodland in Ireland. The lake it'self is an excellent example of a mesotrophic to moderate-eutrophic system, supporting a rare fish species and a good diversity of breeding and wintering birds.

SITE SYNOPSIS

SITE NAME: Lough Funshinagh (SAC)

SITE CODE: 000611

Lough Funshinagh is located approximately 12km north-west of Athlone, in County Roscommon. The lake, which is underlain by Carboniferous Limestone, is classified as a turlough since it fluctuates to a significant extent every year and occasionally dries out entirely. In most years, an extensive area of water, filled with vegetation, persists, providing excellent breeding habitat for wildfowl (the site is a Wildfowl Sanctuary). The unusual hydrology of this site results in a drying out of the basin at irregular intervals, i.e. roughly two or three times every ten years. The lake is fed by springs and a small catchment to the west. It is mesotrophic in quality, with some marl (calcium carbonate) deposition, and is surrounded by pastures.

Open water at Lough Funshinagh is colonised by large beds of Common Club-rush (*Scirpus lacustris*), grading into stands of Tufted Sedge (*Carex elata*), Slender Sedge (*Carex lasiocarpa*) and Bottle Sedge (*Carex rostrata*) in some areas, and Common Reed (*Phragmites australis*) at the main inflow. The shallower parts of the lake contain semi-aquatic plants which are variably exposed in summer. Common here are Sharp-flowered Rush (*Juncus acutiflorus*), Carnation Sedge (*Carex panicea*) and Common Sedge (*Carex nigra*), with Water Spearwort (*Ranunculus flammula*), Water Mint (*Mentha aquatica*), Water Ragwort (*Senecio aquatica*), Marsh Bedstraw (*Galium palustre*) and Tufted Forget-me-not (*Myosotis laxa*). Other turlough communities here, and on the parts of the shore inundated by high waters, include such species as Various-leaved Pondweed (*Potamogeton gramineus*), Amphibious Bistort (*Polygonum amphibium*), Marsh Cudweed (*Gnaphalium uliginosum*), a moss (*Fontinalis antipyretica*) and Northern Yellow-cress (*Rorippa islandica*), a rare species which is listed in The Irish Red Data Book. Marl deposit's, with Stoneworts (*Chara* spp.), also occur in the shallow water. Internally, the vegetation shows considerable patterning, presumably related to nutrient conditions.

The lake is fringed by wet grassland, with species such as Bent Grass (*Agrostis stolonifera*), Marsh Pennywort (*Hydrocotyle vulgaris*) and Silverweed (*Potentilla anserina*), which in turn grades into pasture. A number of islands occur on the eastern side which are never totally flooded. They carry Gorse (*Ulex europaeus*) scrub, whose lower limit is controlled by the winter flooding.

Lough Funshinagh is important for wintering waterfowl. The following figures are derived from 13 counts over 3 seasons (1984/85-1986/87). Included among the regular winter visitors are three species which are listed on Annex I of the European Birds Directive, i.e. Bewick's Swan (4, becoming scarcer since 1987), Whooper Swan (10) and Golden Plover (56), as well as Wigeon (310), Teal (263), Mallard (181), Shoveler (17), Pochard (82), Tufted Duck (52), Coot (42), Lapwing (67) and Curlew (29). In summer, the site attracts a good diversity of breeding waterfowl. Species which breed, probably regularly, at the site include Shoveler, Gadwall and Pochard, while Black-necked Grebe and Pintail may breed sporadically - all of these are listed as rare in the Red Data Book. Lapwing and Snipe are regular breeders, and sometimes also Redshank and Ringed Plover.

Lough Funshinagh is one of the sites used by the River Suck flock of Greenland White-fronted Geese. Nowadays, however, it is not regularly used, possibly because some of the former feeding areas have become overgrown with scrub.

The Common Frog, a species listed in the Red Data Book as internationally important, breeds within the site. Although widespread and common in Ireland, this species is considered to be vulnerable in Europe. It's habitat is threatened by drainage of wetlands and water pollution.

The major threats to lakes arise from drainage and from agricultural intensification, in that the application of fertiliser can lead to eutrophication of the lake and a general loss of species diversity. The lake is mesotrophic now and it has always been

described as full of vegetation. It may be that it has not been enriched significantly by agricultural run-off. There are localised eutrophic patches around the shores where grazing animals congregate, but the lake water is strikingly clear. There have been attempts at drainage in the past, most recently in 1990. As yet, this has resulted in little structural damage to the site.

Lough Funshinagh is of major ecological importance, both from a vegetational and ornithological viewpoint. Turloughs are listed as priority habitat on Annex I of the European Habitats Directive. Lough Funshinagh is a unique and atypical example of this habitat, and has a particular value in being relatively unmodified by grazing and modern agriculture.

SITE SYNOPSIS

SITE NAME : FOUR ROADS TURLOUGH (SAC)

SITE CODE : 001637

Four Roads Turlough is located south-west of Four Roads village, 2.5 km from the River Suck. It lies below a low scarp of limestone hills and is an open, shallow basin without permanent standing water which seems to flood predictably and dry out early.

The site has a very uniform vegetation structure with the eastern part predominantly of grass, mostly Creeping Bent (*Agrostis stolonifera*), and the western of sedges, mostly Common Sedge (*Carex nigra*). There are a few low-lying places where Bottle Sedge (*Carex rostrata*) and Bogbean (*Menyanthes trifoliata*) grow and a few pools with Thread-leaved Water-crowfoot (*Ranunculus trichophyllus*), Lesser Water-plantain (*Baldellia ranunculoides*) and Lesser Marshwort (*Apium inundatum*). No oligotrophic fen vegetation occurs and only a few tufts of Black Bog-rush (*Schoenus nigricans*) are found. Peat is a significant presence throughout and there are occasional tree stumps, suggesting that the floods recede quite early in some years, and earlier than in most turloughs.

The site is undrained, despite a few attempts around the margins, and is fertilized in the eastern half. It is intensively grazed and in some areas there is poaching of the peaty soil.

Four Roads Turlough has long been recognised as an area of ornithological importance for the large numbers of waterfowl that use it in winter, and it is part of a Wildfowl Sanctuary. As with most turloughs, bird numbers are highly variable. There are times when the whole of the River Suck population of Greenland Whitefronted Geese (500) are on the site, along with 2,600 wildfowl and 8,000 waders. At other times bird numbers are in the hundreds. Except where indicated, the following numbers are the average of 11 counts over 3 seasons, 1984/85-1986/87: Wigeon (983), Teal (870), Shoveler (81), Bewick's Swan (21), Greenland White-fronted Goose (177, 1 count in 1987/88), Mallard (235), Pintail (40), Golden Plover (317), Lapwing (473) and Curlew (103). A single count on 17th January 1988 emphasises the importance of assessing bird populations of turloughs based on as large a series of counts as possible - present on that date were 3,600 Wigeon, 2,500 Teal, 177 Greenland White-fronted Geese and 2,900 Lapwing. The site is also used by Whooper Swan (recent count of 60) and breeding Lapwing, Redshank and Snipe.

Several of these species are listed in the Red Data Book and on Annex I of the EU Birds Directive.

The uniformity of the turlough basin and the fertilization of its eastern half means that there is little interest in the vegetation. However, turloughs are listed, with priority status, on Annex I of the EU Habitats Directive and, as such, are of considerable conservation significance. The site is very important as a refuge or feeding area for wildfowl and waders, some of which occur in numbers of national importance.

SITE SYNOPSIS

SITE NAME : SUCK RIVER CALLOWS (SPA)

SITE CODE : 004097

The River Suck Callows comprise a long, sinuous area of semi-natural lowland wet grassland, which floods extensively each winter along the River Suck between Castlecoote in the north and Shannonbridge in the south, and passing through Ballinasloe.

The River Suck is the largest tributary of the River Shannon. The site follows the river from Castlecoote, near Fuerty to its confluence with the River Shannon, a distance of approximately 70 km of river course. The main habitat is grassland, improved to varying extents, that is seasonally flooded. The less-improved areas are species-rich. Here the vegetation consists of Common Sedge (*Carex nigra*), Creeping Bent (*Agrostis stolonifera*), Brown Sedge (*Carex disticha*), Marsh Foxtail (*Alopecurus geniculatus*), Reed Canary-grass (*Phalaris arundinacea*), Creeping Buttercup (*Ranunculus repens*), Jointed Rush (*Juncus articulatus*), Common Spikerush (*Eleocharis palustris*) and Floating Sweet-grass (*Glyceria fluitans*). Many of these species are important food plants for the wintering wildfowl which also forage on the improved grasslands within the site. A large area of flooded fen with Black Bog-rush (*Schoenus nigricans*) and Common Reed (*Phragmites australis*) occurs to the north of Derrycahill Bridge. Small patches of Common Club-rush (*Scirpus lacustris*) occur in shallows along the river margin. The grassland is used mainly for pasture but some is also used for silage or occasionally hay-making. The site adjoins several raised bogs and cutover bogs, and there are turloughs in the vicinity.

The Suck River Callows is an important site for wintering waterfowl. Of particular note is the internationally important Greenland White-fronted Goose flock that is based along the Suck. The birds congregate mainly in the middle reaches of the river. A separate sub-flock is centred at Glenamaddy turlough. The average maximum winter count for the period 1988/89 to 1993/94 was 386 birds. In recent years, the only complete count of waterfowl for the site was in January 2002. Three species had populations of national importance, i.e. Whooper Swan (124), Wigeon (1,203) and Lapwing (3,640). Other species present included Mute Swan (90), Teal (325), Pintail (5), Curlew (67) and Black-headed Gull (240). Golden Plover, a species that is listed on Annex I of the E.U. Birds Directive, occurs at times. The good quality riverine and grassland habitats are also home to populations of Otter and Irish Hare, and Brown Trout occur in the river.

Arterial drainage in the past has already reduced the area of naturally flooded

grasslands, and drainage and land improvement remain the principal threat to this site. The intensification of agriculture in recent years, with earlier mowing and the replacement of hay with silage, is likely to have caused the decline and eventual absence of breeding Corncrake. Wildfowling causes some disturbance, though there is a Wildfowl Sanctuary at Muckanagh, north of Ballyforan.

This site is of considerable ornithological importance on account of the Greenland White-fronted Goose population which is of international significance and which is one of the largest in the country outside of the Wexford Slob. Despite poor survey data for recent years, it is known to support nationally important populations of at least three species, i.e. Whooper Swan, Wigeon and Lapwing. Detailed survey is likely to show that other species also occur in substantial numbers. Of note is that two of the species which occur regularly, Greenland White-fronted Goose and Whooper Swan, are listed on Annex I of the E. U. Birds Directive.

SITE SYNOPSIS

SITE NAME: LOUGH REE (SPA)

SITE CODE: 004064

Situated on the River Shannon between Lanesborough and Athlone, Lough Ree is the third largest lake in the Republic of Ireland. It lies in an ice-deepened depression in Carboniferous Limestone. Some of its features (including the islands) are based on glacial drift. The main inflowing rivers are the Shannon, Inny and Hind, and the main outflowing river is the Shannon. The greater part of Lough Ree is less than 10 m in depth, but there are six deep troughs running from north to south, reaching a maximum depth of about 36 m just west of Inchmore. The lake has a very long, indented shoreline and hence has many sheltered bays. It also has a good scattering of islands, most of which are included in the site. The lake is classified as a mesotrophic system, but the size of the system means that a range of conditions prevail depending on, for example, rock type. This gives rise to local variations in nutrient status and pH, which in turn result in variations in the phytoplankton and macrophyte flora. In the most recent assessment of water quality a reduced planktonic growth was noted, which may be due to the spread of the Zebra Mussel (*Dreissena polymorpha*), which feeds on phytoplankton.

The waters of Lough Ree tend to be strongly peat-stained, restricting macrophytes to depths of less than 2 m. The aquatic flora includes such species as Intermediate Bladderwort (*Utricularia intermedia*), pondweeds (*Potamogeton* spp.), Quillwort (*Isoetes lacustris*), stoneworts (*Chara* spp., including *C. pedunculata*) and Arrowhead (*Sagittaria sagittifolia*). Beds of Common Reed (*Phragmites australis*) are an extensive habitat in a number of the more sheltered places around the lake; monodominant stands of Common Club-rush (*Scirpus lacustris*), Slender Sedge (*Carex lasiocarpa*) and Saw Sedge (*Cladium mariscus*) also occur as swamps in suitable places. Some of these grade into species-rich calcareous fen or freshwater marsh. Lowland wet grassland, some of which floods in winter, occurs frequently around the shore. Dry, broad-leaved, semi-natural woodland occurs in several places around the lake, and on some of the islands within the site, notably on Hare Island. Pockets of wet woodland also occur around the lake, most of which are dominated by willows (*Salix* spp.), Alder (*Alnus glutinosa*) and Downy Birch (*Betula pubescens*).

Lough Ree is one of the most important Midland sites for wintering waterfowl, with nationally important populations of Wigeon (1,475), Teal (912), Pintail (35), Tufted Duck (661), Goldeneye (137), Golden Plover (2,035) and Lapwing (3,870) occurring – all figures are average peaks for the 5 seasons 1995/96-1999/00. Regionally important numbers of Whooper Swan (89) and Greenland White-fronted Goose (92) are found feeding in the vicinity of the lake, as are Golden Plover, Lapwing and, to some extent, Wigeon and Teal. Other species which occur in winter include Cormorant (64), Mallard (675), Coot (250), Shoveler (40), Curlew (167) and Great Crested Grebe (23), as well as the resident Little Grebe (34) and Mute Swan (93).

The site supports a nationally important population of Common Tern (90 pairs in 1990). It is a traditional breeding site for Black-headed Gull and whilst a full survey has not been carried out in recent years, substantial numbers of nesting birds were present on at least one island in 2003. Lesser Black-backed Gull and Common Gull have bred in the past and may still breed. Lough Ree is an important site for breeding duck and grebes, with Tufted Duck (265 individuals in late May 1995) and Great Crested Grebe (89 individuals in late May 1995) having populations of national importance. Of particular note is that Lough Ree is one of the two main sites in the country for breeding Common Scoter, a Red Data Book species. The most recent full census of the site for the species (in 1999) gave a population of *c.* 32 pairs. The woodland around the lake is a stronghold for Garden Warbler and this scarce species probably occurs on some of the islands within the site.

Otter, a species listed on Annex II of the E.U. Habitats Directive occurs frequently within the site. The endangered, Red Data Book fish species, Pollan (*Coregonus autumnalis pollan*) is recorded from Lough Ree, one of only four sites (L. Neagh, L. Erne, L. Ree and L. Derg) in which it occurs. The shrimp, *Mysis relicta*, occurs in the lake and is a relic of the glacial period in Ireland.

Whilst recently classified as a mesotrophic system, Lough Ree had been moderately eutrophic in the mid-1990s. It is vulnerable to artificial enrichment of the waters by agricultural and domestic waste. The recent reduction in phytoplanktonic growth has coincided with the invasion of the Shannon system by the Zebra Mussel; however, in the long-term this invasive bivalve may threaten the ecology of the lake. Recreational activities, especially boating, presently cause some disturbance to the birds and an increase in such activities would be of concern. Developments above the lakeshore could effect feeding grounds of some of the wintering waterfowl and nesting habitat for duck species.

Lough Ree is of high ornithological importance for both wintering and breeding birds. It supports nationally important populations of seven wintering waterfowl species, as well as other important species including Whooper Swan and Greenland Whitefronted Goose (both of which are listed on Annex I of E.U. Birds Directive). The site has a range of breeding waterfowl, notably nationally important populations of Common Scoter, Great Crested Grebe and Tufted Duck. It also has a colony of Common Tern, another species listed on Annex I of the E.U. Birds Directive.

SITE NAME: FOUR ROADS TULOUGH (SPA)

SITE CODE: 004140

Four Roads Turlough (also known as Cloonlaughnan Turlough) is located 6 km south of Athleague, Co. Roscommon and just over 2 km east of the River Suck. It lies below a low scarp of limestone hills and is an open, shallow basin without permanent standing water which floods regularly and dries out early.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Greenland White-fronted Goose and Golden Plover. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Four Roads Turlough is an important site for wintering waterfowl. In most winters it is visited by the nationally important River Suck population of Greenland White-fronted Goose (93 – four year mean peak for four of the five winters between 1994/95 and 1998/99). The site also supports a nationally important population of Golden Plover (3,717) – all figures are mean peaks for three of the five winters between 1995/96 and 1999/2000). Other species which occur regularly include Wigeon (307), Teal (657), Mallard (84), Shoveler (28) and Lapwing (1,521). It is also occasionally used by Whooper Swan. Breeding species include Lapwing and Snipe. Much of the site is a Wildfowl Sanctuary.

Four Roads Turlough SPA is of ornithological importance because it is regularly utilised by the nationally important River Suck Greenland White-fronted Goose flock. A nationally important population of Golden Plover also occurs at the site. The regular occurrence of these two species, which are listed on Annex I of the E.U. Birds Directive, is of note.

SITE NAME: LOUGH CROAN TURLOUGH (SPA)

SITE CODE: 004139

Situated approximately 6 km east of the River Suck in Co. Roscommon, Lough Croan Turlough is a linear wetland, aligned north-west/south-east, which lies in a flattish area of glacial till. It is split into two main parts - the east functions as a typical turlough, with a wet, reedy centre, while the west is a fen, floating in places, which also floods in winter.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Greenland White-fronted Goose, Shoveler and Golden Plover. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Lough Croan supports nationally important numbers of Greenland White-fronted Goose (164) - mean peak counts for the period 1994/95 to 1998/99. The geese that utilise this site are part of an internationally important flock that are based along the River Suck. The site also supports nationally important populations of Shoveler (157), and Golden Plover (2,025) - figures are mean peak counts for four of the five winters between

1995/96 and 1999/2000. The Shoveler population is one of the largest in the country. Other species that occur at the site include Whooper Swan (15), Wigeon (392), Gadwall (7), Teal (330), Mallard (56), Pintail (22), Lapwing (661), Curlew (93) and Black-headed Gull (59). Some of these species use the turlough both as a feeding and roost site.

Lough Croan is also a site for breeding birds - Pochard and Shoveler, which are both rare breeding species in Ireland, have bred at the site in recent years and it is considered that they probably attempt to nest every year. Mute Swan also breeds and Black-headed Gull has bred in the past.

Lough Croan Turlough SPA is of high ornithological importance, primarily for it's Greenland White-fronted Goose population, but also because of it's nationally important Shoveler and Golden Plover populations. The presence of Greenland White-fronted Goose, Golden Plover and Whooper Swan is of particular note as these are listed on Annex I of the E.U. Birds Directive. Part of the site is a Wildfowl Sanctuary.

*For inspection purposes only.
Consent of copyright owner required for any other use.*